

**APPENDIX A**

**COORDINATION LETTERS AND RESPONSES**

**2010 REPRESENTATIVE COORDINATION LETTER AND RESPONSES**

**APPENDIX A. 2010 REPRESENTATIVE COORDINATION LETTER AND RESPONSES**

<b>DATE</b>	<b>FROM</b>	<b>TO</b>
July 14, 2010	Example Coordination Letter from WFF	
July 26, 2010	U.S. Army Corps of Engineers	Wallops Flight Facility
July 22, 2010	Virginia Marine Resources Commission	Wallops Flight Facility
August 3, 2010	Virginia Department of Environmental Quality	Wallops Flight Facility
August 11, 2010	Navy Surface Combat System Center	Wallops Flight Facility
August 11, 2010	U.S. Environmental Protection Agency	Wallops Flight Facility
August 11, 2010	Virginia Department of Conservation and Recreation	Wallops Flight Facility
August 24, 2010	Virginia Department of Environmental Quality	Wallops Flight Facility
September 7, 2010	Virginia Department of Game and Inland Fisheries	Wallops Flight Facility

National Aeronautics and  
Space Administration

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



Reply to Attn of: 250.W

July 14, 2010

Mr. Robert Cole  
Environmental Scientist  
U.S. Army Corps of Engineers, Eastern Shore Field Office  
22545 Center Parkway  
Accomack, VA, 23301-1330

Dear Mr. Cole:

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) is preparing an Environmental Assessment (EA) to analyze potential impacts associated with the construction and operation of an Unmanned Aerial Systems (UAS) airstrip at the north end of Wallops Island in Accomack County, Virginia (Enclosure 1). The airstrip at north Wallops Island is needed to support WFF's ongoing and future UAS test research. The existing airstrip located at the south end of Wallops Island experiences severe cross winds and wash over during storm events. Additionally, mandatory safety constraints from increased rocket launch activities at the nearby Mid-Atlantic Regional Spaceport are anticipated to further reduce UAS research opportunities.

The proposed UAS airstrip would be constructed of asphalt and measure approximately 914 meters (3,000 feet long [2,500 feet plus an additional 500 feet clear zone] by 18 meters (60 feet) wide. The airstrip would be elevated approximately 1 meter (3 feet) above the existing ground surface. Two asphalt pads would also be constructed adjacent to the airstrip for staging aircraft and support vehicles during flight operations. A clear line of sight for UAS operators is necessary; therefore, vegetation alongside the length (up to 30 meters [100 feet] on each side) of the proposed airstrip would be cleared and maintained. Beyond the ends of the airstrip, the vegetation height would be maintained in order to provide the necessary line of sight for UAS operators. Crushed gravel would be used to improve the existing dirt access road to provide service to the airstrip. Infrastructure improvements to provide electrical and telecommunication service would be implemented; however, it is anticipated that most UAS operators would use small portable generators. The total affected area would be approximately 2 hectares (5 acres). The proposed airstrip would likely be constructed in several phases to reach the dimensions described above.

UAS operations would be conducted year round during NASA's normal Air Traffic Control tower hours (7 AM to 5 PM). Night operations would only take place under special

circumstances (e.g., hurricane monitoring). The UAS aircraft would operate within the existing NASA controlled Restricted Airspace Areas (R-6604A/B) and within the Virginia Capes Operating Area (VACAPES OPREA), the Navy's offshore training area. Aside from takeoff and landing, the minimum operating altitude would be 152 meters (500 feet). The largest UAS that would be authorized to operate from the proposed airstrip is the Viking 400. The Viking 400 has a 6 meter (20 foot) wingspan, is 4.5 meters (14.7 feet) in length, and would have a maximum weight of 240 kilograms (530 pounds). UAS would not operate over Chincoteague Island, Assateague Island National Park, or over any populated areas.

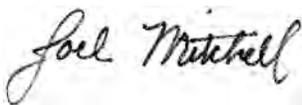
Letters describing the scope of the original proposal were sent June 2009. Since then, the scope of the proposal has changed. Enclosure 2 provides the approximate dimensions of the airstrip and its proximity to wetlands, a bald eagle nest, and a cultural resources investigation site.

As we are reinitiating the NEPA process, we request your participation as a Cooperating Agency in the preparation of the EA. As the USACE possesses both regulatory authority and specialized expertise pertaining to the proposed action, we feel that your agency would be a valuable member of our project team. As a Cooperating Agency, we request the USACE participate in various portions of the EA development as required. Specifically, we ask that you provide technical expertise, document review, and occasional meeting attendance throughout the NEPA process. A more detailed list of Cooperating Agency expectations will be provided if you accept our request.

Finally, as part of our ongoing efforts to keep the public abreast of proposed WFF activities, we plan to hold an information meeting at the WFF Visitor Center on the evening of Monday, August 2, 2010. Additional details regarding the meeting will be included in a forthcoming press release.

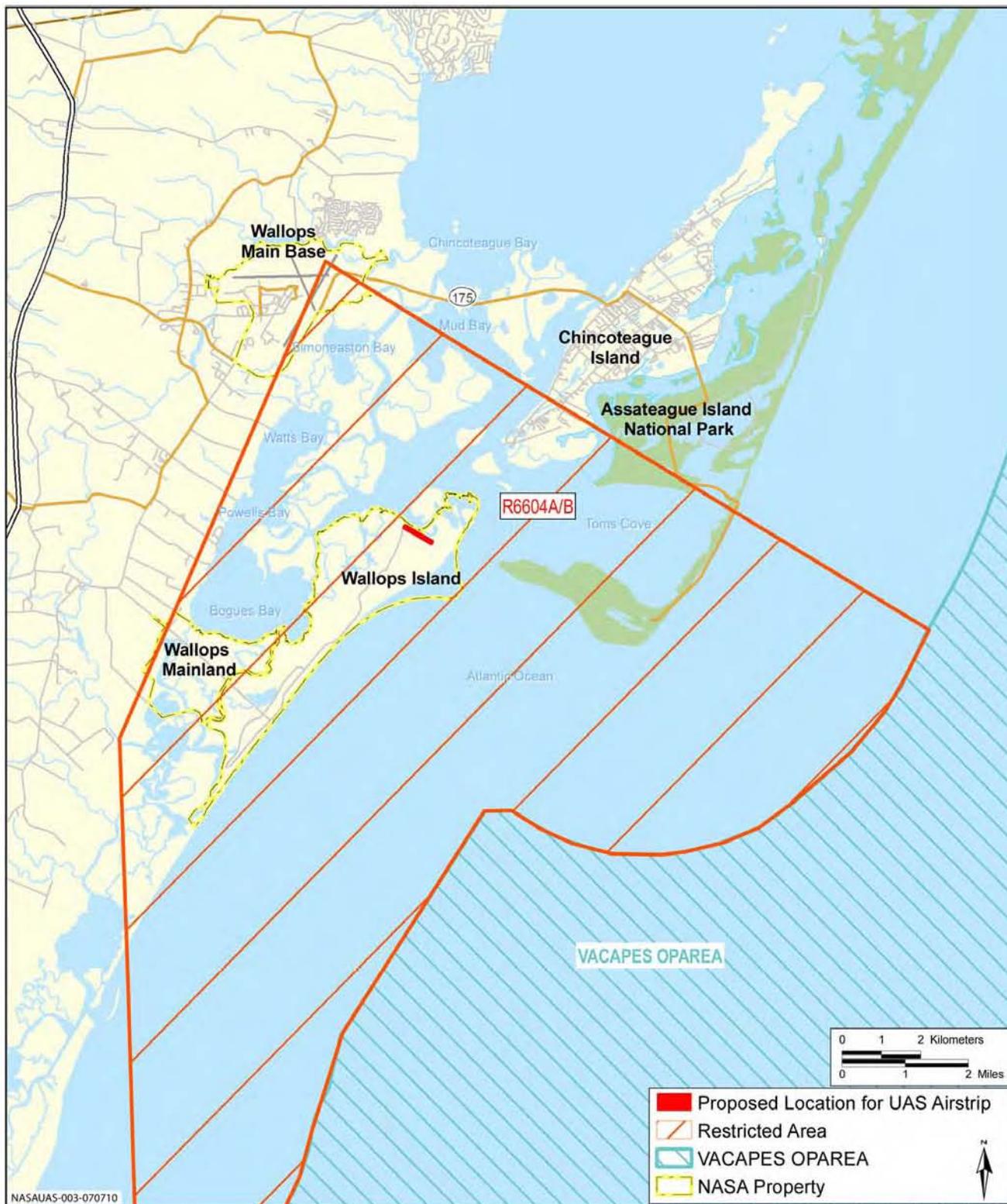
Thank you for your consideration of our request. We look forward to continuing our cooperative relationship with USACE as we work together to enable the WFF mission while also considering the unique environment within which we work. Please contact me at (757) 823-1127 or Mr. Josh Bundick at (757) 824-2319 if you have any questions or require any additional information.

Sincerely,



Joel T. Mitchell  
Natural Resources Manager

2 Enclosures



**Enclosure 1: Location of Proposed UAS Airstrip on NASA’s Wallops Island**



**Enclosure 2: Proximity of Proposed UAS Airstrip to Various Resources**



**DEPARTMENT OF THE ARMY**  
NORFOLK DISTRICT, CORPS OF ENGINEERS  
FORT NORFOLK, 803 FRONT STREET  
NORFOLK, VIRGINIA 23510-1096

REPLY TO  
ATTENTION OF:

July 26, 2010

Eastern Virginia Regulatory Section  
Unmanned Aerial Systems (UAS) Airstrip

Goddard Space Flight Center  
Joel T. Mitchell  
Natural Resources Manager  
Wallops Flight Facility  
Wallop Island, VA 23337-5099

Dear Mr. Mitchell,

The Norfolk District Corps of Engineers will be a cooperating agency in the preparation of documents for the Unmanned Aerial Systems (UAS) Airstrip, in accordance with the National Environmental Policy Act. Mr. Robert Cole will be the contact for the Norfolk District. Please forward to him any requests for participation, notices of meetings, requests for information, and written material to review. He may be contacted at 757-787-7567; by e-mail at "robert.h.cole@usace.army.mil"; by mail at Norfolk District Corps of Engineers, Eastern Shore Field Office, 22545 Center Parkway, Accomac, VA 23301-1330."

Sincerely,

*Robert H. Cole*  
*for*

Audrey L. Cotnoir  
Acting Chief, Eastern Virginia Regulatory Section



# COMMONWEALTH of VIRGINIA

*Marine Resources Commission  
2600 Washington Avenue  
Third Floor  
Newport News, Virginia 23607*

Douglas W. Domenech  
Secretary of Natural Resources

Steven G. Bowman  
Commissioner

July 22, 2010

Mr. Joel T. Mitchell  
Wallops Flight Facility, Natural Resources Manager  
c/o National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility (250.W)  
Wallops Island, Virginia 23337

“Unmanned Airstrip”

Dear Mr. Mitchell:

You have inquired regarding the construction of a 2,500-foot long by 60-foot wide asphalt airstrip on the north end of Wallops Island in Accomack County. The airstrip will be used for unmanned aircraft takeoffs and landings.

The Marine Resources Commission requires a permit for any activities that encroach upon or over, or take use of materials from the beds of the bays, ocean, rivers and streams, or creeks which are the property of the Commonwealth.

Based upon my review of the two enclosures (site maps) it would appear that your proposed landing strip will not fall within the Commission's jurisdiction, therefore, no authorization would be required from the Marine Resources Commission. If however any portion of your proposed project encroaches channelward of mean low water a permit would be required.

For your information it would appear a wetlands permit will be required from Accomack County.

If I may be of further assistance, please do not hesitate to contact me at (757) 414-0710.

Sincerely,

A handwritten signature in black ink, appearing to read "G. Badger, III", written over a horizontal line.

George H. Badger, III  
Environmental Engineer

*An Agency of the Natural Resources Secretariat*

[www.mrc.virginia.gov](http://www.mrc.virginia.gov)

Telephone (757) 247-2200 (757) 247-2292 V/TDD Information and Emergency Hotline 1-800-541-4646 V/TDD



## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

TDD (804) 698-4021

www.deq.virginia.gov

Douglas W. Domenech  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

August 3, 2010

Mr. Joshua A. Bundick  
NEPA Program Manager  
NASA Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, Virginia 23337-5099

Received  
8/4/10 JAB

RE: Proposed Unmanned Aerial Systems Airstrip, Request for Scoping Comments for the Preparation of an Environmental Assessment

Dear Mr. Bundick:

This is in response to your July 14, 2010 letter (received July 16, 2010) announcing the preparation of an Environmental Assessment (EA) for the proposed Unmanned Aerial Systems (UAS) airstrip at the Wallops Flight Facility (WFF) on Wallops Island, and soliciting comments on the scope of the document. A request for scoping comments was originally solicited by the National Aeronautics and Space Administration (NASA) in June 2009. However, the scope of the project has changed.

### PROJECT DESCRIPTION

According to the letter, the proposed airstrip at north Wallops Island is needed to support WFF's ongoing and future UAS test research. The existing airstrip located at the south end of Wallops Island experiences severe cross winds and wash over during storm events. Additionally, mandatory safety constraints from increased rocket launch activities at the nearby Mid-Atlantic Regional Spaceport are anticipated to further reduce UAS research opportunities. The proposed UAS airstrip would be constructed of asphalt and measure approximately 3,000 feet long by 60 feet wide. Two asphalt pads would be constructed adjacent to the airstrip for staging aircraft and support vehicles during flight operations. Vegetation alongside the length of the airstrip would be cleared and maintained. Crushed gravel would be used to improve the existing dirt access road. Infrastructure improvements to provide electrical and telecommunication service would be implemented.

## **ENVIRONMENTAL REVIEW**

The roles of the Virginia Department of Environmental Quality (DEQ) in relation to the project under consideration are as follows. First, DEQ's Office of Environmental Impact Review (OEIR) will coordinate Virginia's review of the EA prepared pursuant to the National Environmental Policy Act (NEPA) and comment to NASA on behalf of the Commonwealth. A similar review process will pertain to the Federal Consistency Determination (FCD) that must be provided pursuant to the Coastal Zone Management Act (CZMA). If the FCD is included as part of the EA, there can be a single review.

## **FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT**

Pursuant to the Coastal Zone Management Act of 1972, as amended, federal activities affecting Virginia's coastal resources or coastal uses must be consistent with the Virginia Coastal Resources Management Program (VCP) (see section 307(c)(1) of the Act and the *Federal Consistency Regulations*, 15 CFR Part 930, sub-part C). NASA must provide a consistency determination which involves an analysis of the activities in light of the enforceable policies of the VCP (first enclosure), and a commitment to comply with the enforceable policies. In addition, we invite your attention to the advisory policies of the VCP (second enclosure). The FCD may be provided as part of the NEPA documentation or independently, depending on your agency's preference; we recommend, in the interests of efficiency for all concerned, that it be provided together with the NEPA document and that 60 days be allowed for review in keeping with the *Federal Consistency Regulations* (see section 930.41(a)). Section 930.39 of the *Federal Consistency Regulations* and Virginia's *Federal Consistency Information Package* at <http://www.deq.virginia.gov/eir/federal.html> give content requirements for the consistency determination.

## **PROJECT SCOPING**

While this Office does not participate in scoping efforts beyond the advice given herein, other agencies are free to provide scoping comments concerning the preparation of the NEPA document for the proposed project. Therefore, we are sharing your letter with selected state and local Virginia agencies, which are likely to include the following (note: starred (\*) agencies administer one or more of the Enforceable Policies of the Virginia Coastal Resources Management Program; see "Federal Consistency..." below):

- Department of Environmental Quality:
  - Office of Environmental Impact Review
  - Tidewater Regional Office\*
  - Air Division\*
  - Waste Division
- Department of Game and Inland Fisheries\*
- Department of Conservation and Recreation:
  - Division of Soil and Water Conservation\*
  - Division of Planning and Recreation Resources

Mr. Joshua A. Bundick  
Proposed Unmanned Aerial Systems Airstrip

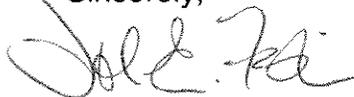
- Marine Resources Commission\*
- Department of Agriculture and Consumer Services
- Department of Health
- Department of Mines, Minerals, and Energy
- Department of Historic Resources
- Department of Aviation
- Accomack-Northampton Planning District Commission
- Accomack County.

In order to ensure an effective coordinated review of the EA and FCD, we will require 18 copies of the document when it is published. The submission may include 4 hard copies and 14 CDs or 4 hard copies and an electronic copy available for download at a NASA web or ftp site. The document should include a U.S. Geological Survey topographic map as part of its information. We recommend, as well, that project details unfamiliar to people outside NASA be adequately described.

If you have questions about the environmental review process or the federal consistency review process, please feel free to call me at (804) 698-4325 or John Fisher of this Office at (804) 698-4339.

I hope this information is helpful to you.

Sincerely,



For Ellie L. Irons, Manager  
Office of Environmental Impact Review

#### Attachments

Ec: Michelle Hollis, DEQ-TRO  
Kotur S. Narasimhan, DEQ-Air  
Paul Kohler, DEQ-Waste  
Amy Ewing, DGIF  
Robbie Rhur, DCR  
Tony Watkinson, MRC  
Barry Matthews, VDH  
David Spears, DMME  
Roger Kirchen, DHR  
Keith Tignor, VDACS  
Rusty Harrington, DoAv  
Paul Berge, Accomack-Northampton PDC  
Steven Miner, Accomack County



## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF ENVIRONMENTAL QUALITY

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Douglas W. Domenech  
Secretary of Natural Resources

David K. Paylor  
Director

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1-800-592-5482

### Attachment 1

### **Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program (VCP)**

- a. **Fisheries Management** - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code 28.2-200 to 28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code 29.1-100 to 29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code 3.1-249.59 to 3.1-249.62.

- b. **Subaqueous Lands Management** - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code 28.2-1200 to 28.2-1213.
- c. **Wetlands Management** - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.
- (1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code 28.2-1301 through 28.2-1320.
  - (2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

Attachment 1 continued

Page 2

- d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code 28.2-1400 through 28.2-1420.
- e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code 10.1-560 et seq.  
  
(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.
- f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code 62.1-44.15. Point source pollution control is accomplished through the implementation of:
  - (1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.
  - (2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.
- g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code 32.1-164 through 32.1-165).
- h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code 10-1.1300 through §10.1-1320).
- (i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.

## Attachment 2

### **Advisory Policies for Geographic Areas of Particular Concern**

- a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:
  - a) Wetlands
  - b) Aquatic Spawning, Nursery, and Feeding Grounds
  - c) Coastal Primary Sand Dunes
  - d) Barrier Islands
  - e) Significant Wildlife Habitat Areas
  - f) Public Recreation Areas
  - g) Sand and Gravel Resources
  - h) Underwater Historic Sites.
  
- b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:
  - i) Highly Erodible Areas
  - ii) Coastal High Hazard Areas, including flood plains.
  
- c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:
  - i) Commercial Ports
  - ii) Commercial Fishing Piers
  - iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged. Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

- i) water access dependent activities;
- ii) activities significantly enhanced by the waterfront location and complementary to other existing and/or planned activities in a given waterfront area.

### Advisory Policies for Shorefront Access Planning and Protection

- a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.
- b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.
- c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.
- d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.
- e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.
- f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.



DEPARTMENT OF THE NAVY  
SURFACE COMBAT SYSTEMS CENTER  
30 BATTLE GROUP WAY  
WALLOPS ISLAND, VIRGINIA 23337-5000

5090  
Ser X31/392

11 AUG 2010

NASA Goddard Space Flight Center  
Wallops Flight Facility  
Attn: 250.W, Joel T. Mitchell  
Wallops Island, Virginia 23337

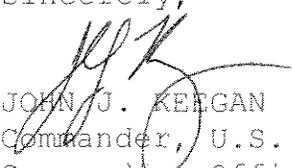
Dear Mr. Mitchell:

In response to your letter of July 14, 2010, Surface Combat Systems Center (SCSC) feels that the smaller runway as illustrated will represent less impact and hence is more desirable than earlier plans. There may still be restrictions due to the presence of piping plovers and bald eagles.

However, we do have concerns over RF avoidance, specifically current restrictions placed on SCSC during UAS/UAV operations for the SPS-49 at V-10 and V-24. Adding additional capability for UAVs at Wallops Island and not knowing the frequencies for which they operate could potentially limit use of other radars during these operations. Foreseen scheduling conflicts will result due to airspace requirements for UAV operations.

My point of contact is Marilyn Ailes at 757-824-2082 or Marilyn.Ailes@navy.mil.

Sincerely,

  
JOHN J. KEEGAN  
Commander, U.S. Navy  
Commanding Officer

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029



August 11, 2010

Joel Mitchell  
Natural Resources Manager  
National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

Re: Scoping Environmental Assessment (EA) Unmanned Aerial Systems (UAS) Airstrip,  
Wallops Island, Accomack County, Virginia, July 14, 2010

Dear Mr. Mitchell:

In accordance with the National Environmental Policy Act (NEPA) of 1969, the U.S. Environmental Protection Agency (EPA) is responding to your request for comments on the above referenced project for the Wallops Flight Facility (WFF). Due to the limited amount of information EPA currently has at this time, we are unable to provide a comprehensive set of comments. We have included the following comments for your consideration in the development of the Environmental Assessment (EA).

The EA should clearly state the purpose and requirements of unmanned flight launching at WFF and the range of alternatives (including location and sizing) of a facility. Information should be provided on the number of flights or launches proposed for the airstrip, size of aircraft that will be utilizing the airstrip, in addition to the total flight/launch capabilities. It would also be helpful to put this information in the context of current flight and launch activities that are occurring at Wallops Flight Facility. The scoping letter described that clearing adjacent to the airstrip and beyond the ends of the airstrip would be necessary. A description of clearing and height restrictions should be included. The relationship the proposed project has to hazard arcs or zones and safety constraints should also be discussed. The EA should include discussion of possible impacts associated with access to the proposed site, any upgrades to existing roads or associated structures that may be needed, as well as impacts resulting from staging pads.

During the EA process, it is important to conduct a thorough alternatives analysis. Alternate airstrip lengths should be considered in the EA. Future plans or possible need to expand the airstrip at a later date should be clearly stated and evaluated. Airstrip locations further on inland on the Mainland, Main Base or other parcels should be evaluated. WFF is located on a barrier island, which is a sensitive and unstable ecosystem that is very vulnerable to



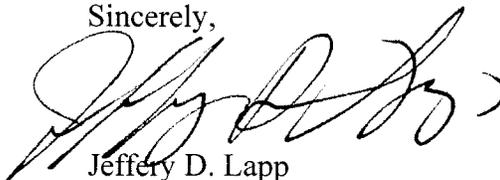
sea-level rise and intense storms. It may be prudent to consider this dynamic nature when looking at this and future development projects.

As noted in the scoping letter received by EPA, there are many wetland systems on Wallops Island that may be in proximity to the proposed airstrip. Avoidance and minimization of impacts to aquatic resources should be fully considered, as required under the CWA Section 404 (b) (1) Guidelines. Bald eagle nests are located near the proposed UAS airstrip. While bald eagles are no longer federally listed as threatened or endangered species, they are protected by the Bald and Golden Eagle Protection Act. EPA suggests coordination with U.S. Fish and Wildlife Service for addressing the bald eagle nests as well as other potential issues regarding threatened and endangered species.

An indirect and cumulative impact analysis for the proposed action should be included in the EA. Cumulative impacts can result from individually minor, but collectively significant, action taking place over a period of time. The Council on Environmental Quality in 40 CFR 1508.7 defines cumulative impacts as "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable action." A summary of other NASA projects and locations, any neighboring projects unrelated to NASA, sufficient project background and potential impacts to resources affected by the UAS, and the status of proposed projects should be included in the cumulative impacts analysis. If possible a tabulation of all proposed projects on Wallops Island should be provided to the resource agencies. It would be helpful if clarification was provided on which projects have funding, authorization or Congressional backing. EPA is concerned that some or many of these projects may be connected actions and warrant additional, more comprehensive study. The cumulative adverse environmental impact of these actions needs to be thoroughly evaluated. EPA recommends use of the document "Consideration of Cumulative Impacts in EPA Review of NEPA Documents" (EPA 1999) for a through explanation of the requirements of a cumulative impacts analysis.

EPA recommends and requests that a meeting be organized to review the information gathered for the study of alternatives for this project, with participation of US Army Corps and US Fish and Wildlife Service. EPA would appreciate if NASA would also provide an update on other planned or ongoing projects at WFF, as well as potential mitigation. Thank you for including EPA in your coordination efforts regarding this project and allowing EPA to provide comments to be incorporated into the EA. If you have questions regarding these comments, please feel free to contact Ms. Barbara Rudnick, NEPA Team Leader at 215-814-3322 or the staff contact for this project, Ms. Alaina DeGeorgio at 215-814-2741.

Sincerely,



Jeffery D. Lapp  
Associate Director  
Office of Environmental Programs



cc. Keith Lockwood, USACE  
Cindy Schulz, USFWS



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Douglas W. Domenech  
Secretary of Natural Resources



David A. Johnson  
Director

**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

Division of Natural Heritage  
217 Governor Street  
Richmond, Virginia 23219-2010  
(804) 786-7951

August 11, 2010

Joel Mitchell  
NASA, Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

Re: NASA, Goddard Space Flight Center Wallops Flight Facility

Dear Mr. Mitchell:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the North Wallops Island Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. North Wallops Island Conservation Site has been given a biodiversity significance ranking of B2, which represents a site of very high significance. The rare plants and communities of concern associated with the site are:

Maritime Dune Woodland		G1G2/SNR/NL/NL
Seaside plantain	Plantago maritime var.juncoides	G5T5/S1/NL/NL
Big-head rush	Juncus megacephalus	G4G5/S2/NL/NL
Southern beach spurge	Chamaesyce bombensis	G4G5/S2/NL/NL

The Maritime Dune Woodland is a tall, deciduous, maritime shrubland or scrub forest of the mid-Atlantic coast, although physiognomy can vary dramatically, ranging from open woodland to stunted forest to dense nearly impenetrable thicket. Individual trees tend to be wind-pruned and multi-stemmed. It generally occurs on the lee side of sand dunes along the coast and is subject to salt spray and winds. The substrate varies from pure sand directly adjacent to the ocean to loamy sands in more sheltered areas of the coast. At the southern end of the range in Virginia, this community occurs as a woodland variably

dominated by *Prunus serotina*, *Sassafras albidum*, *Diospyros virginiana*, and *Malus angustifolia* var. *angustifolia*. Vine tangles are patchy and interspersed with areas of open sand dominated by *Schizachyrium littorale* and also containing *Opuntia humifusa*, *Conyza canadensis*, *Nuttallanthus canadensis*, *Cirsium horridulum* var. *horridulum*, and other xerophytic herbs at lower cover. This maritime shrubland community is restricted to a narrow range on coastal dunes of barrier islands on the mid-Atlantic coast. It does not occur north of southern New Jersey or south of Virginia. Occurrences are naturally small (a few acres), confined to the oceanward portion of barrier islands. Potential or historic habitat has been reduced by extensive human development such as residential or commercial building, recreation, or road expansion.

Seaside plantain (*Plantago maritima* var. *juncooides*, G5T5/S1/NL/NL) is a low perennial herb of salt marshes, beaches and coastal rocks (Gleason and Cronquist 1991). Spikes of mostly densely arranged small white flowers arise on leafless stems from a basal rosette of fleshy, linear-lanceolate leaves. The species is circumboreal, with variety *juncooides* at least being found in Greenland, Canada, and extending into the east coast of the US in New England, New York, New Jersey and Virginia; plants of northwestern North America are variously included or separated from var. *juncooides* (Kartesz 1999, Weakley in prep.). In Virginia, seaside plantain has only been documented in salt marshes and flats on the Eastern Shore in Accomack County. Threats include habitat destruction from development and sea-level rise.

Big-headed rush a rare perennial in Virginia, is found along the coastal plain usually in open moist or wet areas and often in shallow water, sands, peats and marls; marshy shores, interdune hollows, swales, brackish and fresh marshes, marl prairies and bogs. It is also known to colonize abundantly in ditches. Big-headed rush occurs from south of Virginia to Florida and as far west as southeast Texas. It is known currently in Virginia from nine occurrences, and historically from two occurrences.

Southern beach spurge, a state rare plant species, occurs in mats and is found on the secondary dunes of the Atlantic Ocean and Chesapeake Bay. Virginia is the northern limit of its range with ten documented sites state-wide. The rarity of this plant is due to habitat destruction associated with commercial development along the coast (Ludwig, 1996). Southern beach spurge is currently known from 10 occurrences in Virginia, and historically known from an additional five occurrences.

The Maritime Dune Woodland is a very rare community type known only from two sites in Virginia. The proposed project would directly impact this natural heritage resource. In addition, documented occurrences of Southern beach spurge, Big-head rush, and Seaside plantain, state-rare plants would also be impacted by this project. DCR strongly recommends avoiding impacts to this globally rare community and these state rare plants by relocating the proposed landing strip. Please see the attached map for natural heritage resource locations within and adjacent to the project location.

Furthermore, Peregrine falcon (*Falco peregrinus*, G4/S1BS2N/NL/LT), Northern Harrier (*Circus cyaneus*, G5/S1S2B,S3N/NL/SC), Piping plover (*Charadrius melodus*, G3/S2B,S1N/LT/LT), Wilson's plover (*Charadrius wilsonia*, G5/S1B/NL/LE), and Little blue heron (*Egretta caerulea*, G5/S2B,S3N/NL/NL) have been documented within the project area and the project vicinity. DCR zoologist, Dr. Steve Roble recommends a study to evaluate the potential impacts on these birds as well as colonial waterbirds (herons, egrets, terns) and migratory songbirds by the proposed project. With the study results we can more accurately evaluate potential impacts to natural heritage resources and offer specific protection recommendations for minimizing impacts to the documented resources.

Due to the legal status of the Piping plover, DCR also recommends coordination with USFWS and VDGIF to ensure compliance with protected species legislation. Due to the legal status of the Peregrine falcon and Wilson's plover, DCR also recommends coordination with the VDGIF to ensure compliance with protected species legislation.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,



Alli Baird, LA, ASLA  
Coastal Zone Locality Liaison

CC: Amy Ewing, VDGIF

Literature Cited:

Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Second Edition. The New York Botanical Garden. Bronx, NY. 910 pp.

Kartesz, J.T. 1999. A Synonymized Checklist and Atlas with Biological Attributes for the Vascular Flora of the United States, Canada, and Greenland. First Edition. In: Kartesz, J.T. and C.A. Meacham. Synthesis of the North American Flora, Version 1.0. North Carolina Botanical Garden, Chapel Hill, NC.

Ludwig, J. Christopher. 1996. Personal communication. Virginia Department of Conservation and Recreation, Division of Natural Heritage.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: August 9, 2010 ).

Weakley, A.S. in prep. Flora of the Southern and Mid-Atlantic States. Working Draft of 8 March 2010. University of North Carolina Herbarium, North Carolina Botanical Garden, University of North Carolina at Chapel Hill, Chapel Hill, NC. 994 pp.



# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

TDD (804) 698-4021

[www.deq.virginia.gov](http://www.deq.virginia.gov)

L. Preston Bryant, Jr.  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

August 24, 2010

Mr. Joel T. Mitchell  
Natural Resources Manager  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

RE: Proposed Unmanned Aerial Systems Airstrip

Dear Mr. Mitchell,

The Department of Environmental Quality has received your July 14, 2010, letter requesting scoping comments on the above named project. The DEQ Waste Division staff has reviewed your letter and has the following comments concerning the waste issues associated with this project: When an environmental impact report is written or compiled, it should include an environmental investigation on and near the property to identify any solid or hazardous waste sites or issues. This should include a search of waste-related databases.

The report author should analyze the data in the web-based Waste Division databases to determine if the project would affect or be affected by any sites identified in the databases. These are the Solid Waste Database, CERCLA Facilities, Voluntary Remediation Program, and Hazardous Waste Facilities databases.

### **The Solid Waste Database**

A list of active solid waste facilities in Virginia.

### **CERCLA Facilities Database**

A list of active and archived CERCLA (EPA Superfund Program) sites.

### **Hazardous Waste Facilities Database**

A list of hazardous waste generators, hazardous waste transporters, and hazardous waste storage and disposal facilities. Data for the CERCLA Facilities and Hazardous Waste Facilities databases are periodically downloaded by the Waste Division from U.S. EPA's website.

Mr. Joel T. Mitchell  
Natural Resources Manager  
Goddard Space Flight Center  
Page 2

**Accessing the DEQ Databases:**

The report author should access this information on the DEQ website at <http://www.deq.state.va.us/waste/waste.html> . Scroll down to the databases which are listed under Real Estate Search Information heading.

The *solid waste information* can be accessed by clicking on the Solid Waste Database tab and opening the file. Type the county or city name and the word County or City, and click the Preview tab. All active solid waste facilities in that locality will be listed.

The *Superfund information* will be listed by clicking on the Search EPA's CERCLIS database tab and opening the file. Click on the locality box, click on sort, then click on Datasheet View. Scroll to the locality of interest.

The *hazardous waste* information can be accessed by clicking on the Hazardous Waste Facility tab. Go to the Geography Search section and fill in the name of the city or county and VA in the state block, and hit enter. The hazardous waste facilities in the locality will be listed.

The *Voluntary Remediation Program* GPS database can be accessed by clicking on "Voluntary Remediation," then "What's in my backyard" in the center shaded area, and then under "Mapping Applications," click on "What's in my backyard" again.

This database search will include most waste-related site information for each locality. In many cases, especially when the project is located in an urban area, the database output for that locality will be extensive.

This database search will include most waste-related site information for each locality. In many cases, especially when the project is located in an urban area, the database output for that locality will be extensive.

In your letter, neither solid waste issues and sites nor hazardous waste issues and sites were addressed. Nor did the letter detail a search of waste-related data bases. The Waste Division staff conducted a cursory review of its data files including a GIS database search, but did not identify any waste sites that would impact or be impacted by the proposed construction.

Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 et seq.; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-80); and Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 et seq., the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Parts 107.

Mr. Joel T. Mitchell  
Natural Resources Manager  
Goddard Space Flight Center  
Page 3

Also, if an older structure will be demolished as part of this project, the structure should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP). If they are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-80-640 for ACM and 9VAC 20-60-261 for LBP must be followed.

Finally, DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All hazardous wastes should be minimized.

If you have any questions or need further information, please contact Paul Kohler at (804) 698-4208.

Sincerely,

A handwritten signature in blue ink, appearing to read "P. W. Kohler".

Paul W. Kohler  
Environmental Specialist II

CC: file

# Hoffman, Charee

---

**From:** Bundick, Joshua A. (WFF-2500) [joshua.a.bundick@nasa.gov]  
**Sent:** Tuesday, September 07, 2010 11:22 AM  
**To:** Hoffman, Charee; Bartlett, Matthew E.  
**Cc:** Silbert, Shari A. (WFF-200.C)[EG&G, Inc. (WICC)]; Mitchell, Joel T. (WFF-2500)  
**Subject:** ESSLog# 31176\_Wallops Flight Facility\_Unmanned Aerial Systems Airstrip

---

**From:** Ewing, Amy (DGIF) [mailto:Amy.Ewing@dgif.virginia.gov]  
**Sent:** Tuesday, September 07, 2010 11:20 AM  
**To:** Bundick, Joshua A. (WFF-2500)  
**Cc:** Boettcher, Ruth (DGIF); Fisher, John (DEQ)  
**Subject:** ESSLog# 31176\_Wallops Flight Facility\_Unmanned Aerial Systems Airstrip

Joshua,

We received notice that NASA is proposing to construct and Unmanned Airstrip at the north end of the island and that you are looking for scoping comments. In response to various projects going on at Wallops over the past few years, we have provided quite a bit of information about the wildlife resources known from Wallops and what we would like to see the EA's for projects on Wallops consider. We recommend review of the comments we made regarding the SRIPP and the 2009 expansion plans at Wallops. If you need to me provide you with copies of those comments, just let me know. Below is a recap of some of the things we would like to see discussed in the EA for the new airfield.

- Relation of the airfield to the state Threatened bald eagle's nest known from the north end of the property, discussion of any impacts upon this nesting structure, physical encroachment into within 660ft of the nest, and/or any impacts construction and operation of the airfield are likely to have on the eagles using this nest, and how NASA proposes to avoid, minimize or mitigate such impacts.
- Relation of the airfield to the artificial structure used by state Threatened peregrine falcons that is located at the north end of the property, discussion of any impacts construction and operation of the airfield are likely to have on the falcons using this structure, and how NASA proposes to avoid, minimize or mitigate such impacts.
- Any impacts the construction and operation of the airfield may have on federal Endangered piping plovers known to nest on the beaches at the north end of the island and how NASA proposes to avoid, minimize or mitigate such impacts.
- Any impacts the construction and operation of the airfield may have on other shorebirds, listed and non-listed, known to nest on Virginia's barrier islands and how NASA proposes to avoid, minimize or mitigate such impacts.
- Any impacts the construction and operation of the airfield may have on marine species such as sea turtles and sea mammals known from nearby waters and how NASA proposes to avoid, minimize or mitigate such impacts.

In addition to the above, we expect the EA to include a clear description of all proposed activities for the site so that we may better understand the project and assess the impacts it may have to resources under our jurisdiction.

We recommend coordination with the USFWS and NMFS regarding any impacts upon species under their jurisdictions.

Thank you.

Amy

Amy M. Ewing  
Environmental Services Biologist  
Virginia Dept. of Game and Inland Fisheries  
804-367-2211

**2009 REPRESENTATIVE COORDINATION LETTER AND RESPONSES**

**APPENDIX A. 2009 REPRESENTATIVE COORDINATION LETTER AND RESPONSES**

<b>DATE</b>	<b>FROM</b>	<b>TO</b>
June 26, 2009	Wallops Flight Facility	U.S. Fish and Wildlife Service
July 17, 2009	Navy Surface Combat Systems Center	Wallops Flight Facility
July 27, 2011	NOAA National Marine Fisheries Service	Wallops Flight Facility

National Aeronautics and Space Administration

**Goddard Space Flight Center**  
Wallops Flight Facility  
Wallops Island, VA 23337-5099



June 26, 2009

Reply to Attn of: 250.W

Mr. Lou Hinds  
U.S. Fish and Wildlife Service  
Chincoteague National Wildlife Refuge  
P.O. Box 62  
Chincoteague, VA 23336

**Subject: Request for Study Plan Review of the NASA Goddard Space Flight Center's  
Wallops Flight Facility, Wallops Island, Virginia Proposed Unmanned Aerial  
System Airstrip**

To satisfy its obligations under the National Environmental Policy Act and Section 7 of the Endangered Species Act of 1973, the Wallops Flight Facility (WFF) has retained Timmons Group to assist with the planning for a 5,200-foot x 75-foot airstrip on the north end of Wallops Island in Accomack County, Virginia (see Enclosure 1 Site Vicinity Map). The preparation on an Environmental Assessment (EA) is forthcoming; however, WFF is moving forward with the early scoping process. The Unmanned Aerial Systems (UAS) Airstrip is being proposed to serve NASA and NASA clients and partners for uninhabited aerial vehicles. The WFF invites your agency to participate in the scoping process. We are currently seeking your input and recommendations concerning WFF's proposed project as it pertains to the protection of Threatened and Endangered Species.

The UAS Airstrip at WFF is proposed to have a ground disturbance impact of 125 feet x 5,200 feet to accommodate the grading and surfacing of the 75-foot runway for its entire proposed length. The runway would actually be built up 2 to 3 feet above existing ground surface. There is no excavation proposed as the water table is relatively high in this area. Two 100 foot x 100 foot hangars would be constructed to service the airstrip. The existing site access road (dirt road) will be improved to service the runway and hangars. No other ground disturbance is planned for the project (see Enclosure 2 Overall View of the Project Area). Vegetation clearing for sight would be perpendicular from the edge and along the entire length of the runway fill to approximately 250 feet at a maintained height of approximately 2 feet above ground or less. An additional 500 feet of vegetation would be cleared to the same height off of each end of the runway. Additionally, vegetation beyond the 250-foot limit would be maintained to a height of approximately 5 to 10 feet.

There is the potential for the presence of several threatened and endangered species within the vicinity of the proposed project (see Table below). A loggerhead sea turtle nest was documented on the beach 1.5 miles east of the project site and piping plover nesting habitat has been delineated on Wallops Island overwash areas (see Enclosure 3 Overall View of Piping Plover Habitat). Wilson's plovers tend to nest with piping plovers. Gull-billed terns can be found on the beaches or mud flats on Wallops Island. A pair of resident peregrine falcons nests on a tower on the northwest side of Wallops Island approximate 0.7 miles from the proposed airstrip. Migrating peregrine falcons transit the Wallops Island beach during fall migration.

<b>Threatened and Endangered Species Potentially in the Vicinity of the UAS Airstrip</b>		
<b>Scientific Name</b>	<b>Common Name</b>	<b>Status</b>
<i>Dermochelys coriaces</i>	Leatherback Sea Turtle	Federally Endangered
<i>Eretmochelys imbricate</i>	Hawksbill Sea Turtle	Federally Endangered
<i>Lepidechelys kempi</i>	Kemp's Ridley Sea Turtle	Federally Endangered
<i>Chelonia mydas</i>	Atlantic Green Sea Turtle	Federally Threatened
<i>Caretta caretta</i>	Loggerhead Sea Turtle	Federally Threatened
<i>Charadrius melodus</i>	Piping Plover	Federally Threatened
<i>Charadrius wilsonia</i>	Wilson's Plover	State Endangered
<i>Haliaeetus leucocephalus</i>	Bald Eagle	State Threatened
<i>Falco peregrinus</i>	Peregrine Falcon	State Threatened
<i>Bartramia longicauda</i>	Upland Sandpiper	State Threatened
<i>Sterna nilotica</i>	Gull-billed Tern	State Threatened

To protect piping plover habitat, since 1986 WFF has closed northern and southern Wallops Island beaches to vehicle and human traffic during the plover's nesting season (March 15th through September 1st). Biologists from the U. S. Fish and Wildlife Service's (USFWS) Chincoteague National Wildlife Refuge and the U. S. Department of Agriculture's Wildlife Services monitor piping plover nesting activities and provide advice to WFF on protection and management of the species.

Currently the proposed UAS Airstrip on the northern portion of Wallops Island is greater than 3,000 linear feet from any known piping plover nest. In a memorandum dated March 14, 2003, NASA documents consultation with the USFWS concerning the UAS runway that was to be sited at the southern end of Wallops Island. The consultation was to determine the potential for construction and operation of the UAS runway to disturb piping plovers. USFWS recommended imposing a no-fly zone 1,000 feet horizontally and vertically from any active piping plover nesting site. The current proposed UAS Airstrip would be sited much farther than 1,000 feet from any known nest and UAS operations would be conducted so as to observe the same no-fly restrictions instituted on the southern end of Wallops Island.

If you have any additional questions or require more information about the project, please, contact Mr. Josh Bundick at (757) 824-2319 (Joshua.A.Bundick@nasa.gov) or myself at (757-823-1127 (Joel.T.Mitchell@nasa.gov). Thank you for your attention to this request and we look forward to receiving your comments.

  
Joel T. Mitchell  
Environmental Engineer

3 Enclosures

cc: (w/o encl.)  
200/Ms. C. Massey  
228/Mr. P. Bull  
228/Mr. G. Lilly  
250/Mr. J. Bundick  
250/Ms. C. Turner  
840/Mr. J. Pittman



DEPARTMENT OF THE NAVY  
SURFACE COMBAT SYSTEMS CENTER  
30 BATTLE GROUP WAY  
WALLOPS ISLAND, VIRGINIA 23337-5000

5090  
Ser X31/ 200  
17 Jul 09

NASA GSFC Wallops Flight Facility  
Attn: Josh Bundick, Code 250.W  
Wallops Island, Virginia 23337

Dear Mr. Bundick:

Thank you for the opportunity to review your proposal for the UAS Airstrip on the northern end of Wallops Island.

We do recommend that you seek a Section 7 consultation with the Fish & Wildlife Service Endangered Species Office. The beach on the northern end of Wallops Island has been closed to entry for a number of years during the piping plover breeding season. As noted in your current Special Announcement (May 18, 2009), "The closures are part of our continuing cooperation with the U.S. Fish and Wildlife Service (USFWS) to protect the piping plover, a federally endangered species along the Atlantic Coast." Since the area has been closed to protect an endangered species, and since the birds tend to perceive low-flying aircraft as predators, it is likely that establishing a runway in this area would have an impact on the birds. The purpose of a Section 7 consultation is to determine the extent of that impact and any mitigation that could minimize the harm.

You may also need to consider the birds breeding on the nearby Fishing Point. A variety of species have nesting colonies there. A number of them are sensitive to low-flying aircraft due to the similarity to predators. The Section 7 consultation should also address this concern.

Although not clearly addressed, the proposed buildings may include a source of light near the beach. This may affect nesting marine turtles, as well as the viewscape from Assateague Island.

Although not addressed in this point paper, we are confident that you are aware that much of this area is tidal wetlands and will require mitigation. You may also need to address the essential fish habitat located nearby, and the destruction of the dunes. This is a very dynamic area; it will be difficult to maintain the integrity of the runway on the eastern side.

Sincerely,

  
JOHN J. KEEGAN  
Commander, U.S. Navy  
Commanding Officer



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE  
Habitat Conservation Division  
James J. Howard Marine  
Sciences Laboratory  
74 Magruder Road  
Highlands, New Jersey 07732

July 27, 2009

Joshua A. Bundick  
NEPA Program Manager  
National Aeronautics and Space Administration  
Goddard Space Flight Center, Wallops Island Facility  
Wallops Island, VA 23337-5099  
Attn: 250.W

Dear Mr. Bundick,

This is in response to a letter dated June 26, 2009 to John Nichols, NOAA Habitat Conservation Division regarding NASA's Wallops Island Facility's proposed Unmanned Aerial Systems (UAS) Airstrip, located on the north end of Wallops Island in Accomack County, Virginia. The proposed construction of a 75 ft. wide by 5,200 ft. long runway, two (2) 100 ft. by 100 ft. hangars, improvements to an existing dirt access road, and clearing of adjacent vegetation will occur across approximately 161 acres.

In seeking to satisfy your obligations under the National Environmental Policy Act (NEPA) and Section 7 of the Endangered Species Act (ESA) of 1973, your office requested and received comments regarding the proposed UAS's potential to adversely affect listed species from Mary Colligan, NOAA Fisheries Service, Protected Resources Division (PRD). At this time, NOAA Fisheries Service, Habitat Conservation Division (HCD) appreciates the opportunity to also provide input and recommendations during the scoping process in preparation of the forthcoming environmental assessment (EA) for this project.

As you know, NOAA Fisheries Service, Habitat Conservation Division (HCD) reviews projects with regards to the project's potential to adversely affect essential fish habitat (EFH), and provides comments and conservation recommendations to state and federal regulatory agencies pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297; 11 October 1996) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C 661 et seq.). Section 305(b)(2) of the MSA requires all Federal agencies to consult with NOAA Fisheries Service on any action authorized, funded, or undertaken by that agency that may adversely affect EFH. This includes activities authorized or permitted by the U.S. Army Corps of Engineers, such as construction of the proposed UAS airstrip and supporting infrastructure at Wallops Island.

The EFH consultation process includes the preparation of a complete and appropriate EFH assessment to provide the necessary information on which NOAA Fisheries Service then



consults. Our EFH regulation at 50 CFR 600.905 mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation procedure. In accordance with the EFH Final Rule published in the Federal Register on January 17, 2002, Federal agencies may incorporate an EFH assessment into documents prepared for another purpose, such as the forthcoming environmental assessment (EA) being prepared for the Wallops Island UAS project, provided the EFH assessment is clearly identified as a separate and distinct section of the document. The EFH assessment must include four major elements: 1) a description of the proposed actions; 2) an analysis of the effects of the actions on EFH, managed species and their prey species; 3) the Federal agency's views regarding the effects of the action on EFH, and; 4) a discussion of proposed mitigation, if applicable. Other information that should be included in the EFH assessment, if appropriate, includes: 1) the results of on-site inspections to evaluate the habitat and site-specific effects; 2) the views of recognized experts on the habitat or species that may be affected; 3) a review of pertinent literature and related information; and 4) an analysis of alternatives to the action that could avoid or minimize the adverse effects on EFH. Additional information on EFH consultation process and the development of EFH assessments can be found at NOAA's Northeast Region HCD website: <http://www.nero.noaa.gov/hcd/>

Though it is difficult to quantify potential impacts to wetlands and essential fish habitat based on the scale of the figures appended to your letter of June 26, 2009, it appears that the majority of the proposed UAS project area is located in sensitive terrestrial and aquatic habitats including palustrine forested wetlands (PFO), palustrine scrub-shrub wetlands (PSS), palustrine open water (POW), intertidal estuarine emergent wetlands (EEM) and estuarine subtidal open water (ESOW). Intertidal emergent wetlands such as smooth cordgrass (*Spartina alterniflora*) marshes and nonvegetated intertidal flats provide important breeding, nursery, forage and refuge habitat for the various life stages of numerous federally managed fish species and their prey.

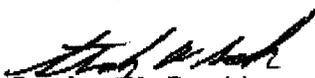
Based on information provided in your letter of June 26, 2009, the UAS airstrip was originally proposed to be located on the southern end of Wallops Island. However, ESA Section 7 consultation with U.S Fish and Wildlife Service (USFWS) regarding the Federally Threatened piping plover (*Charadrius melodus*) resulted in USFWS recommendations for a 1,000 ft. vertical and horizontal no-fly zone from any active piping plover nesting site. We assume that the currently proposed northern location of the UAS is in response to the presence of active piping plover nests on the southern end of the island and the operational constraints the USFWS no-fly zone recommendations would place on the UAS.

The NEPA process requires that a thorough alternatives analysis be conducted for Federal undertakings to evaluate the least environmentally damaging practicable alternative. Please include an alternatives analysis, including potential off-island locations for the UAS, in the EA along with a description of any measures employed during the planning phase of the project to avoid and minimize impacts to waters of the U.S. (WOUS), including tidal and non-tidal wetlands, as required under the Clean Water Act's (CWA) Section 404 (b)(1) guidelines. Typically, permitting agencies require compensation for unavoidable impacts to wetlands. Compensation for unavoidable loss of wetlands is supported by NOAA Fisheries Service HCD to compensate for the lost ecological services provided by these ecologically important habitats.

Thank you for the study plan review of the NASA Goddard Space Flight Center's Wallops Island

Flight Facility's proposed Unmanned Aerial System (UAS) airstrip and the opportunity to comment on issues and concerns under the purview of NOAA Fisheries Service's Habitat Conservation Division. Pursuant to the coordination requirements for Federal agencies under Section 305(b)(2) of the MSA, NOAA Fisheries Service requests that the NASA prepare an EFH assessment for the proposed UAS for inclusion in the forthcoming EA. Within 30 days following the submittal of an EFH assessment, NOAA Fisheries will review the assessment for completeness and will evaluate the proposed project's potential to adversely affect EFH, managed species and their prey species. At that time NOAA Fisheries Service may provide conservation recommendations to NASA designed to help avoid and minimize project impacts or to compensate for unavoidable impacts to EFH, managed species and their prey species. NOAA Fisheries Service reserves the right to raise additional concerns in the future as new information regarding the design, materials, and methods to be used in the construction of the UAS become available. Please contact Mr. David O'Brien of our Gloucester Point, VA field office at 804-684-7828 (David.L.O'Brien@noaa.gov) if you have any questions or concerns regarding the EFH consultation process.

Sincerely,

  
Stanley W. Gorski  
Field Offices Supervisor

Cc: John Nichols, HCD  
Carol Petrow, EPA  
Robert Hume, Corps

## **APPENDIX B**

# **BIOLOGICAL ASSESSMENT**

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**APPENDIX B. BIOLOGICAL ASSESSMENT**

<b>DATE</b>	<b>FROM</b>	<b>TO</b>
July 13, 2009	NOAA National Marine Fisheries Service	Wallops Flight Facility
August 24, 2010	NOAA National Marine Fisheries Service	Wallops Flight Facility
June 10, 2011	Wallops Flight Facility	U.S. Fish and Wildlife Services
September 22, 2011	U.S. Fish and Wildlife Services	Wallops Flight Facility
June 2011	Draft Biological Assessment for the Wallops Flight Facility Unmanned Aerial Systems Airstrip	



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
NORTHEAST REGION  
55 Great Republic Drive  
Gloucester, MA 01930-2276

JUL 13 2009

Joshua A. Bundick  
National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, Virginia 23337  
Attn: 250.W

Dear Mr. Bundick,

This is in response to your letter dated June 26, 2009 regarding the National Aeronautics and Space Administration's (NASA) Goddard Space Flight Center's Wallops Flight Facility's proposed Unmanned Aerial Systems Airstrip, located on the north end of Wallops Island in Accomack County, Virginia. The proposed work would have a ground disturbance impact of 125 feet x 5,200 feet to accommodate the grading and surfacing of the 75-foot runway for its entire proposed length. Work proposed includes: construction of two 100 foot x 100 foot hangars; improvement of the existing site access roads; and clearing of vegetation.

Several species of sea turtles listed by NOAA's National Marine Fisheries Service (NMFS) as threatened and endangered occur seasonally in the coastal waters of Virginia. However, as no in water work is proposed, no listed species will be affected by the proposed project. As such, no consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended, is required. Should project plans change or new information become available that changes the basis for this determination, consultation should be reinitiated. If you have any questions about these comments, please contact Danielle Palmer at (978)282-8468.

Sincerely,

Mary A. Colligan  
Assistant Regional Administrator  
for Protected Resources





UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
NORTHEAST REGION  
55 Great Republic Drive  
Gloucester, MA 01930-2276

AUG 24 2010

Joel T. Mitchell  
National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, Virginia 23337  
Attn: 250.W

Dear Mr. Mitchell,

This is in response to your letter dated July 14, 2010 regarding the National Aeronautics and Space Administration's (NASA) Goddard Space Flight Center's Wallops Flight Facility's proposed Unmanned Aerial Systems Airstrip, located on the north end of Wallops Island in Accomack County, Virginia.

Several species of sea turtles listed by NOAA's National Marine Fisheries Service (NMFS) as threatened and endangered occur seasonally in the coastal waters of Virginia. However, as no in water work is proposed, no listed species will be affected by the proposed project. As such, no consultation pursuant to Section 7 of the Endangered Species Act of 1973, as amended, is required. Should project plans change or new information become available that changes the basis for this determination, consultation should be reinitiated. If you have any questions about these comments, please contact Danielle Palmer at (978)282-8468.

Sincerely,

Mary A. Colligan  
Assistant Regional Administrator  
for Protected Resources



National Aeronautics and  
Space Administration

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



Reply to Attn of: 250.W

June 10, 2011

Ms. Cindy Schulz  
Virginia Field Office  
U.S. Fish and Wildlife Service  
6669 Short Lane  
Gloucester, Virginia 23061

Dear Ms. Schulz:

In accordance with Section 7(c) of the Endangered Species Act of 1973 (ESA), the National Aeronautics and Space Administration (NASA) has prepared a Biological Assessment for the construction and operation of an Unmanned Aerial Systems (UAS) Airstrip at Goddard Space Flight Center's Wallops Flight Facility (WFF) on the north end of Wallops Island in Accomack County, Virginia. Three copies of the Biological Assessment are enclosed with this letter.

NASA has determined that the proposed UAS airstrip will not contribute to the future listing of the candidate species, red knot. The project may affect but is not likely to adversely affect the piping plover and will have no effect on the loggerhead sea turtle. Please consider this correspondence as NASA's request to begin formal consultation pursuant to the ESA. NASA respectfully requests that your agency's Opinion be provided within 135 days of receiving this correspondence.

If you have any questions or require any additional information please contact me at (757) 824-1127, or Ms. Shari Silbert at (757) 824-2327.

Sincerely,

A handwritten signature in cursive script that reads "Joel Mitchell".

Joel Mitchell  
Natural Resources Program Manager

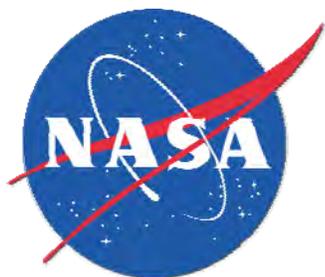
Enclosures

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

**DRAFT**

**BIOLOGICAL ASSESSMENT  
WALLOPS FLIGHT FACILITY  
UNMANNED AERIAL SYSTEMS AIRSTRIP**

*Prepared for:*



National Aeronautics and Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility

**WALLOPS ISLAND, VIRGINIA  
JUNE 2011**

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**TABLE OF CONTENTS**

**CHAPTER 1 PROJECT OVERVIEW .....1-1**

    1.1 INTRODUCTION ..... 1-1

    1.2 PROJECT AREA AND SETTING ..... 1-1

    1.3 PROJECT NEED..... 1-1

    1.4 PROJECT DESCRIPTION ..... 1-7

    1.5 GENERAL CONSERVATION MEASURES..... 1-11

    1.6 CONSULTATION HISTORY ..... 1-13

**CHAPTER 2 EXISTING CONDITIONS .....2-1**

    2.1 ACTION AREA ..... 2-1

    2.2 ECOLOGICAL CLASSIFICATION OF NORTH WALLOPS ISLAND ..... 2-1

**CHAPTER 3 LISTED SPECIES THAT MAY BE AFFECTED BY THE PROPOSED ACTION.....3-1**

    3.1 LISTED SPECIES OVERVIEW ..... 3-1

    3.2 SEABEACH AMARANTH ..... 3-4

    3.3 NORTHEAST BEACH TIGER BEETLE..... 3-5

    3.4 LOGGERHEAD SEA TURTLE ..... 3-5

    3.5 RED KNOT ..... 3-6

    3.6 PIPING PLOVER..... 3-7

    3.7 DELMARVA PENINSULA FOX SQUIRREL ..... 3-7

**CHAPTER 4 ANALYSIS OF EFFECTS TO LISTED SPECIES .....4-1**

    4.1 APPROACH TO ANALYSIS ..... 4-1

    4.2 EFFECTS TO LISTED SPECIES ..... 4-1

    4.3 LOGGERHEAD SEA TURTLE ..... 4-1

    4.4 RED KNOT ..... 4-2

    4.5 PIPING PLOVER..... 4-3

**CHAPTER 5 CUMULATIVE IMPACTS.....5-1**

**CHAPTER 6 CONCLUSION .....6-1**

**CHAPTER 7 REFERENCES.....7-1**

**APPENDIX A WALLOPS ISLAND PROTECTED SPECIES MONITORING PLAN .....A-1**

**List of Figures**

Figure 1. Location of NASA’s Wallops Flight Facility .....1-2

Figure 2. NASA Controlled/Restricted Airspace R-6604A/B and Location of the Existing and Proposed UAS Airstrip .....1-3

Figure 3. Initial UAS Airstrip (2003) .....1-4

Figure 4. Expanded UAS Airstrip (2005).....1-4

Figure 5. UAS Currently Operating and Proposed for Future Operations at WFF .....1-5

Figure 6. South Wallops Island UAS Airstrip after a Storm .....1-6

Figure 7. Representative View of the Proposed UAS Airstrip .....1-8

Figure 8. Nest and Sighting Locations on Wallops Island.....3-2

**List of Tables**

Table 1. UAS Operating and Proposed for Operations on Wallops Island.....1-4

Table 2. Federally Listed Threatened and Endangered Species Known to Occur in the Region.....3-3

Table 3. Summary of Findings for Federally Listed Threatened and Endangered Species under the Jurisdiction of the USFWS.....6-1

## **ACRONYMS AND ABBREVIATIONS**

AGL	above ground level
cm	centimeters
dB	decibel
DNL	Day-Night Average Sound Level
ESA	Endangered Species Act
FAA	Federal Aviation Administration
ft	feet
GTM	Generic Transport Model
in	inch
JP	jet propellant
km	kilometer
L <sub>max</sub>	Maximum Level
m	meters
NMFS	National Marine Fisheries Service
SEL	Sound Exposure Level
UAS	unmanned aerial systems
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VACAPES OPREA	Virginia Capes Operating Area
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
WFF	Wallops Flight Facility

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## **CHAPTER 1 PROJECT OVERVIEW**

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### **1.1 INTRODUCTION**

NASA Goddard Space Flight Center owns and operates Wallops Flight Facility (WFF). The mission of WFF is to support aeronautical research, science technology, and education. WFF provides NASA and other U.S. government agencies as well as foreign and commercial organizations access to resources such as special use (i.e., controlled/restricted) airspace, airstrips, launch pads, and the technical expertise and project oversight to conduct a wide-variety of scientific research in a low-cost environment. Much of the research at WFF is conducted via various carrier systems such as rockets, balloons, and unmanned aerial systems (UAS).

### **1.2 PROJECT AREA AND SETTING**

WFF is located in the northeast portion of Accomack County, Virginia on the Delmarva Peninsula. The facility is comprised of three separate land masses: Main Base, Wallops Mainland, and Wallops Island (Figure 1). NASA Goddard Space Flight Center's Suborbital and Special Orbital Projects Directorate is responsible for management of Wallops Research Range located on Wallops Island. The Research Range is where the majority of scientific research launch activities occur. To support suborbital missions, restricted airspace R-6604A/B was established through the Federal Aviation Administration (FAA). Restricted airspace is established when it is determined necessary to confine or segregate activities considered hazardous to nonparticipating aircraft (14 Code of Federal Regulation Part 1.1). R-6604A/B, owned and operated by WFF, is available 24 hours a day, 7 days a week from the surface to unlimited altitude. This restricted airspace covers the entirety of Wallops Island and extends over the Atlantic Ocean for approximately 5.0 kilometers (km) (3 miles) (Figure 2).

UAS launch operations, which require restricted airspace, are an important business at WFF. UAS perform a wide variety of functions; the majority of these functions are some form of remote sensing (e.g., atmospheric monitoring and testing, hurricane analysis, etc.). Due to the temperate climate in the region, commercial UAS manufacturers and others come from around the world to WFF to conduct product trials, pilot training, and science missions from a UAS airstrip located on the south end of Wallops Island (Figure 2).

### **1.3 PROJECT NEED**

Since 2003, UAS have been operating from an airstrip on a then remote portion of south Wallops Island. The airstrip (Figure 3), formerly a paved road, measured 230 meters (m) long by 15 m wide (750 feet [ft] long by 50 ft wide). In 2005, the airstrip was expanded to accommodate larger classes of UAS. The airstrip was lengthened to 450 m (1,500 ft); two staging pads were also added (Figure 4). While this airstrip met an immediate and emerging need, the location has proven to be unsatisfactory for continued UAS flight operations.



Figure 1. Location of NASA's Wallops Flight Facility

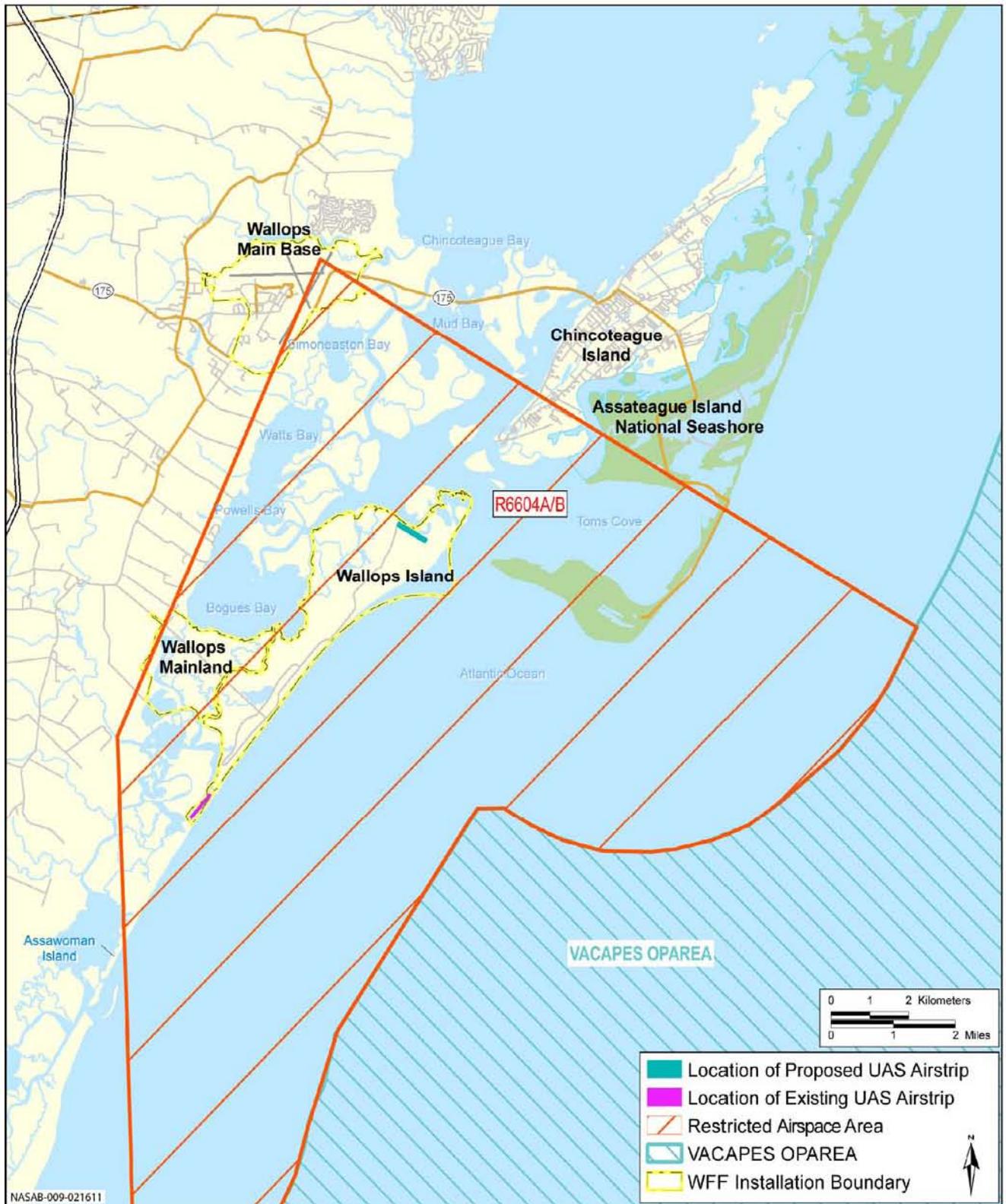


Figure 2. NASA Controlled/Restricted Airspace R-6604A/B and Location of the Existing and Proposed UAS Airstrip



**Figure 3. Initial UAS Airstrip (2003)**



**Figure 4. Expanded UAS Airstrip (2005)**

The most common and largest UAS that currently operate from the south Wallops Island airstrip are shown in Table 1 and provided in Figure 5. As shown in Table 1, the Viking 100 and 300 models require a 450 m (1,500 ft) airstrip for safe takeoff and landing and are therefore the largest UAS capable of operating from the existing airstrip. The Viking 400 is proposed for future operations at WFF.

**Table 1. UAS Operating and Proposed for Operations on Wallops Island**

<i>Model</i>	<i>Wingspan (meters/feet)</i>	<i>Length (meters/feet)</i>	<i>Maximum Weight with Payload (kilogram/pounds)</i>	<i>Takeoff/Landing Minimum Requirement (meters/feet)</i>
Aerosonde <sup>1</sup>	3.0 / 9.5	1.5 / 5.6	14 / 30	none
GTM AirSTAR <sup>2</sup>	2.0 / 7.0	2.5 / 8.0	23 / 50	450 / 1,500
Viking 100 <sup>3</sup>	4.5 / 15.0	2.5 / 8.0	68 / 150	450 / 1,500
Viking 300 <sup>3</sup>	5.5 / 17.5	4.0 / 13.5	144 / 318	450 / 1,500
Viking 400 <sup>3</sup>	6.0 / 20.0	4.5 / 14.7	240 / 530	760 / 2,500
Exdrone <sup>4</sup>	3.0 / 9.5	2.0 / 6.2	2 / 6	100 / 300
Scan Eagle <sup>5</sup>	3.0 / 9.5	2.0 / 5.6	2 / 6	10 / 30
Shadow 200 <sup>6</sup>	6.0 / 20.0	4.0 / 12.0	4 / 12	30 / 500
Blimp (tethered)	2.0 / 7.0	7.0 / 23.0	7 / 23	none

Notes: <sup>1</sup> Manufactured by Aerosonde. <sup>2</sup> GTM (Generic Transport Model) AirSTAR is manufactured by NASA Langley Research Center. The GTM is similar to an upscale model airplane and is the smallest of the UAS piloted at WFF. <sup>3</sup> Manufactured by L3 BAI Systems. <sup>4</sup> Launched via catapult; stopped by chute or skid. <sup>5</sup> Launched via catapult; stopped via SkyHook. <sup>6</sup> Launched via catapult; wheel landing.

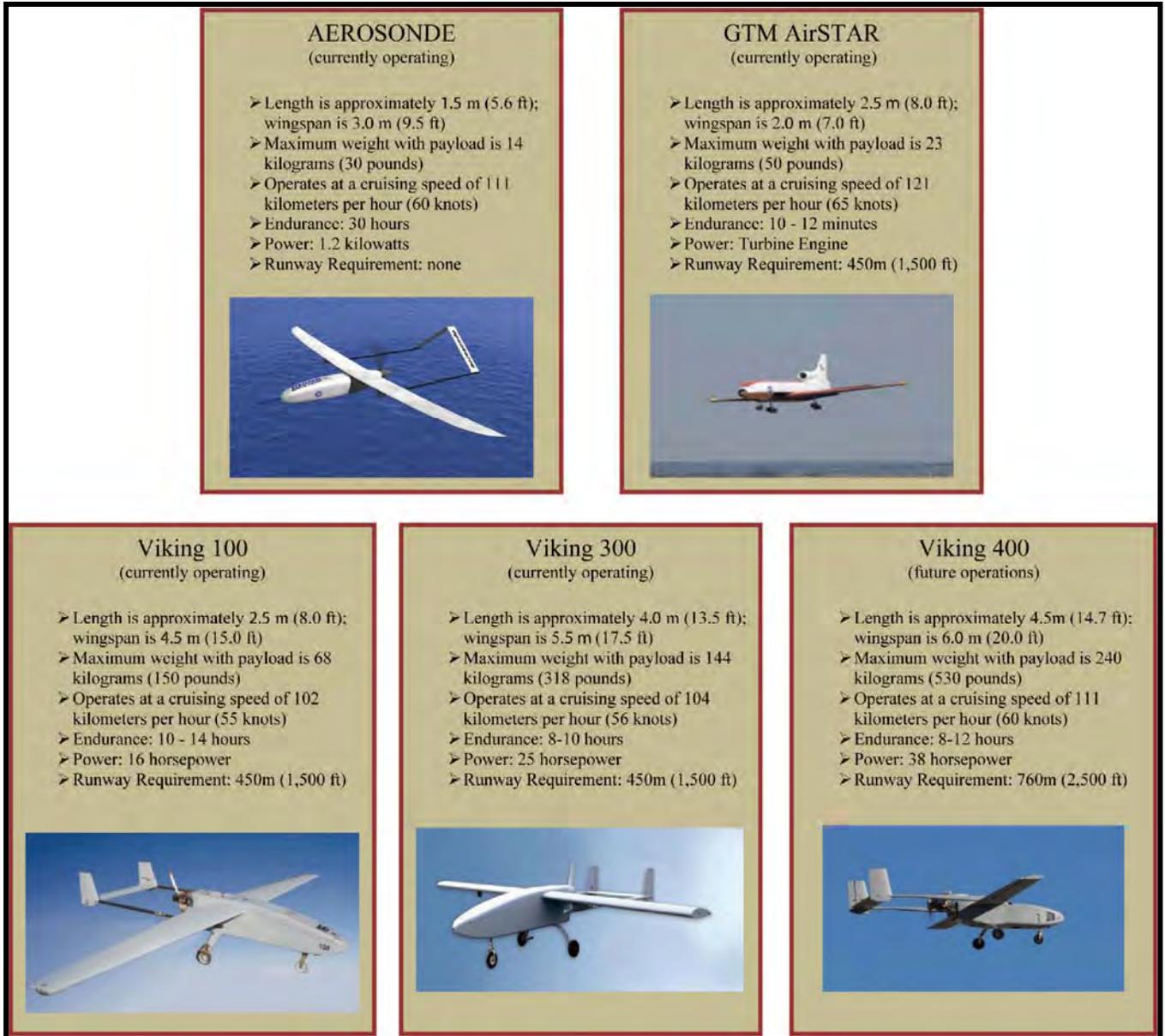


Figure 5. UAS Currently Operating and Proposed for Future Operations at WFF

In recent years, however, WFF has determined that the size and location of the existing airstrip has placed limitations on its use, constraining opportunities for scientific testing and research at WFF. Limitations on use of the existing UAS airstrip are outlined below:

- The airstrip has a north/south orientation making it susceptible to (east/west) cross winds. Due to the small size and light weight of most UAS, strong east/west winds often preclude and/or limit UAS operations. Historical wind data for Wallops Island indicates that winds are generally from the west/northwest or east/southeast directions (NASA 2010a).

- During storm events, the existing airstrip is often inundated with surf and sand. Severe beach erosion from hurricanes and nor'easters (as evident in Figure 6) has virtually eliminated the beachfront and dunes that provided protection in the past. Although, WFF is in the process of restoring the Wallops Island shoreline (NASA 2010b), the beach restoration project will not prevent storm driven flood waters from the back bays from inundating the existing UAS airstrip.
- WFF's rocket launch program has expanded with the current construction of a new launch pad north of the UAS airstrip. Mandatory safety constraints from increased rocket launch activities at the nearby Mid-Atlantic Regional Spaceport are anticipated to further reduce UAS research opportunities. The airstrip is inactivated prior to and immediately following rocket launch activities and static test firing of the rocket engines. Approximately 18 orbital launches, 60 sounding rockets, and 2 static test firing of rockets will occur each year (NASA WFF 2009a). Each of these activities has the potential to reduce opportunities for UAS flight operations.
- The existing airstrip (450 m [1,500 ft] long) would not be capable of supporting the next generation of Viking UAS; the Viking 400 would require, at a minimum, 760 m (2,500 ft) long airstrip for take-offs and landings; an additional 75 m (250 ft) clearance zone on each end would provide for safe operations.



**Figure 6. South Wallops Island UAS Airstrip after a Storm**

Based on the limitations presented, the requirement to operate UAS in restricted airspace, and NASA Goddard Space Flight Center's Suborbital and Special Orbital Projects Directorate's mission to provide the infrastructure and support services for scientific research and discovery, NASA has determined the need to construct a new UAS airstrip on the north end of Wallops Island.

#### **1.4 PROJECT DESCRIPTION**

As described above, WFF has determined that a new airstrip is needed to provide an adequately-sized facility that will be capable of supporting the testing and deployment of existing and future UAS and UAS-based scientific instruments at WFF. UAS test and UAS-based research opportunities form an important objective of NASA Goddard Space Flight Center's Suborbital and Special Orbital Projects Directorate and as such, this type of mission need requires an unencumbered operating environment. The new airstrip will have an asphalt surface and will measure approximately 900 m (3,000 ft long [2,500 ft plus an additional 500 ft clear zone]) by 25 m (75 ft) wide. Figure 7 offers a representative plan view of the proposed airstrip.

##### ***Design***

The UAS airstrip will incorporate typical aircraft airstrip design elements such as the necessary airstrip length, width, shoulders, and clear zone. The length and width of the airstrip will be the minimum required to support the takeoff/landing requirements of the largest UAS proposed (i.e., Viking 400) for operations at the airstrip. The unpaved shoulders of the airstrip will provide passage of maintenance or other vehicles and the occasional UAS that could veer of course. The clear zones will extend beyond the end of the airstrip and will provide additional area for takeoff operations. The airstrip will be designed to ensure that the surface area is flat, without humps, depressions, or other surface variations and the shoulders of the airstrip will be sloped to direct water to an infiltration trench.

##### ***Construction***

Prior to the start of construction activity, silt fencing and other approved measures to control erosion, sedimentation, stormwater runoff, and the integrity of a known archaeological site will be put in place. Following these control measures, two structures (metal observation tower and wood frame observation platform) located within the project area will be removed. The area comprising the base and clearing limits of the airstrip will be cleared of all vegetation. Vegetation alongside the length (out to 30 m [100 ft] on each side) of the airstrip will be cleared. Trees will be cut to ground level; digging below ground to remove stumps and roots is not anticipated since the area for the airstrip will be elevated with up to 1 m (3 ft) with fill in most areas. The site will then be filled, compacted, and graded to design specifications prior to application of the asphalt.

Construction of the UAS airstrip will affect approximately 5.3 hectares (13 acres) of vegetated areas from clearing and approximately 1.2 hectares (3 acres) of jurisdictional wetlands from fill activities. The appropriate permits for construction in a wetland area will be obtained prior to commencement of construction activities. Additionally, WFF will submit an infiltration trench design plan to Virginia Department of Environmental Quality (VDEQ) and U.S. Army Corps of Engineers (USACE) for review and approval.

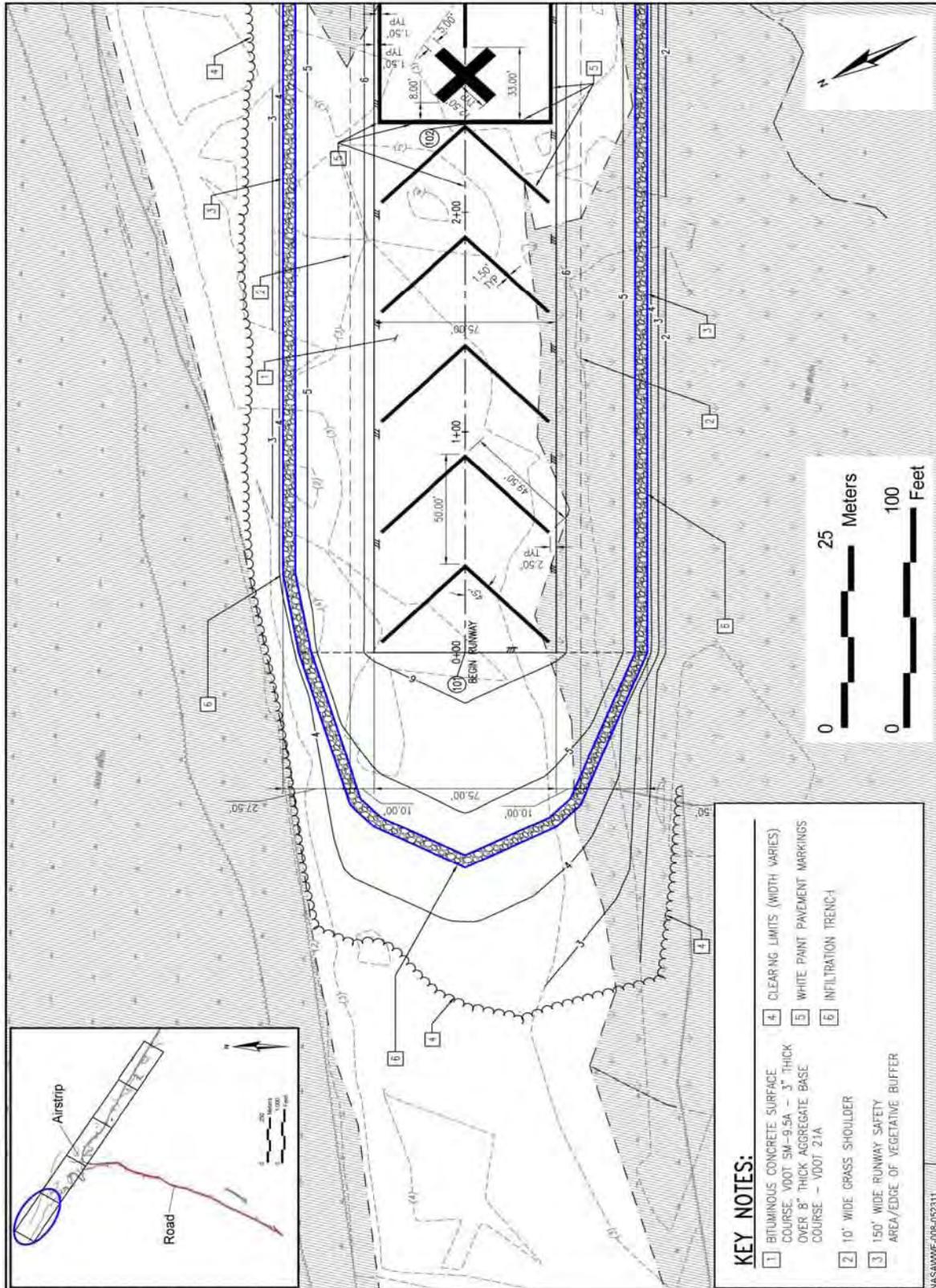


Figure 7. Representative View of the Proposed UAS Airstrip

The UAS airstrip will need to be elevated approximately 1 m (3 ft) above the existing ground surface to ensure sufficient surface water runoff for UAS operations. An infiltration trench will be constructed to capture the surface water runoff; the trench will incorporate low impact development techniques and will be constructed in accordance with Virginia stormwater management regulations and VDEQ standards for pre- and post-development stormwater discharge rates.

A staging pad for aircraft and support vehicles (i.e., government vehicles, fire truck, mobile command station, and road sweeper) in preparation for and during flight operations will be located just below the point where the access road meets the airstrip. Crushed gravel will be used to improve the existing dirt access road that provides service to the northernmost end of Wallops Island. Infrastructure improvements to provide electrical and telecommunication service will be implemented.

WFF anticipates construction of the UAS airstrip will begin in fiscal year 2013 and require approximately 9 months to complete. Construction activities will occur during daylight hours.

### ***Maintenance***

UAS operators require a clear line of sight during take-offs and landings; therefore, vegetation alongside the length (out to 30 m [100 ft] on each side with some variations) of the airstrip will be maintained via mowing and simple mechanical tools, as needed, throughout the year. Beyond the ends of the airstrip, the vegetation height will also be maintained in order to provide the necessary line of sight for UAS operators. Clearing around the known archaeological site will be done in accordance with a plan approved by the Virginia Department of Historic Resources.

### ***Operations***

UAS and UAS-based operations will be conducted year round during NASA's normal Air Traffic Control tower hours (Monday through Friday, 7 AM to 5 PM). From 2007 to 2009, annual UAS operations varied between 70 and 130 sorties<sup>1</sup> (personal communication, Justis 2010). Under this proposal, WFF intends to conduct on average, four UAS sorties each day. A maximum of 1,040 UAS sortie operations<sup>2</sup> will occur each year. This total will include the transition of UAS flight operations from the south Wallops Island airstrip. The number and frequency of operations will be dictated by the type of UAS test and UAS-based research being conducted in a given year.

Night operations are probable and will take place under special circumstances (e.g., hurricane monitoring). The airstrip will have no permanent lighting; should lighting be required for the rare nighttime operation, the lighting will be provided via mobile vehicle source at the minimum intensity necessary for task performance.

UAS will operate within the existing NASA controlled/restricted airspace (R-6604A/B) and within the Virginia Capes Operating Area (VACAPES OPREA), the Navy's offshore training area (Figure 2). UAS from WFF will not operate over Chincoteague Island, Assateague Island National Seashore, or over any populated areas. Aside from takeoff and landing, the minimum operating altitude for UAS operating near the airstrip will be approximately 150 m (500 ft).

---

<sup>1</sup> A sortie consists of a single UAS flight operation from takeoff through landing.

<sup>2</sup> A sortie operation applies to flight activities outside of the airfield/airstrip space environment.

### **UAS Community Operational Noise Levels**

Of the UAS currently operating and proposed for operations at the new UAS airstrip, the Viking 3 00 has been determined to be the loudest of the unmanned systems. The noise level<sup>3</sup> of the Viking 3 00 is 70 dB at 300 m (1,000 ft) flight altitude at 100 km per hour (56 knots) (this is maximum level ( $L_{max}$ ) occurring during the flyover). For aircraft fly overs at these speeds, the Sound Exposure Level (SEL)<sup>4</sup> is approximately 10 decibels (dB) greater than the maximum level, which would give an estimated SEL value of 80 dB for a 300 m (1,000 ft) flyover. A 150 m (500 ft) minimum cruise altitude near the airstrip is proposed. The reduction of the altitude by a factor of 2 would increase the SEL by 3 dB<sup>5</sup>. Thus, the estimated SEL underneath the flight track near the airstrip at 150 m (500 ft) would be approximately 83 dB.

Under the Proposed Action, it is projected that the average operational day would consist of no more than four UAS sorties, which means eight operations per day (one sortie equals one departure and one arrival). UAS sorties would occur during daylight hours, with the potential for an occasional nighttime operation taking place under special circumstances (e.g., hurricane monitoring). Therefore, an estimated maximum Day-Night Average Sound Level (DNL)<sup>6</sup> value underneath the flight track is calculated using the following formula:

$$DNL = SEL + 10 \cdot \log(\text{Number of passes}) - 49.4$$

Using this formula, a maximum DNL for UAS operations under this proposal would be:

$$DNL = 83 \text{ dB SEL} + 10 \cdot \log(8) - 49.4 = DNL 43 \text{ dB}$$

This level is very low and is actually 10 dB below the ambient levels of DNL 52.5 dB (Downing 2011). These calculations indicate that UAS operations at the new airstrip would not create significant noise levels in the surrounding areas, assuming operational parameters remain as projected.

---

<sup>3</sup> Sound Level is the amplitude (level) of the sound that occurs at any given time. When an aircraft flies by, the level changes continuously, starting at the ambient (background) level, increasing to a maximum as the aircraft passes closest to the receiver, then decreases to ambient as the aircraft flies into the distance. Sound levels occur on a logarithmic decibel scale; a sound level that is 10 dB louder than another will be perceived as twice as loud.

<sup>4</sup> SEL accounts for both the maximum sound level and the length of time a sound lasts. SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total sound exposure for an entire event.

<sup>5</sup> SEL values are analogous to a line source which has a distance variation of 3 dB per doubling, whereas  $L_{max}$  variation with distance follows a point source which is 6 dB per doubling of distance.

<sup>6</sup> DNL is a noise metric combining the levels and durations of noise events, and the number of events over a 24-hour time period. It is a cumulative average, computed over a given time period like a year, to represent total noise exposure.

### ***UAS Proposed for Operations***

A representative list of UAS that currently operate and are proposed for operations has been provided (refer to Table 1). The Viking 400 would be the largest UAS authorized to operate from the proposed airstrip. The Viking 400 has a 6 m (20 ft) wingspan, is 4.5 m (14.7 ft) in length, and has a maximum weight of 240 kilograms (530 pounds). The minimum length for takeoff and landing the Viking 400 is 760 m (2,500 ft).

### ***UAS Operators***

UAS operators are and will remain responsible for transporting their respective aircraft to and from WFF; operators are not provided storage or maintenance space while on the installation. On average, a UAS operations team will consist of three people who will remain in the local area for up to two weeks. Additionally, WFF range safety personnel, consisting of up to three persons will remain on site during UAS operations. If the UAS airstrip will be used as a base for NASA scientific instrumentation, up to two NASA science personnel will also be present to monitor the instrument's functionality. UAS will 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 will be required to maintain a clear line of sight for UAS take-offs and landings. WFF will not permit UAS to be remotely controlled unless prior approval by WFF Range Safety Office was provided. With the exception of the Aerosonde listed above, UAS operating from the airstrip will be fueled with a common jet propellant (JP). JP-5 is the most frequently used fuel for turbine engines. This fuel will not be stored on site; each UAS operator will be responsible for transporting and dispensing fuel for each day's use. The average UAS operating from WFF will hold approximately 11 liters (3 gallons) of JP-5 fuel.

## **1.5 GENERAL CONSERVATION MEASURES**

Provided below is a summary of considerations and mitigation measures for sensitive biological resources that WFF has incorporated into the planning, design, and operation of the new UAS airstrip. These more general conservation measures help to avoid and minimize impacts to all species being covered by this biological assessment; species-specific conservation measures are discussed separately for each species in Chapter 3.

1. In 2009, WFF proposed to construct a 1,600 m (5,200 ft) long by 25 m (75 ft) wide UAS airstrip in the north end of Wallops Island at the location currently proposed. Coordination letters were sent to Federal and state agencies providing a brief description of the proposal. After careful consideration, WFF determined that a smaller UAS airstrip will meet their overall need. As such, the original proposed airstrip has been reduced by 42% in length, placing it further inland away from the coastal dunes and beaches, and thus lessening potential impacts on species using those habitats.
2. WFF has chosen to construct the shortest airstrip possible necessary to accommodate all UAS types. The Viking 400 will be the largest UAS that would be authorized to operate from the new airstrip.
3. The proposed airstrip is now sited to minimize encroachment of the existing bald eagle nest. The eastern end of the airstrip is now approximately 215 m (700 ft) from the recently active nest, and

the clear zones that will be annually maintained now only encroach tangentially on the previously required 200 m (660-ft) nest site buffer.

4. Prior to the start of construction activity, silt fencing and other approved measures to control erosion and sedimentation will be installed. After completion of construction, all barren and exposed soil surfaces will be revegetated using native grass seed mixtures following a site-specific Sediment and Erosion Control Plan that WFF will design and oversee its implementation.
5. In accordance with State of Virginia stormwater management standards for pre- and post-development stormwater discharge rates, an infiltration trench will be constructed to capture the surface water runoff from the airstrip and all other developed, impervious surfaces; low impact development methods will be incorporated into the trench allowing stormwater to infiltrate directly from the trench.
6. Clear zones on either side of the airstrip (out to 30 m [100 ft] on each side with some variations) and at either ends are required to maintain clear lines-of-sight per safety standards. Vegetation within clear zones will be maintained in a minimally intrusive manner via mowing and simple mechanical tools, as needed, throughout the year.
7. UAS operating from the airstrip would be fueled with a common JP. JP-5 is the most frequently used fuel for turbine engines. In order to minimize any potential spills of hazardous materials, jet fuel will not be stored on site; instead, each UAS operator will be responsible for transporting fuel to the site, dispensing fuel for each day's use, and then transporting fuel offsite. All personnel involved in transporting and dispensing fuel will be trained on how to implement WFF's Integrated Contingency Plan prior to handling fuel onsite.
8. There will be no permanent lighting at the new airstrip. Any temporary lighting that may be necessary during UAS operations will be of the minimum intensity necessary to perform the required function and will be designed so that it is shielded and/or cast downwards. Because nighttime UAS operations will be very infrequent, and any light that is needed will be shielded and downward cast, the potential impact from nighttime safety lighting at the airstrip will be negligible.
9. Besides being infrequent, nighttime operations of UAS will not result in impacts from aircraft safety lighting potentially illuminating beachfront areas. UAS will be operating within the existing NASA controlled/restricted airspace (R-6 604A/B) and within the Navy's VACAPES OPAREA, both of which are restricted airspace so standard FAA aircraft safety lighting requirements do not apply.
10. A minimum cruise altitude will be mandated as UAS fly over the beach areas, and maximum angles of ascent and descent will be used for UAS takeoffs and landings. Although, minimum cruise altitudes over the airstrip and beach/land areas may be as low as 150 m (500 ft) above ground level, UAS operators will be instructed to maintain an altitude of 305 m (1,000 feet) over protected species. Trajectories will be included in each UAS flight profile/plan.
11. UAS operators will be instructed not to use flight paths that run parallel to the beaches.
12. The existing threatened and endangered species monitoring/reporting program will continue. A summary of the program's objectives, methodologies, and reporting forms for the coming year

(2011) can be found in Appendix A – “*Wallops Island Protected Species Monitoring Plan, February 2011.*” Per the program’s protocols, should listed species (e.g., piping plovers, red knot, sea turtles) or their nests be found on the beach directly under the primary UAS flight paths, UAS operators will be directed to use alternate flight paths, or to temporarily shut down flight operations.

## **1.6 CONSULTATION HISTORY**

NASA is the proponent for the North Wallops Island airstrip and is the lead agency for preparation of the corresponding Environmental Assessment. The USACE is a cooperating agency. As defined in 40 CFR §1508.5, a cooperating agency....

means any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment.

USACE is a cooperating agency because they possess regulatory authority and specialized expertise pertaining to the location of the Proposed Action. Under Section 404 of the Clean Water Act, the USACE has jurisdiction over the disposal of dredged and fill material in Waters of the U.S.

Because of the project’s potential to affect federally listed species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS), WFF sent a project scoping letter to the USFWS Virginia Field Office on July 14, 2010, requesting any early project-related comments and potential concerns. Informal USFWS consultation began with a teleconference held on January 26, 2011, which was attended by Mr. Mike Drummond of the USFWS Virginia Field Office. Mr. Drummond requested that he be provided with a more focused project description, as well as a list of any avoidance and minimization measures that may have already been incorporated into the project design and operational phases. Mr. Drummond also requested that, in addition to the species list he was provided, that the biological assessment also consider potential impacts to red knot (*Calidris canutus*), nesting loggerhead sea turtles (*Caretta caretta*), and evaluate the potential for Delmarva fox squirrel (*Sciurus niger cinereus*) and tiger beetle (*Tetracha virginica*) to be present on Wallops Island.

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## CHAPTER 2 EXISTING CONDITIONS

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### 2.1 ACTION AREA

The action area is the geographic area in which project effects could be experienced by listed species. The area of effect for the construction of the new UAS airstrip includes the airstrip footprint, access road upgrade, and areas underlying the approach and takeoff zones at either end of the airstrip. The coastal communities over which UAS will traverse during takeoffs and on approach during landings are included because of potential indirect effects of visual and noise disturbance produced by overflying UAS. There are four distinct ecological communities included within the action area: 1) uplands, 2) non-tidal emergent and scrub-shrub wetlands, 3) estuarine intertidal emergent wetlands, and 4) coastal habitats (i.e., dunes, inter-dune swales, beaches, and nearshore waters). Due to varying degrees of human disturbance and the influence of invasive species within the project area, the quality of these habitats varies significantly throughout the site.

### 2.2 ECOLOGICAL CLASSIFICATION OF NORTH WALLOPS ISLAND

The western portion of the project area, identified as the area to the west of North Seawall Road, is dominated by tidal marsh which transition into smaller areas of palustrine emergent and scrub-shrub wetlands. Scrub-shrub uplands are located between the tidal and non-tidal wetland complexes located to the north and south. The eastern portion of the project area contains a larger percentage of forested and scrub-shrub uplands than the western portion. Palustrine emergent wetlands are more prevalent to the north of North Seawall Road while palustrine scrub-shrub wetlands are prevalent to the south of the road. The following descriptions generally depict the habitats encountered while transiting from the drier, more central portions of the island seaward to the inshore waters of the Atlantic Ocean.

#### *Forested Uplands*

The majority of the forested upland areas located within the subject project area are characterized as mature pine with mixed hardwoods. Dominant species within these areas include loblolly pine (*Pinus taeda*), black cherry (*Prunus serotina*), American Holly (*Ilex opaca*), and eastern red cedar (*Juniperus virginiana*). Dominant species within the scrub-shrub upland areas include wax myrtle (*Myrica cerifera*), poison ivy (*Toxicodendron radicans*), common greenbrier (*Smilax rotundifolia*), black cherry, American holly, eastern red cedar, and Sassafras (*Sassafras albidum*). Upland soils typically have a fine sand texture with a very dark grayish brown (10YR 3/2) color with no mottles in the upper 2.5 to 10 centimeters (cm) (1 to 4 inches [in]) and underlain with a light olive brown (2.5Y 5/3) color.

Common mammal species that occupy the maritime forest include white tail deer (*Odocoileus virginianus*), gray fox, and opossum. Songbirds frequently seen in the woodlands and adjoining tidal wetlands include saltmarsh sharp-tailed sparrow (*Ammodramus caudacutus*), swamp sparrow (*Melospiza georgiana*), common yellowthroat (*Geothlypis trichas*), white-eyed vireo (*Vireo griseus*), and white-breasted nuthatch (*Sitta canadensis*). The inland areas and tidal marshes on Wallops Island also support a variety of raptor species, including turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), sharp-shinned hawk (*Accipiter striatus*), red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), northern harrier (*Circus cyaneus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), bald eagle, and peregrine falcon.

### **Palustrine Scrub-Shrub**

Palustrine scrub-shrub wetland communities are dominated by wax myrtle, poison ivy, common greenbrier, and groundsel bush (*Baccharis halimifolia*). Palustrine emergent wetlands are mainly dominated by common reed (*Phragmites australis*) with a low persistence of soft rush (*Juncus effuses*) in some areas. Soils within the non-tidal wetlands vary but typically have a sand texture with a black color in the upper 2.5 to 10 cm (1 to 4 in) and a grayish brown color beneath. Evidence of organic streaking was also noted to exist below the A layer.

### **Tidal Marsh**

The tidal marsh complexes are dominated by species typically occurring in these communities. These species, transitioning from upper tidal marsh to lower tidal marsh, include common reed, salt bush (*Iva frutescens*), seashore mallow (*Kosteletzkya virginica*), marsh mallow (*Althaea officinalis*), seaside goldenrod (*Solidago sempervirens*), common glasswort (*Salicornia europaea*), salt meadow hay (*Spartina patens*), salt grass (*Distichlis spicata*), and salt marsh bulrush (*Scirpus robustus*). Typical lower tidal communities include salt meadow hay and smooth cordgrass (*Spartina alternifolia*). Non-vegetated tidal mud flats and tidal drainage patterns are present within the low marsh habitat along the southeastern boundary of the project area. Comacca soils within the tidal areas exhibit a fine sandy texture with a dark grayish brown color (10YR 4/2) in the top 15 cm (6 in), and underlain with a very dark gray color (10YR 3/1). Chincoteague soils exhibited a black (2.5Y 2.5/1) silt loam in the upper 15 cm (6 in) of soil, and underlain with a dark grey (2.5Y 4/1) loamy sand.

The tidal marshes on Wallops Island represent an important stop-over habitat for waterfowl and shorebirds during spring and fall migration. Some of the species frequently observed in large numbers on Wallops Island include Canada goose (*Branta canadensis*), gadwall (*Anas strepera*), least sandpiper (*Calidris minutilla*), short-billed dowitcher (*Limnodromus griseus*), least tern (*Sterna antillarum*), osprey (*Pandion haliaetus*), double-crested cormorant (*Phalacrocorax auritus*), and horned grebe (*Podiceps auritus*).

The bays and tidal marshes adjacent to Wallops Island support a wide variety of breeding, wintering, and migrating waterfowl. Species frequently observed in large numbers during winter include common loon (*Gavia immer*), American black duck (*Anas rubripes*), blue-winged teal (*Anas discors*), bufflehead (*Bucephala albeola*), common goldeneye (*Bucephala clangula*), canvasback (*Aythya valisineria*), lesser scaup (*Aythya affinis*), common merganser (*Mergus merganser*), hooded merganser (*Lophodytes cucullatus*), and red-breasted merganser (*Mergus serrator*).

### **Dunes and Maritime Grasslands**

The maritime grasslands, which occur on the foredunes and secondary sand dunes, are characterized by American beachgrass (*Ammophila breviligulata*), saltmeadow cordgrass, beach panic grass (*Panicum amarum*), and seaside goldenrod (*Solidago sempervirens*). Relatively pristine occurrences of this habitat type can be found at the northern end of Wallops Island.

### **Inter-dune Swales**

Inter-dune swales (“sea swales”) are seasonally to semipermanently flooded, maritime herbaceous wetlands occupying deep inter-dune basins and swales. These swales occur chiefly in the northern and north central parts of the island. Common threesquare (*Schoenoplectus pungens* = *Scirpus pungens*), other Cyperaceae, grasses such as switchgrass (*Panicum virgatum*), and saltmeadow cordgrass, rushes (*Juncus*

spp.), sea pink (*Sabatia stellaris*), saltmarsh fimbriatilis (*Fimbristylis spadicea*), seaside goldenrod, and other herbaceous species are present.

Mammal species routinely observed in the inter-dune areas include white-tailed deer, meadow vole (*Microtus pennsylvanicus*), and cottontail rabbit (*Sylvilagus floridanus*), while typical amphibians and reptiles include Fowler's toad (*Bufo fowleri*), green tree frog (*Hyla cinerea*), black rat snake (*Elaphe obsoleta obsoleta*), eastern hognose snake (*Heterodon platirhinos*), fence lizard (*Sceloporus undulatus*), box turtle (*Terrapene carolina*), and diamondback terrapin (*Malaclemys terrapin*).

### **Beaches**

The beach systems include upper beaches and overwash flats, which are situated just above the mean high tide limit, but are flooded by high spring tides and storm surges. They are generally sparsely vegetated with American searocket (*Cakile edentula*), seabeach orach (*Atriplex arenaria*), and Russian thistle (*Salsola kali*), a common invasive non-native beach species.

Mammalian species frequently observed in the upper beach and intertidal zones include red fox and raccoon. Shorebirds and wading birds species that routinely use the marshes and shoreline areas of Wallops Island include piping plover (*Charadrius melodus*), red knot (*Calidris canutus*), great-black backed gull (*Larus marinus*), American oystercatcher (*Haematopus palliatus*), willet (*Catoptrophorus semipalmatus*), glossy ibis (*Plegadis alcinellus*), ring-billed gull (*Larus delawarensis*), great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and green heron (*Butorides striatus*).

### **Inshore Marine System**

The marine system consists of the open ocean overlying the continental shelf and its associated high-energy coastline. Salinities exceed 30 parts per thousand with little or no dilution except outside the mouths of estuaries. Marine systems are divided into two subsystems, subtidal and intertidal. In subtidal subsystems the substrate is continuously submerged, whereas in intertidal subsystems the substrate is exposed and flooded by tides. Substrates may consist of rock bottom, unconsolidated bottom, aquatic bed, reef, rocky shore, and unconsolidated shore. The beaches at Wallops Island are classified as intertidal with an unconsolidated sand bottom and the adjacent waters are classified as subtidal with an unconsolidated bottom. Shoreline erosion and accretion constantly change the character of the shoreline. Currently, the widest beaches occur on the northern and southern portions of the east shore, with the central portion of the island being nearly devoid of beaches and protected by a seawall.

Nearshore state jurisdictional waters extend 5.5 km (3 nautical miles) offshore of the Wallops Island coast. Water depth in state waters ranges up to approximately 12 m (40 ft). This zone is located on the inner portion of the outer continental shelf and extends to about 130 to 160 km (80 to 100 miles) off the mid-Atlantic Coast. Numerous invertebrate species are present in the unconsolidated substrate and open waters of the nearshore zone. Common species include annelid worms, bivalves, crabs, sand dollars, gastropods, comb jellies, and jellyfish. Many of these organisms are an important food source for fish, birds, and sea turtles.

Common fish in the waters near WFF include the sandbar shark (*Carcharhinus plumbeus*), sand shark (*Carcharisa taurus*), northern pipefish (*Syngnathus fuscus*), dusky pipefish (*Syngnathus floridae*), bay anchovy (*Anchoa mitchilli*), smooth dogfish (*Mustelus canis*), smooth butterfly ray (*Gymnura micrura*), bluefish (*Pomatomidae saltatrix*), spot (*Leiostomus xanthurus*), and summer flounder (*Paralichthys dentatus*).

## **CHAPTER 3 LISTED SPECIES THAT MAY BE AFFECTED BY THE PROPOSED ACTION**

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### **3.1 LISTED SPECIES OVERVIEW**

The federal Endangered Species Act (ESA) provides for the protection of federally listed threatened and endangered species of plants and animals, as well as designation of critical habitat for animal species. The ESA establishes federal policy that federal agencies, in exercise of their authorities, shall seek to conserve and protect endangered and threatened species. It also establishes a consultation process through which federal agencies, such as NASA and USFWS, can facilitate avoidance of agency actions that would adversely affect, or result in “take,” of federally listed species or critical habitat. The taking prohibition includes any harm or harassment, and applies within the U.S. and on the high seas.

Table 2 includes a list of federally threatened and endangered species that are known to occur, or may potentially occur, within the action area. Note that this BA, and the table below, is an analysis of federally listed species that are terrestrial, but also includes marine species that may come ashore and nest on the nearby beaches of north Wallops Island. In general, this includes listed species that may be occupying habitats directly impacted by construction of the new UAS airstrip and associated facilities, as well as species that may be indirectly affected from lights, overflight UAS noise, and the visual disturbance from UAS suddenly appearing over the beach. As a federal agency, NASA does not have an obligation to protect state-listed only species, but often consults with Virginia Department of Game and Inland Fisheries (VDGIF) on species that are dually listed under the federal ESA and state ESA. As the Proposed Action will not affect nearshore or subtidal habitats, impacts to marine mammals, fish, and sea turtle species in the nearshore open water environment will not occur.

As a responsible federal agency and steward of the land under its jurisdiction and management, NASA WFF environmental program staff have been monitoring threatened and endangered species use of Wallops Island for many years now, either solely or through partnerships with other agencies, institutions, or research groups. In 2010, WFF staff organized its various monitoring efforts into a single Protected Species Monitoring Program, the results of which were published in December 2010 (NASA WFF 2010b). Data for loggerhead sea turtle nests, piping plover nests, and red knot flock sighting locations are presented in Figure 8, as are the locations of the Proposed Action (new UAS airstrip, hangar, and clear zones). A summary of the objectives, methodologies, and procedures that will be used in the 2011 monitoring program is provided in Appendix A.

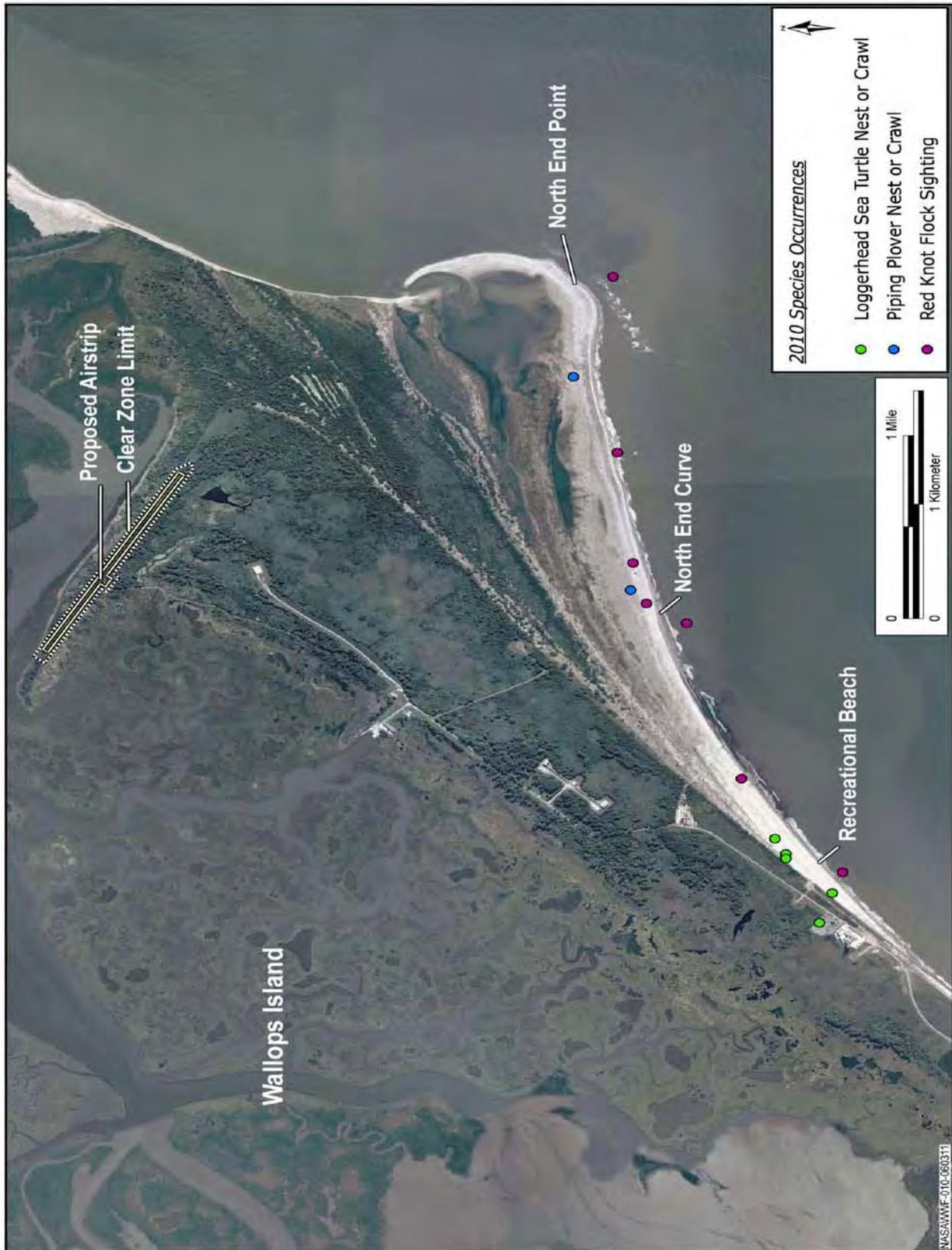


Figure 8. Nest and Sighting Locations on Wallops Island

**Table 2. Federally Listed Threatened and Endangered Species Known to Occur in the Region**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Federal Listing Status</i>	<i>Likelihood of Occurrence</i>	<i>Seasonality of Occurrence</i>	<i>Required Habitat &amp; Potential to Occur Onsite</i>
<b>Plants</b>					
Seabeach Amaranth	<i>Amaranthus pumilus</i>	Threatened	Slight	Year-round	Restricted to open sandy portions of ocean beaches between the high tide line and the toe of the primary dune. Nearest known location in Virginia is Hog Island. Not known to occur on Wallops.
<b>Invertebrates</b>					
Northeast Beach Tiger Beetle	<i>Cicindela d. dorsalis</i>	Threatened	Remote	Year-round	Present historically, from Cape Cod south through the Chesapeake Bay shorelines, but now believed extirpated from nearly this entire region. Normally occurs from about the fore-dune to the high tide line on ocean and bay beaches. Not known to occur on Wallops.
<b>Reptiles</b>					
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Threatened	Known to Occur	<u>Maturation &amp; Migration</u> May- November  <u>Nesting</u> April- September	The only sea turtle that nests as far north as Virginia. Nests in small numbers on sandy beaches along Virginia's coast late spring through summer, and found in Virginia's offshore coastal waters during winter and migration. Last nested on Wallops Island in 2010.
<b>Birds</b>					
Red Knot	<i>Calidris canutus</i>	Candidate	Known to Occur	Primarily late May	A locally common to abundant transient in late spring and early fall, and does not breed in Accomack County. Preferred habitats include tidal flats and sandy or pebbly beaches. Numbers declining, but several hundred observed in 2010 at North End Curve and North End Point on Wallops Island's ocean beaches.

**Table 2. Federally Listed Threatened and Endangered Species Known to Occur in the Region**

<i>Common Name</i>	<i>Scientific Name</i>	<i>Federal Listing Status</i>	<i>Likelihood of Occurrence</i>	<i>Seasonality of Occurrence</i>	<i>Required Habitat &amp; Potential to Occur Onsite</i>
Piping Plover	<i>Charadrius melodus</i>	Threatened	Known to Occur	late April-late July	Known to nest on Virginia’s coastal beaches, dunes, and wash-over areas in late spring to mid-summer, with one brood raised per year. They feed on small invertebrates in intertidal surf zones, mud flats, tidal pool edges, barrier flats, and sand flats and along the ocean and barrier bays. Suitable nesting habitat occurs on the extreme southern and northern ends of Wallops Island., with three nesting events at north end in 2010, and one on south end in 2011.
<b>Mammals</b>					
Delmarva Peninsula Fox Squirrel	<i>Sciurus niger cinereus</i>	Endangered	None	Year-round	Prefers mature forest of both hardwood and pine trees with minimal understory and ground cover. Feeds primarily on nuts from oak, hickory, sweet gum, walnut and loblolly pine. While within the historic range of the species, the only known location for it in Virginia is a trans-located population at Chincoteague National Wildlife Refuge. This species does not occur on Wallops Island.

Sources: Virginia Department of Game and Inland Fisheries (VDGIF 2009); NASA INRMP (2008b); USFWS (2011); and National Marine Fisheries Service (NMFS [2011]).

Note: The bald eagle, formerly listed as endangered, now de-listed and considered recovered; is provided protection under the federal Bald and Golden Eagle Protection Act. An active bald eagle nest is known to occur about 200 m (700 ft) east of the eastern portion of the proposed airstrip. WFF will continue to monitor activity at the nest during breeding season and during the operational phase of the UAS airstrip.

### 3.2 SEABEACH AMARANTH

The threatened seabeach amaranth (*Amaranthus pumilus*) is an herbaceous plant, which colonizes and stabilizes the areas seaward of the primary dunes, growing closer to the high tide line than any other coastal plant. An annual plant and fugitive species, seabeach amaranth appears to need extensive beach and inlet areas that function in a relatively natural and dynamic manner. It often grows in the same areas selected for nesting by shorebirds such as plovers, terns, and skimmers. It emerges on sand dunes, inlets, and over-wash flats in summer and early fall. Its distribution varies from year to year,



influenced by seed dispersal and locally favorable conditions for germination, growth, and flowering. Flowering begins as soon as plants are mature, sometimes as early as June, but more typically beginning in July and continuing into late fall. Seed production begins in July or August and peaks in September.

Seabeach amaranth occurs on barrier islands and beaches, where its primary habitat consists of over-wash flats at the accreting ends of islands, and the lower foredunes and upper strands of non-eroding beaches. This species appears to be intolerant of competition, and does well on sites with low vegetative cover. Seabeach amaranth requires extensive areas of barrier island beaches and inlet areas, and is most successful at colonizing un-altered beach landscapes which are inherently dynamic. These characteristics allow it to “move around” in the landscape as a fugitive species, occupying suitable habitat as it becomes available.

While seabeach amaranth has been documented as occurring along coastal Virginia in areas of suitable habitat, it has yet to be located on Wallops Island. Surveys in 2010 failed to locate any seabeach amaranth on Wallops Island (NASA WFF 2010b). Because seabeach amaranth is not known to occur on Wallops Island, and beach dune habitats will not be disturbed by construction, implementation of the Proposed Action would have **No Effect** on this plant species, and it will not be discussed further in this BA.

### 3.3 NORTHEAST BEACH TIGER BEETLE



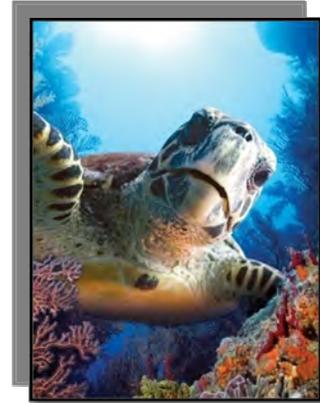
Northeast beach tiger beetle (*Cicindela dorsalis dorsalis*) is a whitish tiger beetle with variable dark maculation that is found only along saltwater beaches. The northeast beach tiger beetle only occurs from about the fore-dune to the high tide line on some ocean and bay beaches. Adults actively hunt while larvae live in burrows in the sand where they sit and wait for passing prey. Tiger beetle larvae seal off their burrow and hibernate in early fall. The life cycle spans two or three years. The northeastern beach tiger beetle spends its entire two-year life cycle on sandy beaches. Eggs are laid in the sand, and the larvae live in burrows below the high tide line. The adults are about 1 cm (0.5 in) long and are active along the intertidal zone (between high and low tide) during the day and rest under the sand along the back beach at night. The larvae inhabit vertical burrows within the intertidal zone, capturing food items washed ashore by waves.

The northeastern beach tiger beetle has a historic range from New Jersey to Cape Cod and along much of the eastern and western shorelines of the Chesapeake Bay, from southern Maryland to Virginia. Although the northeastern beach tiger beetle was present historically on the Atlantic coast beaches, especially in the northeast, it is extirpated from nearly this entire region. It is believed that this species only inhabits portions of the Delmarva Peninsula fronting the Chesapeake Bay, not the Atlantic Ocean (NASA WFF 2009b). Because it is highly unlikely that this species occurs in the Action Area, implementation of the Proposed Action would have **No Effect** on northeast beach tiger beetle, and they will be excluded from further discussion in this BA.

### 3.4 LOGGERHEAD SEA TURTLE

Although the loggerhead sea turtle (*Caretta caretta*) is the most abundant sea turtle in U.S. waters, it is still listed as threatened under the ESA. Loggerhead sea turtles are a reddish-brown sea turtle that inhabit the open sea to more than 800 km (500 miles) from shore, mostly over the continental shelf, as well as

bays, estuaries, lagoons, creeks, and river mouths. Nesting occurs on open high-energy sandy beaches above the high-tide mark, seaward of well-developed dunes. Hatchlings drift in convergence zones in floating patches of kelp (*Sargassum* spp.) (USFWS and NMFS 1993). As juveniles, they begin occupying the waters of the continental shelf, edge and slope from 200 m (656 ft) depth all the way into coastal waters and estuaries (Hopkins-Murphy et al. 2003). These waters comprise an important developmental habitat for this species. Juveniles and adults feed mostly on benthic invertebrates. Loggerheads do not venture into the Gulf Stream in the fall, probably to avoid being swept into the colder northern waters (Epperly et al. 1995). Loggerheads prefer steeply sloped beaches with gradual offshore approaches and are sensitive to beachfront lighting.



Based on data from the Wallops Island protected species monitoring program (NASA WFF 2010b), a total of four loggerhead sea turtle nests were found on Wallops Island's beaches in 2010 (during June and July), with the number of eggs in each ranging from 99 to 175. All four nests were located south of the existing south Wallops Island UAS airstrip, approximately 2.5 km (1.6 miles) southwest of the proposed new north Wallops Island airstrip (see Figure 8). Each nest was marked with protective signage and covered with a protective cage, with one egg being retained for eventual genetic analyses. No sea turtle nests or false crawls were found on Wallops Island's beaches in 2009, and in 2008 one nest was laid late in the season but was flooded and froze during late October storms (Mitchell 2011a).

### 3.5 RED KNOT

The red knot (*Calidris canutus*), a Candidate species for federal listing, is a medium sized sandpiper that is one of the longest-distance migrants known in the world (USFWS 2005). These small birds have wingspans of approximately 50 cm (20 in) and fly more than 1,500 km (930 miles) from south to north each spring and in reverse each autumn. These are relatively short birds with short legs, and their heads



and breasts are rusty colored during the breeding season and grey the rest of the year. Red knots migrate in large flocks and frequent the same stopping areas each year. Their long migration periods cause physiological changes such as increases in fat mass and flight muscle and decreases in leg muscle mass, stomach mass, and gizzard mass (USFWS 2005). Red knots survive on small mussels and other mollusks for a large percentage of the year and horseshoe crab eggs during migration (USFWS 2005). In 2006, USFWS reviewed the candidacy status of red knot, but determined that its protection under the federal ESA remains warranted but precluded by other, higher priority activities. Currently it is still a Candidate species.

Based on survey data from the mid-1990s, 8,000 to 10,000 red knots would migrate through the barrier islands of Virginia each year (NASA WFF 2009b). However, survey data throughout 2009 indicated much lower numbers of individuals. On May 8, 2009, there was a flock of approximately 1,300 individuals seen on north Wallops Island; but, later that same month, flock size dropped to about 20 to 200 individuals (NASA WFF 2009b). In 2010, red knot flocks were sighted between May 14 and May 28 at numerous locations along Wallops Island's beaches, with flock size ranging from 2 to 230, and flocks

averaging 56 individuals. A number of these sightings occurred at “North End Curve” and “North End Point,” which are both about 1.5 km (1 mile) south-southeast from the eastern end of the proposed airstrip, and generally near what will eventually be some of the UAS departure and approach flight paths over the beach (see Figure 8).

### 3.6 PIPING PLOVER

The Atlantic coast population of piping plover (*Charadrius meolodus*) breeds on coastal beaches in the north from Newfoundland and southeastern Quebec and south to North Carolina and Florida. Some plovers migrate as far south as the West Indies and Bahamas. Plovers are small, beige and white shorebirds with a black band across their breast and forehead. They typically feed on invertebrates such as marine worms, beetles, fly larvae, crustaceans, and mollusks. Habitat generally consists of ocean beaches, sand, or algal flats in protected bays, while breeding occurs mainly on gently sloping



foredunes or blow-out areas behind dunes (NASA WFF 2009b). In late March or early April, after they have established territories and conducted courtship rituals, plover pairs form shallow depressions in the sand for nests where they lay their eggs. Nests can be found above the high tide line on coastal beaches, sandflats at the end of spits and barrier islands, gently sloping foredunes, blowout areas behind dunes, and over-wash areas between dunes. These nests consist of a range of substrate material from fine grained sands up to shells and cobbles. Generally, nests are found in areas with little or no vegetation, however, occasionally nests have been found under beachgrass and other vegetation (NASA WFF 2009b).

Piping plovers have been monitored on Wallops Island since 1986 and nesting habitat has been delineated in the dune and over-wash areas. Plovers are observed annually foraging and resting on the beaches of Wallops Island, and nesting is routinely documented on the northern beaches; however, no nesting plovers have been observed on the southern portion of the island since 2000. In 2008, two pairs of piping plovers began nesting attempts at the north end of Wallops Island, but no eggs were laid (NASA WFF 2010b). In 2009, three pairs nested successfully on the northern beaches; and in 2010, there were three nesting attempts, including one nest that was washed out by the tide, one nest with eggs that did not hatch, and one nest with 4 eggs that fledged 4 young (NASA WFF 2010b; Mitchell 2011b). Of the three 2010 piping plover nests, the one nearest to the project site was at “North End Point,” about 1.5 km (0.9 miles) to the south-southeast from the eastern end of the proposed airstrip (see Figure 8). In May 2011, one piping plover nest was observed on the south end of Wallops Island. At the request of USFWS, NASA has designated piping plover nesting habitat at the extreme northern and southern ends of Wallops Island, and these areas are recognized as sensitive resource areas by WFF requiring special protective measures.

### 3.7 DELMARVA PENINSULA FOX SQUIRREL

Delmarva Peninsula fox squirrel (*Sciurus niger cinereus*) is a large tree squirrel that is a well-marked and distinct subspecies restricted in range to the Delmarva Peninsula (Delaware, Maryland, Virginia). There are about 180 Delmarva Peninsula fox squirrels in the Chincoteague National Wildlife Refuge. Habitat for the Delmarva Peninsula fox squirrel includes mature, open park-like stands of deciduous or mixed

deciduous-pine forest, especially near farm land; this species prefers ecotones where forest grades into scrub or grasslands. It is found in both upland and bottomland locations, but most often among loblolly pines. It is restricted to larger groves along streams, bays, or salt marshes and is found in relatively small woodlots on occasion. The squirrels prefer dens in hollow trees, but also construct nests of twigs and leaves in tree crotches, in tangles of vines in trees, or toward the ends of larger branches, 10-15 m (30 to 50 ft) above ground. Delmarva Peninsula fox squirrels are more terrestrial than gray squirrels and often forage on the ground. Diet includes acorns and nuts; the seeds of hickory, beech, walnut, and loblolly pine; buds and flowers of trees; and fungi, insects, fruit, and an occasional bird egg. When available in abundance, they can feed almost exclusively on green pine cones.



Though it occurs on nearby Assateague Island, the Delmarva Peninsula fox squirrel does not occur on those portions of the peninsula fronting the Atlantic Ocean, so it would not occur in the Action Area, and it has never been found on any part of Wallops Island (NASA WFF 2009b). As such, implementation of the Proposed Action would have **No Effect** on the Delmarva Peninsula fox squirrel, and it will be excluded from further discussion in this BA.

## **CHAPTER 4 ANALYSIS OF EFFECTS TO LISTED SPECIES**

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### **4.1 APPROACH TO ANALYSIS**

This chapter presents an analysis of potential direct, indirect, temporary, and permanent effects on listed species that would result from construction, operation, and periodic maintenance of the proposed new UAS airstrip on north Wallops Island. Direct effects are considered to be the immediate result of the Proposed Action, whereas indirect effects are caused by the Proposed Action but occur later in time and are reasonably certain to occur. Potential project effects on protected species are further classified and evaluated based on their anticipated longevity as temporary or permanent effects. All project effects are summarized as they would occur after the General Conservation Measures (avoidance and minimization measures) described in Subchapter 1.5 are implemented. Any additional conservation measures being considered and implemented that are specific to certain species protection are described below.

### **4.2 EFFECTS TO LISTED SPECIES**

Based on the scope of the proposed new UAS airstrip construction and operational parameters, as described in Chapter 1, potential effects to nesting loggerhead sea turtles, red knots, and piping plovers could occur with implementation of the Proposed Action. As discussed below, some impacts may occur from construction noise, but more likely from operational lighting with regard to sea turtles, or UAS overflight noise or visual disturbance with regard to red knots and piping plovers. The benefits that will be derived from implementing the project's General Conservation Measures, as well as any remaining potential effects, are described below for each of these three species.

### **4.3 LOGGERHEAD SEA TURTLE**

Loggerhead sea turtles are often seen in the channels and inlets of Virginia's barrier islands. It has only been in more recent years that loggerhead sea turtle nests have been periodically found on Wallops Island beaches. Four loggerhead sea turtle nests were found on Wallops Island in 2010 (during June and July), but all four nests were located north of the existing south Wallops Island UAS airstrip, and approximately 2.6 km (1.6 miles) southwest of the proposed new north Wallops Island airstrip (see Figure 8). However, direct impacts to this species from the Proposed Action are not anticipated, because the project has been intentionally designed and sited to avoid disturbance to any dune or beach habitats. Nighttime lighting could disorient nesting females and emerging hatchlings; however, this type of indirect impact is also not anticipated, because: (1) UAS will only be operating infrequently at night; (2) any safety lighting at the airstrip will be of minimal intensity and downward-shielded; and (3) overflying UAS will not be using running lights. Finally, as directed by the WFF Threatened and Endangered Species Monitoring Program protocols, should WFF monitoring staff identify sea turtle nesting activity under UAS flight paths on the beach, UAS flights will be redirected or suspended until nesting activity has ceased or nestlings have completed their emergence. Given that direct impacts to sea turtle nesting habitat will be avoided, and that numerous measures will be implemented to avoid lighting and UAS overflight noise disturbances, it is concluded that implementation of the Proposed Action will have **No Effect** on loggerhead sea turtles.

#### 4.4 RED KNOT

Red knots, a candidate species for federal listing, are a locally common to abundant transient from May 10th through June 5th and from July 20th through September 25th along the coast of Accomack County, Virginia. Red knots are rare west of the Chesapeake Bay and an uncommon to rare visitor in the winter and summer. Red knots do not breed in the vicinity of Accomack County, although they have been appearing regularly during spring migration on Wallops Island, mostly during the second half of May. In 2010 on the northern beaches of Wallops Island, numbers of red knots grew steadily from a low of 50 individuals or so in mid-May, to a large flock of 230 birds that was observed on May 28. No red knots were observed on the northern beaches after the end of May, and none were ever observed on the southern beaches. Many of the 2010 north beach sightings of red knots were at “North End Curve” and “North End Point” (see Figure 8), which are both about 1.6 km (1 mile) south-southeast from the eastern end of the proposed airstrip, and generally near what will eventually be some of the UAS departure and approach flight paths over the beach. However, direct impacts to this species’ habitat from the Proposed Action are not anticipated because the project has been intentionally designed and sited to avoid all sensitive intertidal and over-wash habitats seaward of the dunes.

It is possible that red knots occurring within the flight path of UAS overflying the beach could experience deleterious startle responses from the sudden appearance and sound generated by UAS. The effects of overflying aircraft on waterfowl and shorebirds have been well-studied in the past 20 years, with researchers reporting varying results and conclusions. A review of the literature indicates that at least some level of temporary startle response can be expected and anticipated, particularly in non-nesting birds. Komenda-Zehnder *et al.* (2003), for example, focused on determining the minimum altitude above ground level (AGL) needed to minimize the stressful startle response of ducks in the Swiss lowlands to overflying aircraft and helicopters; they found that, depending on aircraft type, between 60 and 78 percent of waterfowl exhibited “stressed” behaviors (alarm posture, swimming away, taking immediate flight) with fixed-wing aircraft flying at approximately 150 m (500 ft) AGL and generating 66-68 dB noise, while helicopters at the same altitude caused a 82-89 percent startle response rate at 75-79 dB. Waterfowl returned to a relaxed posture after 5 minutes or so, although they did not appear to habituate or acclimate to the overflights. Smit and Visser (1993), in summarizing many Dutch studies, believe that large groups of waterfowl can habituate to overflights that occur daily, but mass startle responses can be elicited when a new type of aircraft suddenly appears, particularly at low altitudes (less than 300 m [about 1,000 ft] AGL).

It is sufficient to conclude that at least some level of shorebird startle response may be elicited, particularly early on in UAS operations, and if UAS fly below 150 m (500 ft) over the beach and intertidal zone, although some eventual habituation to UAS overflights is possible. However: (1) UAS will only be overflying the beach eight times per day, at most; (2) UAS operators will be instructed to maintain a flight path both 305 m (1,000 feet) vertically and horizontally away from red knots; and (3) with sound levels generated by the loudest UAS type actually being nearly 10dB below ambient levels measured onsite - it is unlikely that red knots would experience any significant short or long-term effects from UAS sound or visual disturbances. Therefore, given that direct impacts to dune habitats and maritime habitats seaward of the dunes will be avoided, and that numerous measures will be implemented to minimize visual and sound disturbances, it is concluded that implementation of the Proposed Action **will not substantially affect** local populations of red knots.

## **4.5 PIPING PLOVER**

The piping plover is an uncommon transient and summer resident of the lower Chesapeake Bay and is known to inhabit the coastal habitats of the nearby Chincoteague National Wildlife Refuge. It was first identified on northeast Wallops Island in a survey in June 28, 1995. Piping plovers are known to periodically use the sandy beaches and tidal flats along the coast of Wallops Island; piping plover nesting has been documented in recent years on Wallops Island. In 2008, two pairs of piping plovers began nesting attempts at the north end of Wallops Island, but no eggs were laid (NASA WFF 2010b). In 2009, three pairs nested successfully on the northern beaches; and in 2010, there were three nesting attempts, including one nest with 4 eggs that fledged 4 young (NASA WFF 2010b). Of the three 2010 piping plover nests, the one nearest to the project site was at “North End Point,” about 1.5 km (0.9 miles) to the south-southeast from the eastern end of the proposed airstrip (see Figure 8).

Direct impacts to this species’ habitat from the Proposed Action are not anticipated because the project has been intentionally designed and sited to avoid all sensitive intertidal and over-wash habitats seaward of the dunes. Indirect impacts on piping plovers from UAS noise and visual disturbances is possible, but unlikely. Similar precautions will be taken to avoid startle responses in nesting piping plovers from overflying UAS, including: (1) UAS overflights of the beach will be infrequent (eight times per day, at most) and (2) UAS operators will be instructed to maintain a flight path both 305 m (1,000 feet) vertically and horizontally away from piping plovers. And, with sound levels generated by the loudest UAS type actually being nearly 10dB below ambient levels measured onsite, startle responses resulting in piping plover nest abandonment are also not anticipated. Given that direct impacts to dune habitats and other maritime habitats seaward of the dunes will be avoided, and that numerous measures will be implemented to minimize visual and sound disturbances, it is concluded that implementation of the Proposed Action **may affect, but is not likely to adversely affect**, piping plovers.

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## **CHAPTER 5 CUMULATIVE IMPACTS**

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"Cumulative effects" under the ESA are those effects of *future* State, municipal, or private activities, *not* involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 Code of Federal Regulations 402.02). No future State, municipal, or private projects have been identified in the action area. Therefore, the Proposed Action, in conjunction with other past, present, or reasonably foreseeable projects, would not be expected to result in major adverse cumulative impacts to any listed threatened or endangered species.

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## CHAPTER 6 CONCLUSION

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Based on the evaluation presented above, NASA has made the following determination of effects on listed species and critical habitat from implementation of the Proposed Action within the action area (Table 3).

<b>Table 3. Summary of Findings for Federally Listed Threatened and Endangered Species under the Jurisdiction of the USFWS</b>		
<i>Species</i>	<i>ESA Status</i>	<i>Effects Determination</i>
<b>Sea Turtles (nesting only)</b>		
Loggerhead Sea Turtle	Threatened	No effect.
<b>Birds</b>		
Red Knot	Candidate	Not likely to substantially affect.
Piping Plover	Threatened	May affect, not likely to adversely affect.

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**APPENDIX A  
WALLOPS ISLAND PROTECTED SPECIES  
MONITORING PLAN**

This document is available online at  
<http://sites.wff.nasa.gov/code250/docs/2011WFFProtectedSpeciesMonitoringPlan.pdf>



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Ecological Services  
6669 Short Lane  
Gloucester, Virginia 23061

SEP 22 2011

Mr. Josh Bundick  
NASA Wallops Flight Facility  
Code 250.W  
Wallops Island, Virginia 23337

Re: Wallops Flight Facility – Unmanned  
Aerial Systems Airstrip, Accomack  
County, Virginia, Project # 2010-I-  
0642

Dear Mr. Bundick:

This document transmits the U.S. Fish and Wildlife Service's (Service) the results of our review of the National Aeronautics and Space Administration's (NASA) referenced proposed project at the Wallops Flight Facility (WFF), in Accomack County, Virginia and its effects on the federally listed endangered green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), and Delmarva fox squirrel (*Sciurus niger cinereus*), and the threatened Atlantic coast population of the piping plover (*Charadrius melodus*), loggerhead turtle (*Caretta caretta*), seabeach amaranth (*Amaranthus pumilius*), and northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*) in accordance with section 7 of the Endangered Species Act (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).

Since 2003, unmanned aerial systems (UAS) have been operating from an airstrip on a then remote portion of south Wallops Island. In 2005, the airstrip was expanded to accommodate larger classes of UAS. The airstrip was lengthened to 1,500 feet (ft); two staging pads were also added. While this airstrip met an immediate and emerging need, the location has proven to be unsatisfactory for continued UAS flight operations. Storm events often inundate the runway with surf and sand, and the east/west orientation makes it susceptible to cross winds.

WFF has determined that a new airstrip is needed to provide an adequately-sized facility that will be capable of supporting the testing and deployment of existing and future UAS and UAS-based scientific instruments at WFF. UAS tests and UAS-based research opportunities form an important objective of NASA Goddard Space Flight Center's Suborbital and Special Orbital Projects Directorate and as such, this type of mission need requires an unencumbered operating environment. The new airstrip will have an asphalt surface and will measure approximately 3,000 ft long (2,500 ft plus an additional 500 ft clear zone) by 75 ft wide located at the northern portion of the island with an east-west orientation.

The federally listed species found on WFF inhabit the coastal beach zone of the island. The proposed runway site lies within the upland and marsh section of the island, well behind the coastal dune and shoreline side of the island. The Service agrees with NASA's determination that the proposed construction of the facility will have "no effect" on any of the federally listed species because construction activities will be limited to areas outside habitat that supports the listed species. However, the subsequent use of the runway and operation of UAS over the coastal zone associated with the construction of the runway as proposed has the potential to impact the federally listed species found within.

The candidate species red knot (*Calidris canutus rufa*) was included in NASA's June, 2011 biological assessment (BA). This species has not yet been proposed for listing and therefore will not be addressed further in this document; however, we appreciate NASA's consideration of this species and any conservation measures implemented to minimize or avoid threats to this species will contribute to its conservation. The Service would like to work with NASA to develop a candidate conservation agreement for the red knot.

The Service concurs with the NASA's determination that the proposed action will have "no effect" on the seabeach amaranth, Delmarva fox squirrel, and northeastern beach tiger beetle because these species are not found on Wallops Island.

The Service does not concur with NASA's determination of "no effect" on nesting sea turtles for the proposed project. NASA has proposed the following steps to reduce and minimize potential impacts to nesting sea turtles: (1) limit night flights for special circumstances like hurricane monitoring, (2) any safety lighting at the airstrip will be minimal intensity and downward-shielded, (3) over flying UAS will not use running lights, and (4) as directed by the WFF Threatened and Endangered Species Monitoring Program protocols, should WFF monitoring staff identify sea turtle nesting activity under UAS flight paths on the beach, UAS flights will be redirected or suspended until nesting activity has ceased or nestlings have completed their emergence. The avoidance and minimization measures proposed by NASA will be sufficient to prevent possible impacts to nesting sea turtles during normal UAS operations. However, during special circumstances (e.g., hurricane data collection missions) there may be a potential to affect nesting turtles. Based on the low number of nests at this site annually (between 1-4 nests per year), the low probability of hurricanes occurring during the nesting period here in Virginia, and the even lower probability that an emergency UAS flight would occur at night while turtles were nesting, the likelihood of disturbance resulting from UAS operations is low. Additionally, UAS operations and clearances from beach habitats will minimize the potential that UAS operations will affect sea turtles even if they do occur during nesting, and any effects are expected to be limited to temporary changes in behavior that will not reduce the likelihood of nesting. Consequently, these minor disturbances are considered to be insignificant and discountable, and the project as proposed, "may affect, but is not likely to adversely affect" nesting sea turtles.

The Service concurs with NASA's determination that the proposed action "may affect, but is not likely to adversely affect" piping plovers with the addition of avoidance and monitoring measures that NASA and the Service agreed to during a 19 August 2011 conference call. The

UAS flights may have the potential to disturb nesting plovers. NASA has proposed the following precautions to avoid and minimize disturbance of plovers: (1) UAS over-flights of the beach will be on average only four sorties each day (1,040 sorties maximum per year) and (2) UAS operators will be instructed to maintain a flight path both 1,000 ft vertically and horizontally away from nesting piping plovers. The Service has some concern regarding the 1,000 ft vertical and horizontal buffer proposed for UAS over flights adjacent to nesting piping plovers because this distance may not avoid all effects. Based on our review of available information on the effects of aircraft overflights on shorebirds, consultation with species experts, and past Service consultations on the effects of aircraft on nesting plovers, we recognized that the specific information on effects of aircraft is either limited to specific situations and/or aircraft types and no information was available that would allow evaluation of effects of small aircraft similar to those proposed. Current research that is being done is focusing primarily on larger and faster military aircraft types like the F-18 and the Osprey, and not the type of aircraft involved in this proposed action. Early results have shown that nesting plovers after such aircraft have flown over, are fast to return to normal behavior and there appears to be no adverse effects (Dr. Jim Fraser, Virginia Tech, pers. comm.).

The Service believes that conducting monitoring of the effects of UAS aircraft on plovers, in conjunction with an adaptive management type of approach, would be appropriate to ensure that any possible effects of these types of aircraft is addressed. On August 19, 2011, NASA and the Service held a conference call to discuss our concerns regarding what would be considered an appropriate buffer distance. NASA has agreed to work with the Service and other species experts to develop an approach to UAS operation and monitoring that would be compatible with NASA's needs and provide information on potential effects on shorebirds. NASA has agreed to monitor nesting plover behavior, through observation, video-recording, or even UAS-mounted cameras during aircraft operation to determine if plovers are affected. NASA may also attempt to establish disturbance thresholds and evaluate effects of other variables on likelihood of disturbance, including aircraft propulsion type, flight path relative to plovers, and others. The Service is confident that the monitoring program would provide good information on the response of plovers to UAS over-flights, and allow NASA to adopt appropriate modifications to avoidance buffers and flight paths if needed, and to reinitiate consultation under section 7 if necessary. Based on the best currently available data, the Service believes that with the conservation measures and the 1,000 foot horizontal and vertical buffers, disturbances to nesting plovers are unlikely to occur, and will be limited to temporary changes in behavior that are similar to responses to potential predators in the vicinity of nesting plovers and are unlikely to result in flushing from nests. The Service believes that the level of disturbance will be insignificant and discountable, and birds will return to normal activities quickly following disturbance, and the proposed action is not likely adversely affect piping plovers. In addition, the proposed monitoring in conjunction with UAS operation has the potential to significantly improve future conservation efforts for plovers and other shorebirds.

The proposed airstrip location was modified to minimize encroachment on an existing bald eagle nest. The project is outside the 660 ft buffer required to protect active nests, and there are no

identified eagle concentration areas, thus the proposed action is not likely to disturb bald eagles, and consequently, no eagle act permit is required.

Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact Mike Drummond of this office at (804) 693-6694, extension 122, or via email at [mike\\_drummond@fws.gov](mailto:mike_drummond@fws.gov).

Sincerely,

  
Cindy Schulz  
Supervisor  
Virginia Field Office

cc: Chincoteague NWR, Chincoteague, VA (Lou Hinds)  
VDACS, Richmond, VA (Keith Tignor)  
VDCR, DNH, Richmond, VA (René Hypes)  
VDGIF, Richmond, VA (Amy Ewing)

**APPENDIX C**

**FEDERAL CONSISTENCY DETERMINATION**

National Aeronautics and  
Space Administration

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



Reply to Attn of: 250.W

December 21, 2011

Ms. Ellie Irons  
Office of Environmental Impact Review  
Virginia Department of Environmental Quality  
629 East Main Street, Sixth Floor  
Richmond, Virginia 23219

Dear Ms. Irons:

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, and Section 307 (c) (1) of the Coastal Zone Management Act of 1972, the National Aeronautics and Space Administration (NASA) has prepared a Draft Environmental Assessment (EA) and Federal Consistency Determination (FCD) for the proposed Unmanned Aerial Systems (UAS) airstrip at its Goddard Space Flight Center's Wallops Flight Facility (WFF) on Wallops Island, Virginia. The location for the proposed airstrip is the north end of Wallops Island.

As the project sponsor, NASA is serving as the lead agency for both NEPA and Federal Consistency coordination with the Virginia Department of Environmental Quality. The U.S. Army Corps of Engineers (USACE) would undertake actions connected to the UAS airstrip and are participating in NASA's NEPA process and Consistency coordination.

In cooperation with USACE, NASA has found that the proposed construction of the UAS airstrip would be consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program. NASA respectfully requests that you review the enclosed Draft EA and FCD and provide comments within 60 days of receiving this letter. Four (4) hard copies and fourteen (14) compact discs are enclosed to facilitate the consolidated state agency review process.

If you have any questions or require any additional information please contact me at (757) 824-1127, or Ms. Shari Silbert at (757) 824-2327.

Sincerely,

A handwritten signature in black ink that reads "Joel Mitchell".

Joel T. Mitchell  
Natural Resources Manager

2 Enclosures

**FEDERAL CONSISTENCY DETERMINATION FOR THE  
NORTH WALLOPS ISLAND  
UNMANNED AERIAL SYSTEMS AIRSTRIP**

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
GODDARD SPACE FLIGHT CENTER  
WALLOPS FLIGHT FACILITY  
WALLOPS ISLAND, VIRGINIA 23337**

**INTRODUCTION**

This document provides the Commonwealth of Virginia with the National Aeronautics and Space Administration's (NASA) Consistency Determination under Coastal Zone Management Act Section 307(c)(1) and Title 15 Code of Federal Regulations (CFR) Part 930, Subpart C, for construction of an Unmanned Aerial Systems (UAS) airstrip at NASA's Goddard Space Flight Center Wallops Flight Facility (WFF), Wallops Island, Virginia. The location for the proposed airstrip is the north end of Wallops Island. The information in this Consistency Determination is provided pursuant to 15 CFR Section 930.39.

NASA has prepared an Environmental Assessment (EA) to evaluate the potential environmental impacts from the proposed UAS airstrip in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S. Code 4321-4347), the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508), NASA's regulations for implementing NEPA (14 CFR Subpart 1216.3), and the *NASA Procedural Requirements (NPR) for Implementing NEPA* and *Executive Order (EO) 12114* (NPR 8580.1).

The U.S. Army Corps of Engineers (USACE), Norfolk District, has served as a Cooperating Agency in preparing the EA and this Consistency Determination, because they possess regulatory authority and specialized expertise pertaining to the Proposed Action. The ES is being developed to fulfill all three Federal agencies' obligations under NEPA. NASA, as the WFF property owner and project proponent, is the Lead Agency and responsible for ensuring overall compliance with applicable environmental statutes, including NEPA.

Based on the data and analysis, NASA finds that the activities associated with the construction of the proposed UAS airstrip are consistent to the maximum extent practicable with the enforceable polices of the Virginia Coastal Resources Management Program. The summary below supports NASA's determination.

**ENFORCEABLE POLICIES COMPRISING VIRGINIA’S COASTAL ZONE MANAGEMENT PROGRAM  
AND PROPOSED ACTION ANALYSIS**

- a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (MRC) (Virginia Code §28.2-200 through §28.2 - 713) and the Department of Game and Inland Fisheries (DGIF) (Virginia Code §29.1-100 through §29.1-570).

*Consistent? Yes*

*Analysis* –No fisheries habitat areas located within the footprint of the airstrip. Tidal wetlands are located outside of the footprint and all impacts to tidal wetlands have been avoided. The proposed airstrip construction would not have an impact on fisheries management.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The MRC, DGIF, and Virginia Department of Agriculture and Consumer Services share enforcement responsibilities (Virginia Code §3.1-249.59 through §3.1-249.62).

*Consistent? Yes*

*Analysis* - No boating areas located within the footprint of the airstrip or adjacent to it. The proposed airstrip construction would not have an impact on the State TBT Regulatory Program.

- b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ) Water Division. The program is administered by the MRC (Virginia Code §28.2-1200 through §28.2-1213).

*Consistent? Yes*

*Analysis* - There are no regulated subaqueous lands located within the footprint of the airstrip construction. The proposed range renovation would not have an impact on subaqueous lands.

- c. Wetlands Management - The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner

consistent with wetlands preservation. (i) The tidal wetlands program is administered by the MRC (Virginia Code §28.2-1301 through §28.2-1320).

*Consistent? Yes*

*Analysis* –No tidal wetlands are located in the footprint of the airstrip construction. Impacts to tidal wetlands have been avoided. The proposed airstrip construction would not have an impact on tidal wetlands.

(ii) The Virginia Water Protection Permit program administered by the DEQ includes protection of wetlands --both tidal and non-tidal. This program is authorized by Virginia Code § 62.1-44.15.5 and the Water Quality Certification requirements of §401 of the Clean Water Act of 1972.

*Consistent? Yes*

*Analysis* –Non-tidal wetlands are present in the footprint of the airstrip. These non-tidal wetlands have been delineated and the limits confirmed by the Army Corps of Engineers (the Corps) in 2009. The wetland limits have been located by survey and illustrated on the attached exhibits. These wetlands are comprised of emergent and scrub shrub habitats. Impacts to forested areas have also been avoided. A Joint Permit application has been prepared to secure authorization for the necessary wetland impacts. A detailed alternatives analysis has been completed as part of this project. Additionally, many avoidance and minimization measures have been incorporated to further reduce wetland impacts. Mitigation will be provided to compensate for all wetland losses. Funds will be donated to the Virginia Aquatic Resources Trust Fund, managed by The Nature Conservancy. NASA has already initiated discussions with TNC to identify suitable mitigation for the proposed impacts. Wetland impacts are summarized in the table below.

<b>Habitat Type</b>	<b>Acreage</b>
Emergent Wetlands	0.9 hectares (2.32 acres)
Scrub Shrub Wetlands	0.06 hectares (0.15 ac.)
<b><i>Total</i></b>	<b>1.0 hectares (2.47 ac.)</b>

- d. Dunes Management - Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the MRC (Virginia Code §28.2-1400 through §28.2-1420).

*Consistent? Yes*

*Analysis* - No dunes are located within the footprint of the airstrip construction. The proposed range renovation would not have an impact on dunes.

- e. Non-point Source Pollution Control - Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation (DCR) (Virginia Code §10.1-560 *et.seq.*).

*Consistent? Yes*

*Analysis* – The proposed airstrip construction incorporates temporary and permanent best management practices to reduce soil erosion. Low Impact Development (LID) principles were utilized in the development of the stormwater management plan for the project. In addition, WFF's most recent Stormwater Pollution Prevention Plan (SWPPP), developed in 2009 will be revised to include this airstrip. The SWPPP describes current stormwater management systems and associated outfalls, potential pollutant sources, and best management practices (BMPs) implemented to reduce runoff. In addition, the SWPPP details stormwater sampling activities, procedures for completing annual comprehensive site compliance evaluations, and the employee training program.

- f. Point Source Pollution Control - The point source program is administered by the State Water Control Board pursuant to Virginia Code §62.1-44.15. Point source pollution control is accomplished through the implementation of the National Pollutant Discharge Elimination System permit program established pursuant to §402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System permit program. The Water Quality Certification requirements of §401 of the Clean Water Act of 1972 is administered under the Virginia Water Protection Permit program.

*Consistent? Yes*

*Analysis* – The proposed airstrip construction would not create any new point sources for pollution. Therefore, the action would have no impact on point source pollution control.

- g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code §32.1-164 through §32.1-165).

*Consistent? Yes*

*Analysis* - This action does not require the construction of facilities that require a septic tank. The proposed range renovation would not have an impact on shoreline sanitation.

- h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code §10.1-1300 through 10.1-1320).

*Consistent? Yes*

*Analysis* – Minimal impacts to air quality would occur during airstrip construction activities. The action would not lead to non-attainment to any of the National Ambient Air Quality Standards. The proposed range renovation would have minimal impacts to air pollution control.

- i. Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act (CBPA); Virginia Code §§ 10.1-2100 through 10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative code 9 VAC10-20-10 *et seq.*

*Consistent? Yes*

*Analysis* –The site is not located within the Chesapeake Bay Drainage Area. The proposed airstrip construction would not have an impact on Chesapeake Bay Preservation Areas resources.

**APPENDIX D**

**NATIONAL HISTORIC PRESERVATION ACT,  
SECTION 106 CORRESPONDENCE**

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**APPENDIX D. NATIONAL HISTORIC PRESERVATION ACT,  
SECTION 106 CORRESPONDENCES**

<b>Date</b>	<b>From</b>	<b>To</b>
April 28, 2009	Wallops Flight Facility	Virginia Department of Historic Resources
May 28, 2009	Virginia Department of Historic Resources	Wallops Flight Facility
October 9, 2009	Wallops Flight Facility	Virginia Department of Historic Resources
November 12, 2009	Virginia Department of Historic Resources	Wallops Flight Facility
July 20, 2010	Wallops Flight Facility	Assateague Island National Seashore
August 9, 2010	Assateague Island National Seashore	Wallops Flight Facility
August 11, 2010	Virginia Department of Historic Resources	Wallops Flight Facility
September 24, 2010	Telephone Log between VDHR and WFF	
November 22, 2010	Virginia Department of Historic Resources	Wallops Flight Facility
December 13, 2010	Wallops Flight Facility	Virginia Department of Historic Resources
January 10, 2011	Virginia Department of Historic Resources	Wallops Flight Facility

National Aeronautics and  
Space Administration

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



April 28, 2009

Reply to Attn of: 250.W

Virginia Department of Historic Resources  
Attn: Mr. Ron Grayson  
Archaeologist, Office of Review and Compliance  
2801 Kensington Avenue  
Richmond Virginia, 23221

**Subject: Request for Study Plan Review of the NASA, Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia, Proposed UAS Airstrip**

To satisfy its obligations under the National Environmental Policy Act and Section 106 of the National Historic Preservation Act, the Wallops Flight Facility (WFF) has retained the Timmons Group and New South Associates to assist with the planning for a 5,200 foot x 75 foot airstrip on the north end of Wallops Island in Accomack County, Virginia (See attached Site Vicinity Map). The preparation of an Environmental Assessment (EA) is forthcoming; however, WFF is moving forward with the early scoping process. The Unmanned Aerial Systems (UAS) Airstrip is being proposed to serve NASA and NASA partners for small-scale uninhabited aerial vehicles. The WFF invites your agency to participate in the scoping process. We are currently seeking your input and recommendations concerning WFF's proposed scope for evaluating the potential effect this project may have on cultural resources.

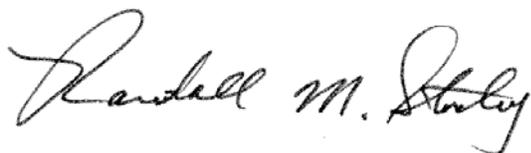
A study was previously conducted for WFF that included the current project area. The study, *Cultural Resources Assessment (CRA) of WFF, Accomack County, Virginia*, identified high sensitivity areas that would require further investigations. The purpose of the proposed investigation is to conduct a Phase I Archaeological Survey to determine if high sensitivity areas in the Area of Potential Effect (APE) contain sites that are eligible for listing on the National Register of Historic Places, and determine the effects this project may have on cultural resources. One previously identified site, 44AC0089, which is a probable Revolutionary War fort, will be investigated as part of this scope. This work is being undertaken proactively and will also be incorporated in the EA that will be prepared for this proposed action.

The UAS Airstrip at WFF is proposed to have a ground disturbance impact of 125 feet x 5,200 feet to accommodate the grading and surfacing of the 75-foot runway for its entire proposed

length. The runway would actually be elevated 2-to-3 feet above existing ground surface. There is no excavation proposed as the water table is relatively high in this area. Two 100 foot x 100 foot hangars would be constructed to service the airway. The site access road (existing dirt road) would be improved to service the runway and hangars. No other ground disturbance is planned for the project (See attached Cultural Resources Investigation Limits Map). Vegetation clearing for line of sight would be perpendicular from the edge and along the entire length of the runway fill to approximately 250 feet at a maintained height of approximately 2 feet or less. An additional 500 feet of vegetation would be cleared to the same height off of each end of the runway. Additionally, vegetation beyond the 250-foot limit would be maintained at a height of approximately 5-to-10 feet.

The APE for this project as defined in the attached scope includes the 125 feet x 5,200 feet of ground disturbance for the airstrip, the two 100 foot x 100 foot hangar sites, and the improvements to the existing site access road. The vegetation clearings for line of sight have not been included in the proposed scope, as no ground disturbance will occur within those areas (See attached Cultural Resources Investigation Limits Map).

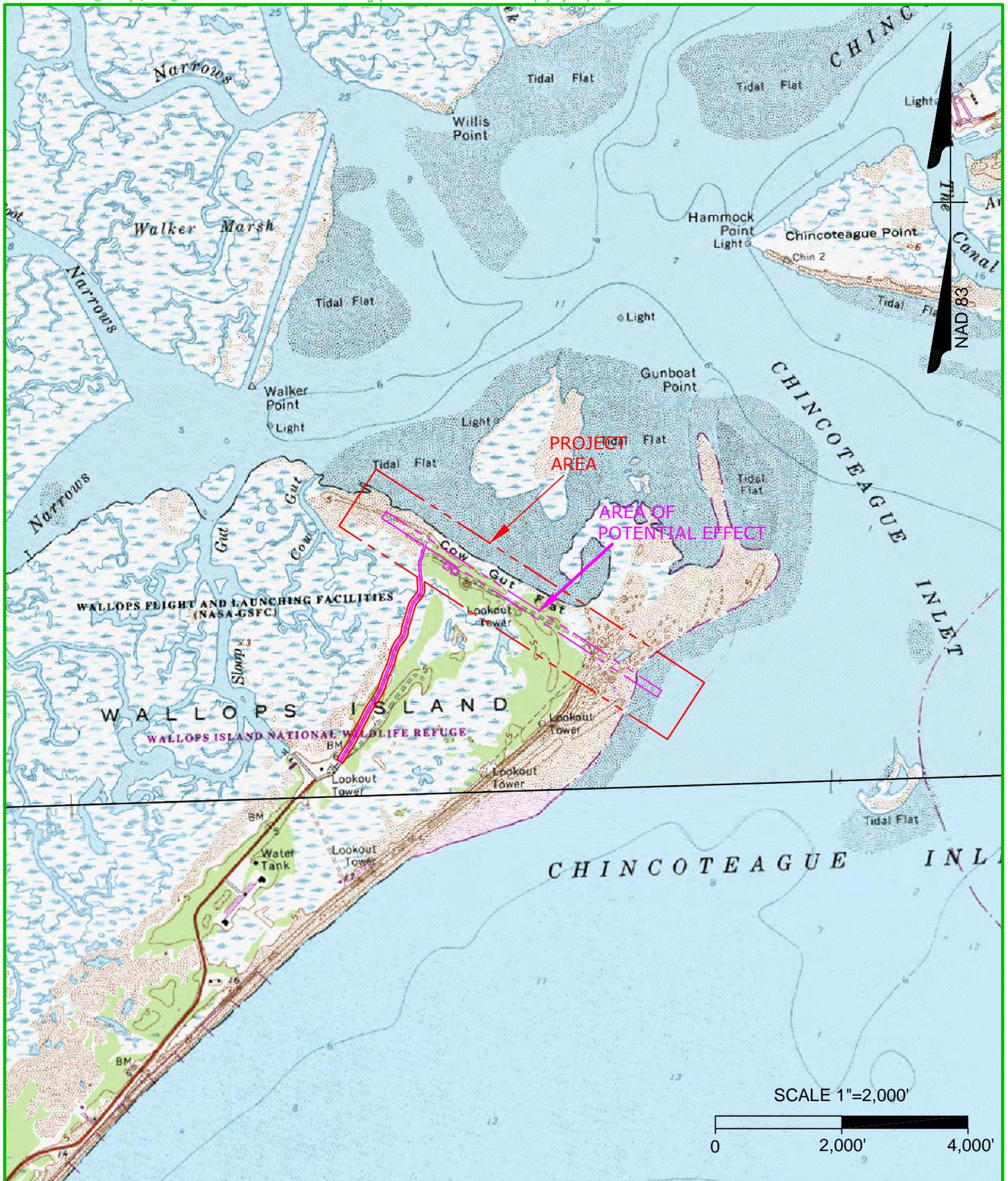
A detailed description technical proposal outlining the proposed survey methodology and staff qualification from New South Associates is attached for you review. If you have any additional questions or require more information about the project, please Mr. Josh Bundick at 757-824-2319 ([joshua.a.bundick@nasa.gov](mailto:joshua.a.bundick@nasa.gov)) or me at 757-824-1309 ([randall.m.stanley@nasa.gov](mailto:randall.m.stanley@nasa.gov)). If you have any specific questions regarding the technical proposal, please contact New South Associates via Mr. Chris Espenshade at (336) 379-0433 ([cespenshade@newsouthassoc.com](mailto:cespenshade@newsouthassoc.com)). Thank you for your attention to this request and we look forward to receiving your comments.



Randall M. Stanley  
Facility Historic Preservation Officer

4 Enclosures

cc: (w/o encl.)  
200/Ms. C. Massey  
228/Mr. P. Bull  
228/Mr. G. Lilly  
250/Mr. J. Bundick



**UAS AIRFIELD AT WFF**  
 ACCOMACK COUNTY, VIRGINIA  
 SITE VICINITY MAP

**TIMMONS GROUP**   
 YOUR VISION ACHIEVED THROUGH OURS.

TIMMONS GROUP JOB NUMBER: 27597  
 PROJECT STUDY LIMITS: 161.1 ACRES  
 LATITUDE: 35°53'05"  
 LONGITUDE: 75°26'16"

U.S.G.S. QUADRANGLE(S): CHINCOTEAGUE WEST AND WALLOPS ISLAND  
 DATE: 1989  
 WATERSHED: CHINCOTEAGUE & EASTERN LOWER DELMARVA  
 HUC IDENTIFICATION: 02060010, 02080110

These plans and associated documents are the exclusive property of TIMMONS GROUP and may not be reproduced in whole or in part and shall not be used for any purpose whatsoever, inclusive, but not limited to construction, bidding, and/or construction staking without the express written consent of TIMMONS GROUP.

## **NEW SOUTH TECHNICAL PROPOSAL**

**Principal Investigator: Chris Espenshade, MA, RPA**

**WFF Page 1 of 2**

### **Cultural Resources Assessment**

The Historian will conduct background research at the Wallops Flight Facility, the Library of Virginia, and the Virginia Department of Historic Resources. The research will begin with a review of the 2003 Cultural Resource Assessment. It is anticipated that a focus of the background research will be better defining the history of the military earthwork in the Area of Potential Effect (APE). For this survey, the APE is defined as an area that captures the proposed airstrip plus a construction corridor (125 x 5,200), (2) 100 x 100 hangars, and access road improvements. The APE will be established in the field through the use of Trimble GeoXT GPS receivers with sub-meter positional accuracy.

The main method for site discovery will be excavation of subsurface shovel tests. Given the high sensitivity of the APE for archaeological sites, it is appropriate that this survey use shovel tests excavated at 15-meter intervals. The 15-meter interval is recommended for areas of high archaeological potential by the VDHR in their survey guidelines. At 15-meter intervals, there will be 16 shovel tests per acre for site discovery. These will be positioned through pacing and compass bearing from known points, and the locations of all positive shovel tests will be plotted with the GPS. The shovel tests will measure 30 centimeters in diameter and will be excavated to sterile subsoil, groundwater, or 70 centimeters below surface. The majority of the APE is mapped as Fisherman-Assateague complex, which is characterized by deep sands. It is likely that the majority of the units will need to be excavated to 70 centimeters below surface. Soil will be screened through 0.25-inch mesh. Notes will be made on the soil strata and artifact content of each test.

When artifacts are recovered from a unit, the site will be delineated using a cruciform of shovel tests at 7.5-meter intervals. The site boundaries will be pursued until there are two negative tests in each direction, the landform drops away, or the edge of the APE is reached. A plan map will be prepared for each site, and photographs will be made of each site. All site boundaries, surface finds, positive shovel tests, and any other pertinent natural or cultural features will be recorded with the sub-meter GPS receiver. It is anticipated that 318 shovel tests will be excavated for runway (3 transects of 106 tests each), an estimated 100 additional tests will be required for the road along 1 transect, and an additional 64 tests for site discovery.

Artifacts will be accessioned by discrete field provenience. They will be washed and rebagged with appropriate identifying tags. The focus of the analysis will be to characterize the temporal and functional dimensions of each site, and to provide a comprehensive artifact catalog. Prehistoric pottery will be sorted by aplastic content and surface decoration; type names will be assigned as feasible. Lithic artifacts will be described by raw material and technotype. Shell or bone tools will be described by species and function. Historic artifacts will be first classified by material class (e.g., ceramics). Additional technological and stylistic details will be recorded to narrow the production span (e.g., amethyst glass was produced only 1890-1905). Form will also be recorded when feasible (e.g., pint flask).

Military items will be sorted to army of origin, as feasible. Diameter will be recorded for all munitions; musket balls will be classed as dropped or fired. Buttons and other uniform items will be identified through consultation with published artifact guides.

## **NEW SOUTH TECHNICAL PROPOSAL**

**Principal Investigator: Chris Espenshade, MA, RPA**

**WFF Page 2 of 2**

The consultant will complete a full technical report, as per the guidelines of the VDHR. The report will include: a detailed description of the project and APE; a natural context chapter; a cultural context chapter including a historic overview of the APE; a chapter describing the methods for the background research, field survey, analysis, and curation; a detailed results chapter with throughout descriptions of each site, their soils, and the recovered artifacts; a recommendations chapter that details the eligibility recommendations and appropriate further work; a bibliography; and a complete artifact catalog. The report will have a detailed map of every positive and negative shovel test, a map of every metal detector find, a photograph and plan map for every site discovered, drawings of representative soil profiles, and illustrations of key artifacts.



# COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.  
Secretary of Natural Resources

**Department of Historic Resources**  
2801 Kensington Avenue, Richmond, Virginia 23221-0311

Kathleen S. Kilpatrick  
Director

Tel: (804) 367-2323  
Fax: (804) 367-2391  
TDD: (804) 367-2386  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

May 28, 2009

Mr. Randall Stanley  
Facility Historic Preservation Officer  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

Re: Study Plan Review of the Proposed UAS Airstrip  
Wallops Island  
DHR File #: 2009-0696  
Date Received: April 29, 2009

Dear Mr. Stanley:

We have received information for our review and comment regarding the above referenced project. The proposed survey methodology and Area of Potential Effect appears appropriate for the archaeological investigation proposed. However, because of the possible increase in noise, we recommend that you request the comments of the National Park Service (NPS) Assateague Island National Seashore regarding indirect effects to the NRHP-listed Assateague Beach Lifeboat Station. According to the NPS directory, Trish Kicklighter is Superintendent and Carl Zimmerman is the Resource Management Specialist. These comments will allow us to better comment on the effects of the proposed undertaking.

We look forward to further consultation on this project. If you have any questions about our comments, please contact me at: [ron.grayson@dhr.virginia.gov](mailto:ron.grayson@dhr.virginia.gov) or (804) 367-2323, Ext. 105.

Sincerely,

Ronald Grayson, RPA, Archaeologist  
Office of Review and Compliance

National Aeronautics and  
Space Administration



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

Reply to Attn of: 250.W

July 20, 2010

Ms. Trish Kicklighter  
Superintendent  
National Park Service, Assateague Island National Seashore  
7206 National Seashore Lane  
Berlin, MD 21811

Dear Ms. Kicklighter:

In accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's Wallops Flight Facility (WFF) is preparing an Environmental Assessment to analyze potential impacts associated with the construction and operation of an Unmanned Aerial Systems (UAS) airstrip at the north end of Wallops Island in Accomack County, Virginia (Enclosure 1).

A letter we recently sent to you dated July 14, 2010, describes the full scope of this project. In summary, the proposed UAS airstrip would be constructed of asphalt and measure approximately 914 meters (3,000 feet long [2,500 feet plus an additional 500 feet clear zone]) by 18 meters (60 feet) wide. The airstrip would be elevated approximately 1 meter (3 feet) above the existing ground surface. Two asphalt pads also would be constructed adjacent to the airstrip for staging aircraft and support vehicles during flight operations. A clear line of sight for UAS operators is necessary; therefore, vegetation alongside the length (up to 30 meters [100 feet]) on each side of the proposed airstrip would be cleared and maintained. Additionally, vegetation height would be maintained beyond the ends of the airstrip. Crushed gravel would be used to improve the existing dirt access road to provide service to the airstrip. Infrastructure improvements to provide electrical and telecommunication service would be implemented; however, it is anticipated that most UAS operators would use small portable generators. The total affected area would be approximately 2 hectares (5 acres). The proposed airstrip would likely be constructed in several phases to reach the dimensions described above.

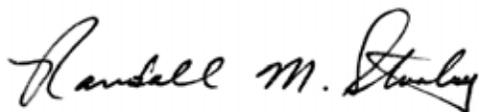
In mid-2009, WFF was preparing for a cultural resources investigation of the project area for the proposed UAS airstrip and consulted with the Virginia Department of Historic Resources (VDHR), which is the Virginia State Historic Preservation Office, regarding the area of potential effects and survey methodology for the investigation. In turn, VDHR recommended consulting with you regarding potential indirect effects of the project on the National Register-eligible Assateague Beach Life-Saving Station located on Toms Cove Hook (Enclosure 1). We are seeking your input concerning WFF's UAS airstrip proposal.

We have determined that UAS operations from the proposed airstrip on Wallops Island would have no adverse effect on the Assateague Beach Life-Saving Station. UAS operations would be conducted year round during NASA's normal Air Traffic Control tower hours (7 AM to 5 PM). Night operations would only take place under special circumstances (e.g., hurricane monitoring). The UAS aircraft would operate within the existing NASA controlled Restricted Airspace Areas (R-6604A/B) and within the Virginia Capes Operating Area (VACAPES OPREA), the Navy's offshore training area (Enclosure 1). Aside from takeoff and landing, the minimum operating altitude would be 152 meters (500 feet). The largest UAS that would be authorized to operate from the proposed airstrip is the Viking 400. The Viking 400 has a 6 meter (20 foot) wingspan, is 4.5 meters (14.7 feet) in length, and would have a maximum weight of 240 kilograms (530 pounds).

UAS would not operate over Assateague Island National Seashore. UAS would take off from the airstrip and fly southeast over water. Preliminary noise analysis indicates the loudest noise would be at the airstrip on Wallops Island; otherwise, the noise environment would not perceptibly change. Because UAS would not fly over Assateague Island National Seashore and the current noise environment beyond Wallops Island would not change, the proposed project would have no indirect visual or audible effects on the Assateague Beach Life-Saving Station.

If you have any questions or require additional information about the project, please contact Mr. Joel Mitchell at (757) 824-1127 or me at (757) 824-1309. Thank you for your attention to this request and we look forward to receiving your comments.

Sincerely,

A handwritten signature in black ink that reads "Randall M. Stanley". The signature is written in a cursive style with a large, prominent initial "R".

Randall M. Stanley  
Facility Historic Preservation Officer

Enclosure



**United States Department of the Interior**  
**NATIONAL PARK SERVICE**  
**Assateague Island National Seashore**  
7206 National Seashore Lane  
Berlin, MD 21811  
(410) 641-1443



August 9, 2010

Mr. Joel Mitchell, Natural Resources Manager  
250.W  
NASA Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, Virginia 23337

Dear Mr. Mitchell:

Assateague Island National Seashore (AINS), a unit of the National Park Service located in Virginia and Maryland, appreciates the opportunity to provide comments during the preparation of the Environmental Assessment to analyze potential impacts associated with a new UAS airstrip at the north end of Wallops Island, Virginia.

The southern portion of AINS is located approximately 2 miles east of the proposed project. After speaking with you about this project, our understanding is that the project would not add any additional restrictions to the airspace over Assateague Island, that the flight lines would not cross over Assateague Island, and that the noise levels associated with flights would not exceed the ambient noise levels on Assateague Island. With that understanding, we do not have significant concerns at this time about the project's potential impacts on AINS resources or visitor experience.

Thank you for the opportunity to comment. We would appreciate continued communication about this project and any changes to the proposal.

Sincerely,

Trish Kicklighter  
Superintendent, Assateague Island National Seashore

National Aeronautics and  
Space Administration  
**Goddard Space Flight Center**  
**Wallops Flight Facility**  
**Wallops Island, VA 23337**



Reply to Attn of: 228

October 9, 2009

Virginia Department of Historic Resources  
Attn: Mr. Ron Grayson  
Archaeologist, Office of Review and Compliance  
2801 Kensington Avenue  
Richmond Virginia, 23221

Subject: UAS Airstrip at Wallops Flight Facility, Draft Cultural Resources  
Investigation for the Proposed Uninhabited Aerial Systems Airstrip,  
Wallops Flight Facility, Accomack County, Virginia

In accordance with Section 106 of the National Historic Preservation Act, as amended, the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF) is submitting the enclosed draft "*Cultural Resources Investigation of the Proposed Uninhabited Aerial Systems Airstrip*" (Enclosure 1) for your review and concurrence concerning the below-described undertaking.

Wallops Flight Facility (WFF) has contracted Timmons Group to assist with a proposal to create a 1,500 x 34 meter airstrip and associated improvements on the north end of Wallops Island in Accomack County, Virginia. The Uninhabited Aerial Systems (UAS) Airstrip is being proposed to serve as a takeoff and landing facility for UAS. WFF previously consulted with Virginia Department of Historic Resources (VDHR) while preparing the study plan for the proposed undertaking (DHR File #:2009-0696).

#### **Brief Background:**

Previously, an archaeological study was conducted for WFF that included the current project area. The study, *Cultural Resources Assessment, (CRA) NASA Wallops Flight Facility (NASA, 2003c), Accomack County, Virginia*, identified areas of increased sensitivity for the presence of archaeological resources that would require further investigations if the areas were to be disturbed. The CRA briefly discussed the recordation and discovery of Site, 44AC0089, described as a probable Revolutionary War fort. Because no development was planned for the north end of Wallops Island, Site 44AC0089 was not further investigated at that time.

In 2009, Timmons Group sub-contractor New South Associates completed a cultural resource study in support of the proposed construction of UAS Airstrip on north Wallops Island. . The proposed airstrip effectively would reach from the Atlantic Ocean beach across the northern end of the island, to the tidal marshes between the island and the mainland. The project vicinity has mixed vegetation including small hardwoods, 20 to 30-year old planted pines, and dense underbrush. Soils are generally deep sands. The proposed project would entail the construction of a paved airstrip and two hangar buildings, as well as improvements to the current access road.

The archaeological Area of Potential Effects (APE) was originally defined as 1,100 x 10 meters of road improvements, two 30 x 30-meter hangar locations, and 1,500 x 34 meters of airstrip and apron. When it was discovered that the original airstrip location threatened a site recommended eligible for the National Register of Historic Places (NRHP), the APE was revised by shifting the northwestern end of the airstrip to the south as detailed in the enclosed report. The revised APE now completely avoids this area.

The cultural resources investigations also included:

- archaeological survey of the APE as originally defined;
- delineation and evaluation of site 44AC0089, a Revolutionary War fort;
- archaeological survey of the APE after revision to avoid 44AC0089;
- architectural resource survey of the original and revised APEs; and
- architectural evaluation of the North Observation Mound, a mid-late twentieth-century structure.

The background research revealed that 44AC0089 was the only previously recorded site in the original APE. The examination of the APE through screened shovel tests at 15-meter intervals encountered only 44AC0089. The APE was revised to avoid this site, and the survey of the revised APE found no additional archaeological sites. Metal detector survey behind the fort failed to discover any evidence of an associated camp. Site 44AC0089 is a well-preserved example of a small, coastal, gun emplacement from the Revolutionary War. It is recommended eligible for the NRHP under Criteria C and D. The revised APE does not include the site, and the proposed undertaking will have no effect on any sites eligible for, or listed on, the NRHP.

NASA has determined that this undertaking will have no adverse effect on historic properties. NASA is requesting VDHR's concurrence with this determination, and submits the enclosed draft of the *Cultural Resources Investigation of the Proposed Uninhabited Aerial Systems Airstrip* (Enclosure 1) and associated Project Review Form (Enclosure 2) which describes this undertaking for your consideration.

If you have any questions or require any additional information please contact me at (757) 824-1309, or Ms. Shari Silbert at (757) 824-2327.

A handwritten signature in black ink that reads "Randall M. Stanley". The signature is written in a cursive style with a large, stylized initial 'R'.

Randall M. Stanley  
Facility Historic Preservation Officer

2 Enclosures

cc:  
200/Ms. C. Massey  
228/Mr. G. Lilly  
250/Ms. C. Turner



# COMMONWEALTH of VIRGINIA

## Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221-0311

L. Preston Bryant, Jr.  
Secretary of Natural Resources

Kathleen S. Kilpatrick  
Director

Tel: (804) 367-2323  
Fax: (804) 367-2391  
TDD: (804) 367-2386  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

November 12, 2009

Mr. Randall Stanley  
Facility Historic Preservation Officer  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

Re: UAS Airstrip Draft Cultural Resources Investigation  
Wallops Flight Facility  
DHR File #: 2009-0696  
Date Received: October 13, 2009

Dear Mr. Stanley:

We have received information regarding our review of the above referenced undertaking, including a copy of the Draft report *Cultural Resources Investigations of the Proposed Uninhabited Aerial Systems Airstrip, Wallops Flight Facility, Accomack County, Virginia* (Espenshade and Lockerman: 2009). Based upon information presented in the report, the level of effort appears to be sufficient to have identified any historic properties within the area investigated. However, we are unable to comment on the effect of this undertaking to historic properties without additional information.

We are unable to provide comments regarding the eligibility of the ca. 1952 North Observation Mound (DHR ID# 001-0027-0125) at this time. The hard copy survey file that accompanies the Data Sharing System (DSS) record is incomplete, and the record does not meet the Department's Quality Assurance and Quality Control (QA/QC) requirements. We require the supporting materials (USGS topographic map of the resource, black and white photographs, and sketch plan) be provided to complete this record.

Additional information is also needed to positively determine the eligibility of archaeological site 44AC0089 for listing in the National Register or Historic Places (NRHP). The boundary of the site must be indicated on the contour map (Figure 15). Additionally, further information concerning the soils of the earthwork is needed, including a comparison of soil profiles from within the site to those of the surrounding area. Given the lack of cultural materials, this information is crucial to understanding the construction/formation of this landform.

Administrative Services  
10 Courthouse Avenue  
Petersburg, VA 23803  
Tel: (804) 862-6416  
Fax: (804) 862-6196

Capital Region Office  
2801 Kensington Ave.  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Tidewater Region Office  
14415 Old Courthouse Way, 2<sup>nd</sup> Floor  
Newport News, VA 23608  
Tel: (757) 886-2807  
Fax: (757) 886-2808

Roanoke Region Office  
1030 Penmar Ave., SE  
Roanoke, VA 24013  
Tel: (540) 857-7585  
Fax: (540) 857-7588

Northern Region Office  
5357 Main Street  
PO Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7023

November 12, 2009

It is stated within the report and in the accompanying cover letter that the plans of the project have been revised to avoid impacts to 44AC0089. However, the plans in the report do not clearly indicate this alteration. Additional plans are needed to assess the impacts of the proposed construction on 44AC0089.

We also request an update regarding the agreements concerning the Wallops Beach Lifeboat Station (DHR ID# 011-0027-0100) and Observation Tower (DHR ID# 011-0027-0101).

We look forward to further consultation on this project. If you have any questions about our comments, please contact me at: [ron.grayson@dhr.virginia.gov](mailto:ron.grayson@dhr.virginia.gov) or (804) 367-2323, Ext. 105.

Sincerely,



Ronald Grayson, RPA, Archaeologist  
Office of Review and Compliance



# COMMONWEALTH of VIRGINIA

## Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

Douglas W. Domenech  
*Secretary of Natural Resources*

Kathleen S. Kilpatrick  
*Director*

Tel: (804) 367-2323  
Fax: (804) 367-2391  
TDD: (804) 367-2386  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

August 11, 2010

Mr. Joel T. Mitchell  
Natural Resources Manager  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

Re: UAS Airstrip Impacts  
Wallops Flight Facility  
DHR File #: 2009-0696  
Date Received: July 15, 2010

Dear Mr. Mitchell:

We have received information regarding our review of the above referenced undertaking, our office previously responded to your agency in a letter dated November 12, 2009. Our current comments are largely the same as those forwarded to you in 2009. However, we are unable to comment on the effect of this undertaking to historic properties without additional information.

We are unable to provide comments regarding the eligibility of the ca. 1952 North Observation Mound (DHR ID# 001-0027-0125) at this time. The hard copy survey file that accompanies the Data Sharing System (DSS) record is incomplete, and the record does not meet the Department's Quality Assurance and Quality Control (QA/QC) requirements. We require the supporting materials (USGS topographic map of the resource, black and white photographs, and sketch plan) be provided to complete this record.

Additional information is also needed to positively determine the eligibility of archaeological site 44AC0089 for listing in the National Register or Historic Places (NRHP). Further information concerning the soils of the earthwork is needed, including a comparison of soil profiles from within the site to those of the surrounding area. Given the lack of cultural materials, this information is crucial to understanding the construction/formation of this landform.

Administrative Services  
10 Courthouse Ave.  
Petersburg, VA 23803  
Tel: (804) 862-6416  
Fax: (804) 862-6196

Capital Region Office  
2801 Kensington Office  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Tidewater Region Office  
14415 Old Courthouse Way  
2<sup>nd</sup> Floor  
Newport News, VA 23608  
Tel: (757) 886-2807  
Fax: (757) 886-2808

Roanoke Region Office  
1030 Penmar Avenue, SE  
Roanoke, VA 24013  
Tel: (540) 857-7585  
Fax: (540) 857-7588

Northern Region  
Preservation Office  
P.O. Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7033

Even though it appears that direct impacts from the airstrip avoid the archaeological site 44AC0089, the impacts from other activities are unknown. We require a more complete description of the ground disturbing activities in the vicinity of archaeological site 44AC0089. The description should include impacts related to the construction of the airstrip itself and any vegetation clearing activities.

We look forward to further consultation on this project. If you have any questions about our comments, please contact me at: [ron.grayson@dhr.virginia.gov](mailto:ron.grayson@dhr.virginia.gov) or (804) 367-2323, Ext. 105.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ron Grayson', written in a cursive style.

Ronald Grayson, RPA, Archaeologist  
Office of Review and Compliance

c.c. Randall Stanley, NASA Wallops Historic Preservation Officer

## **Silbert, Shari A. (WFF-200.C)[EGG, Inc. (WICC)]**

---

**From:** Mitchell, Joel T. (WFF-2500)  
**Sent:** Wednesday, September 22, 2010 2:45 PM  
**To:** Bundick, Joshua A. (WFF-2500); Silbert, Shari A. (WFF-200.C)[EG&G, Inc. (WICC)]  
**Cc:** Bull, Paul C. (WFF-2280); Turner, Carolyn (WFF-2500); Stanley, Randall M. (WFF-2280)  
**Subject:** UAS and the revolutionary war earthworks

Randy Stanley and I, along w/ the TEC folks (Charee, Kim, and Matt) talked w/Ron Grayson and Amanda Lee of VDHR today concerning the extent of buffer zone that would be required for construction of the air strip and the associated vegetation clearing activities.

First of all, Ron said that DHR had not yet determined that the site was eligible and referred to the information DHR requested back in 2009 and again this summer in 2010. Specifically it was soil profile information that would determine the boundaries of the earthworks and determine if changing conditions over the years would have redeposited soils or filled areas which would minimize the archaeological value of portions of the site..

Ron continued that typically a Phase II survey would answer these questions. I responded that New South had conducted a "limited Phase II at the site and Ron said that he still needed the information that DHR had requested. He also said that in the interests of time you can just assume that the site is eligible and use the profile information to determine the buffer and the type of clearing activities (if any) would be allowed on and within the earthworks themselves. When pressed about typical buffer distances for very unstable soils, he would not commit. Evidently depending on the site, you may need no buffer and a buffer up to 100+ feet.

The upshot of the meeting was that DHR cannot advise us on buffer zones and clearance activities until it is provided with the soil profile information. Kim indicated that she had the information, would pull it together and send it to NASA for review, whereupon we'll forward it to DHR with all due dispatch.

Ron said that information should be sent to Amanda Lee, who will be our point of contact until a permanent replacement for Ron Grayson is chosen. Ron is leaving DHR as of next Thursday.

Randy, if you have anything to add or change, please reply to the group. Thanks.

Joel Mitchell  
Environmental Engineer  
NASA Wallops Flight Facility  
757-824-1127



# COMMONWEALTH of VIRGINIA

## Department of Historic Resources

Douglas W. Domenech  
*Secretary of Natural Resources*

2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick  
*Director*

Tel: (804) 367-2323  
Fax: (804) 367-2391  
TDD: (804) 367-2386  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

November 22, 2010

Mr. Randall M. Stanley, Historic Preservation Officer  
NASA Goddard Space Flight Center  
Wallops Flight Facility  
Building N-161, Room 127  
Wallops Island, Virginia 23337

Re: UAS Airstrip Cultural Resources Investigations  
Accomack County  
DHR File No. 2009-0696

Dear Mr. Stanley,

On October 26, 2010, the Virginia Department of Historic Resources (DHR) received additional information (letter describing the proposed action as well as the additional information requested by DHR in its letter of November 12, 2009) regarding the above referenced project for our review and comment pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended. Unfortunately, we are unable to comment on the effect of this undertaking to historic properties.

We are unable to provide comments regarding the eligibility of the ca. 1952 North Observation Mound (DHR ID# 001-0027-0125) at this time. The hard copy survey file that accompanies the Data Sharing System (DSS) record is incomplete, and the record does not meet DHR's Quality Assurance/Quality Control (QA/QC) requirements. We require the supporting materials (USGS topographic map of the resource, black and white photographs, and sketch plan) be provided to complete this record. While your submission noted that black and white photographs were provided, none accompanied the report. We do appreciate the submission of the digital photographs, but current survey standards require black and white photographs for the file as well as mapping that is separate for a produced report.

DHR understands that NASA WFF wishes to treat archaeological site 44AC0089, the Revolutionary War earthworks, as eligible for listing in the National Register of Historic Places. DHR agrees to this treatment for the purposes of compliance with Section 106 of the National Historic Preservation Act. The proposed UAS Airstrip has the potential to affect site 44AC0089, perhaps adversely, and NASA proposes five options for protection of the resource

Administrative Services  
10 Courthouse Ave.  
Petersburg, VA 23803  
Tel: (804) 862-6416  
Fax: (804) 862-6196

Capital Region Office  
2801 Kensington Office  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Tidewater Region Office  
14415 Old Courthouse Way  
2<sup>nd</sup> Floor  
Newport News, VA 23608  
Tel: (757) 886-2807  
Fax: (757) 886-2808

Roanoke Region Office  
1030 Penmar Avenue, SE  
Roanoke, VA 24013  
Tel: (540) 857-7585  
Fax: (540) 857-7588

Northern Region  
Preservation Office  
P.O. Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7029  
Fax: (540) 868-7033

during construction. While the "No Disturbance" option, which calls for retaining all current vegetation and excluding heavy machinery on the site and within a reasonable buffer, may be the most effective way to preserve site 44AC0089, DHR accepts that this is not the only feasible option. Accordingly, DHR would accept the following as appropriate treatment of site 44AC0089:

1. Establish a 25-foot buffer around the site within which no heavy machinery is allowed.
2. Depict the buffer zone on all construction plans.
3. Erect during construction a temporary exclusion fence around the site, including the buffer.
4. Remove, by hand, all vegetation on the site at or above ground level while keeping all roots intact and minimizing foot traffic on the earthworks.
5. Seed the site with a low-lying, non-woody ground cover.
6. Establish a maintenance plan that monitors the condition of the earthworks and stipulates procedures for future vegetation removal, as needed.

We look forward to receiving the DSS record and supporting materials for North Observation Mound (DHR ID# 001-0027-0125) and notice of your preferred option regarding the treatment of archaeological site 44AC0089. Should you have any questions, I may be reached via email at [amanda.lee@dhr.virginia.gov](mailto:amanda.lee@dhr.virginia.gov) or by phone at 804-367-2323 Ext. 122.

Sincerely,



M. Amanda Lee, Historic Preservationist  
Office of Review and Compliance



National Aeronautics and  
Space Administration  
Goddard Space Flight Center  
Wallops Flight Facility  
Wallops Island, VA 23337

December 13, 2010

Amanda Lee  
Commonwealth of Virginia  
Department of Historic Resources  
2801 Kensington Avenue  
Richmond, Virginia 23221-0311

RE: UAS Airstrip Cultural Resources Investigations  
Wallops Flight Facility  
DHR File #2009-0696

Dear Ms. Lee:

As per your request in your letter of November 22, 2010, please find enclosed the additional information for the determination of eligibility for the 1952 North Observation Mound (DHR# 001-0027-0125). Included are a copy of the VDHR resource survey form, topographical maps, and a site sketch on acid-free paper. A set of black and white photographs (from digital) in Print File sleeves are included, as well as a CD with the digital photo files.

In addition, NASA has determined that the following options will be taken to preserve and protect the earthworks associated with the Revolutionary War Fort (44AC0089) during construction of the new UAS airstrip. Option 1 would establish a 25-foot buffer zone around the earthworks within which no clearing will be done and the site will be maintained and preserved in its current state.

Should it be determined that the vegetation must be removed from the site for safety concerns, trees and large vegetation will be hand-cleared from the site and 25-foot buffer zone. NASA will attempt to control excess foot traffic and inadvertent damage to the earthworks during clearing activities. The roots of trees and other vegetation will not be removed from the earthworks to minimize damage and the site will be reseeded with an approved, non-woody ground cover.

A long-term maintenance plan will be established that will outline procedures for yearly vegetation removal and that will monitor the state of the earthworks. The plan may include observations of erosion and/or other damage to the earthworks through photodocumentation and

include provisions for short and long term stabilization techniques and emergency stabilization in the event of natural disasters, including hurricanes. Long-term maintenance may include the erection of a permanent enclosure to guard against vandalism or inadvertent damage to the site.

If you have any questions or require additional information about the project, please contact Mr. Joel Mitchell at (757) 824-1127 or me at (757) 824-1309. Thank you for your attention to this request and we look forward to receiving your comments.

Sincerely,

A handwritten signature in black ink that reads "Randall M. Stanley". The signature is written in a cursive style with a large, looping initial 'R'.

Randall M. Stanley  
Facility Historic Preservation Officer

Enclosure



# COMMONWEALTH of VIRGINIA

## Department of Historic Resources

Douglas W. Domenech  
*Secretary of Natural Resources*

2801 Kensington Avenue, Richmond, Virginia 23221

Kathleen S. Kilpatrick  
*Director*

Tel: (804) 367-2323  
Fax: (804) 367-2391  
TDD: (804) 367-2386  
[www.dhr.virginia.gov](http://www.dhr.virginia.gov)

January 10, 2011

Mr. Randall M. Stanley, Historic Preservation Officer  
NASA Goddard Space Flight Center  
Wallops Flight Facility (WFF)  
Building N-161, Room 127  
Wallops Island, Virginia 23337

Re: UAS Airstrip Cultural Resources Investigations  
Accomack County  
DHR File No. 2009-0696

Dear Mr. Stanley,

On December 14, 2010, the Virginia Department of Historic Resources (DHR) received additional information regarding the above referenced project for our review and comment pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended.

Based upon a review of the information provided regarding the ca. 1952 North Observation Mound (DHR ID# 001-0027-0125), DHR concurs that the resource is not eligible for inclusion in the National Register of Historic Places.

DHR understands that NASA WFF has determined that it will implement Option 1 regarding the treatment of the Revolutionary War Fort, archaeological site (44AC0089). NASA WFF will establish a 25-foot buffer zone around the earthworks within which no clearing will be done, and the site will be maintained and preserved in its current state. DHR recommends no adverse effect to 44AC0089 by this option.

Should you have any questions, I may be reached via email at [amanda.lee@dhr.virginia.gov](mailto:amanda.lee@dhr.virginia.gov) or by phone at 804-367-2323 Ext. 122.

Sincerely,

M. Amanda Lee, Historic Preservationist  
Office of Review and Compliance

Cc: Shari A. Silbert, NASA WFF

Administrative Services  
10 Courthouse Ave.  
Petersburg, VA 23803  
Tel: (804) 862-6416  
Fax: (804) 862-6196

Capital Region Office  
2801 Kensington Office  
Richmond, VA 23221  
Tel: (804) 367-2323  
Fax: (804) 367-2391

Tidewater Region Office  
14415 Old Courthouse Way 2<sup>nd</sup>  
Floor  
Newport News, VA 23608  
Tel: (757) 886-2807  
Fax: (757) 886-2808

Western Region Office  
Hundley Hall  
962 Kime Lane  
Salem, VA 24153  
Tel: (540) 387-5428  
Fax: (540) 387-5446

Northern Region Office  
5357 Main Street  
PO Box 519  
Stephens City, VA 22655  
Tel: (540) 868-7031  
Fax: (540) 868-7033

## **APPENDIX E**

# **AIR QUALITY CALCULATIONS**

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# APPENDIX E

## AIR QUALITY ANALYSIS

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As described in Section 3.9, air quality in a given location is described by the concentration of various pollutants in the atmosphere. The significance of the pollutant concentration is determined by comparing it to the federal and state ambient air quality standards.

The air quality analysis in this Environmental Assessment (EA) examined impacts from air emissions associated with the proposed construction and operation activities associated with the Proposed Action. As part of the analysis, emissions generated from construction equipment, motor vehicles and Unmanned Aerial Systems (UAS), and other area (nonmobile) sources (i.e., generators) were examined for carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>x</sub>), ozone (in the form of volatile organic compounds [VOCs]), and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>). Air quality at Wallops Island is regulated by the United States Environmental Protection Agency (USEPA) and Virginia Department of Environmental Quality (VDEQ). The Northeastern Virginia Intrastate Air Quality Control Region (AQCR), including Accomack County, is attainment/unclassifiable for all criteria pollutants.

### **CONSTRUCTION**

Air quality impacts from proposed construction activities were estimated from (1) combustion emissions due to the use of fossil fuel-powered equipment; (2) fugitive dust emissions (PM<sub>10</sub> and PM<sub>2.5</sub>) during earth-moving activities, and the operation of equipment on bare soil; and (3) VOC emissions from application of asphalt materials during paving operations.

Factors needed to derive the construction source emission rates were obtained from *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling* (USEPA 2010a); *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (USEPA 2010b); *Nonroad Engine and Vehicle Emission Study—Report* (USEPA 1991); *Conversion Factors for Hydrocarbon Emission Components* (USEPA 2005); and *Western Regional Air Partnership (WRAP) Fugitive Dust Handbook* (WRAP 2006).

The analysis assumed that all construction equipment was manufactured before 2000. This approach is based on the well-known longevity of diesel engines, although use of 100% Tier 0 equipment may be somewhat conservative. The analysis also inherently reduced PM<sub>10</sub> fugitive dust emissions from earth-moving activities by 50 percent as this control level is included in the emission factor itself.

**Off-Road Equipment Emissions.** The NONROAD model (USEPA 2008) is the EPA standard method for preparing emission inventories for mobile sources that are not classified as being related to on-road traffic, railroads, air traffic, or water-going vessels. As such, it is the starting place for quantifying emissions from construction-related equipment.

The NONROAD model uses the following general equation to estimate emissions separately for CO, NO<sub>x</sub>, PM (essentially all of which is PM<sub>2.5</sub> from construction sources), and total hydrocarbons (THC), nearly all of which are nonmethane hydrocarbons:

$$EMS = EF * HP * LF * Act * DF$$

**Where:**

*EMS* = estimated emissions

*EF* = emissions factor in grams per horsepower hours

*HP* = peak horsepower

*LF* = load factor (assumed percentage of peak horsepower)

*Act* = activity in hours of operation per period of operation

*DF* = deterioration factor

The emissions factor is specific to the equipment type, engine size, and technology type. The technology type for diesel equipment can be “base” (before 1988), “tier 0” (1988 to 1999), or “tier 1” (2000 to 2005). Tier 2 emissions factors could be applied to equipment that satisfies 2006 national standards (or slightly earlier California standards). The technology type for two-stroke gasoline equipment can be “base” (before 1997), “phase 1” (1997 to 2001), or “phase 2” (2002 to 2007). Equipment for phases 1 and 2 can have catalytic converters. For this study, all diesel equipment was assumed to be either tier 0 or tier 1 and all two-stroke diesel equipment was assumed to be phase 1 without catalytic converters.

The load factor is specific to the equipment type in the NONROAD model regardless of engine size or technology type, and it represents the average fraction of peak horsepower at which the engine is assumed to operate. NONROAD model default values were used in all cases. Because Tier 0 equipment was conservatively used throughout the analysis period (begin in 2016; complete within 9 months), deterioration factors were not used to estimate increased emissions due to engine age. Based on the methodology described, it is possible to make a conservative estimate of emissions from off-road equipment if the types of equipment and durations of use are known.

**Fugitive Dust.** Emission rates for fugitive dust were estimated using guidelines outlined in the *WRAP Fugitive Dust Handbook* (WRAP 2006). The WRAP handbook offers several options for selecting factors for PM<sub>10</sub> (coarse PM) depending on what information is known. After PM<sub>10</sub> is estimated, the fraction of fugitive dust emitted as PM<sub>2.5</sub> is estimated, the most recent WRAP study (MRI 2005) recommends the use of a fractional factor of 0.10 to estimate the PM<sub>2.5</sub> portion of the PM<sub>10</sub>. For site preparation activities, the emission factor was obtained from Table 3-2 of the WRAP Fugitive Dust Handbook. The areas of disturbance and approximate durations were used in conjunction with the large scale of land-disturbing activities occurring, resulting in the selection of the first factor with worst-case conditions for use in the analysis.

**PM<sub>10</sub>, PM<sub>2.5</sub>, and Mobile Sources.** Diesel exhaust is a primary, well-documented source of PM<sub>2.5</sub> emissions. The vast majority of PM emissions in diesel exhaust is PM<sub>2.5</sub>. Therefore, all calculated PM is assumed to be PM<sub>2.5</sub>. A corollary result of this is that the PM<sub>10</sub> fraction of diesel exhaust is estimated very conservatively as only a small fraction of PM<sub>10</sub> is present in the exhaust. However, ratios of PM<sub>10</sub> to PM<sub>2.5</sub> in diesel exhaust are not yet published and therefore for the purposes of the EA calculations, all PM emissions are equally distributed as PM<sub>10</sub> and PM<sub>2.5</sub>.

**VOC Emissions from Paving.** VOC emissions from the application of hot mix asphalt were calculated throughout the nine month construction period in 2016. The estimates used asphalt volumes as provided in the Final Cost Estimate (NASA 2011) , and used the published California Air Resources Board (CARB) hot mix asphalt emission factor.

### **OPERATIONS**

Air emissions from the air strip operations are due to the UAS themselves and generators that power the mobile command centers that are associated with each UAS.

**UAS Operations.** The total number of flights per year for each model of UAS was evenly split from the proposed annual total, including the flights for battery-powered UAS. The maximum flight duration for each model was provided by NASA personnel, and these data were conservatively used as the standard flight duration. Brake specific fuel consumption (BSFC) and criteria pollutant emission factors were obtained from ) *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (USEPA 2010b).

For the GTM AirSTAR, which is a 5.5% scaled version of a Boeing 757, throughput and emission factors were derived from the International Civil Aviation Organization (ICAO) Engine Emissions Databank Datasheets for two common 757 engine models, the PW2037 and PW2040 (ICAO 2004a and ICAO 2004b). The emission factors for these two engines were averaged because the exact engine model that has been scaled for the GTM AirSTAR is not known. In order to appropriately scale the emission factors, the rated turbofan engine output for each engine type was scaled to 5.5% of the actual full-size output (in kilonewtons) as indicated in the datasheets, and the average taken of the scaled outputs for the two engine models. The emission factors were then multiplied by the scaled output and the number of engines (2) to calculate total air emissions from operation of the UAS.

**Command Center Generator Operations.** Mobile generators are required to power the command centers for the UAS. A generator size of 60 kW was assumed for all command centers, based on the use of this size generator for the GTM AirSTAR Command Center (Jordan *et al.* undated). The total hours of operation of a 60 kW generator for one year was established by adding the total maximum duration flight times X total annual flights for each UAS (including battery operated UAS). Emission factors for the rated generator size were obtained from *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (USEPA 2010b) and the use of diesel fuel was assumed for generator operation.

**REFERENCES**

- International Civil Aviation Organization (ICAO). 2004a. Engine Exhaust Emissions Data Bank. PW2037.
- \_\_\_\_\_. 2004b. Engine Exhaust Emissions Data Bank. PW2040.
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- National Aeronautic and Space Administration (NASA). 2011. Final Cost Estimate for Unmanned Aerial Systems Airstrip. May 6.
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- \_\_\_\_\_. 2005. EPA420-R-05-015, NR-002c. Conversion Factors for Hydrocarbon Emission Components. December.
- \_\_\_\_\_. 1991. EPA 460/3-91-02, Nonroad Engine and Vehicle Emission Study—Report.
- Western Regional Air Partnership (WRAP). 2006. WRAP Fugitive Dust Handbook.

**UAS Airstrip Construction Air Emissions - Wallops Flight Facility, VA**

**Airstrip Construction**

Begin in 2016 and completion within 9 months

Construct Airstrip measuring 3,000 ft long by 75 feet wide  
Fill brought from offsite except 978 CY from onsite trenching.

14cy

Land Clearing 13 AC

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i># days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Excavator	1	6	13	95	0.21	0.99	3.49	6.9	0.85	0.722	3	12	24	3	2
Mulching head	1	6	13	150	0.58	0.68	2.7	8.38	0.93	0.402	10	40	125	14	6
Backhoe/loader	2	4	30	98	0.21	0.99	3.49	6.9	0.85	0.722	11	38	75	9	8
Skid/steer Loader	1	8	13	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	2	8	20	3	2
Dump truck	6	0.5	30	275	0.21	0.68	2.7	8.38	0.89	0.402	8	31	96	10	5
<b>Subtotal</b>											34	130	340	40	23

Site fill 44228 CY

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i># days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Skid steer loader	2	8	91	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	26	117	277	46	23
Backhoe/loader	4	8	105	98	0.21	0.99	3.49	6.9	0.85	0.722	151	532	1,052	130	110
Dump truck	30	0.5	105	275	0.21	0.68	2.7	8.38	0.89	0.402	136	541	1,680	178	81
<b>Subtotal</b>											177	649	1,329	176	133

Grading 95571 SY

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i># days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Dozer	1	6	22	90	0.59	0.99	3.49	6.9	0.93	0.722	15	54	107	14	11
Skid steer loader	2	4	55	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	8	35	84	14	7
Backhoe/loader	2	6	22	98	0.21	0.99	3.49	6.9	0.85	0.722	12	42	83	10	9
Small diesel engines	2	4	44	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	3	14	17	3	1
Grader	2	2	22	150	0.59	0.68	2.7	8.38	0.93	0.402	12	46	144	16	7
<b>Subtotal</b>											49	191	434	58	35

Trenching 978 CY

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i>days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Backhoe/loader	1	8	10	98	0.21	0.99	3.49	6.9	0.85	0.722	4	13	25	3	3
Excavator	1	8	7	90	0.21	0.99	3.49	6.9	0.85	0.722	2	8	16	2	2
Dump truck	1	4	10	275	0.21	0.68	2.7	8.38	0.89	0.402	3	14	43	5	2
Small diesel engines	1	8	7	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	0	2	3	0	0
Trencher	1	8	8	100	0.21	0.99	3.49	6.9	0.85	0.722	3	10	20	3	2
<b>Subtotal</b>											13	47	107	13	9

Gravel Work 2666 CY

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i># days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Backhoe/loader	1	8	28	98	0.21	0.990	3.49	6.9	0.85	0.722	10	35	70	9	7
Skid steer loader	2	6	83	67	0.23	0.521	2.3655	5.5988	0.93	0.473	18	80	189	31	16
Small diesel engines	1	8	83	10	0.43	0.763	4.1127	5.2298	0.93	0.4474	5	26	33	6	3
Dump truck	8	0.5	28	275	0.21	0.680	2.7	8.38	0.89	0.402	10	39	119	13	6
<b>Subtotal</b>											42	180	412	59	32

Construct/pave airstrip 225,000 SF

<i>Equipment</i>	<i>Number</i>	<i>Hr/day</i>	<i># days</i>	<i>Hp</i>	<i>LF</i>	<b>VOC</b> g/hp-hr	<b>CO</b> g/hp-hr	<b>NOx</b> g/hp-hr	<b>SO2</b> g/hp-hr	<b>PM</b> g/hp-hr	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Grader	1	4	38	150	0.59	0.68	2.7	8.38	0.93	0.402	20	81	251	28	12
Roller	1	4	13	30	0.59	1.8	5	6.9	1	0.8	4	10	14	2	2
Paver	1	8	13	107	0.59	0.68	2.7	8.38	0.93	0.402	10	39	121	13	6
Delivery truck	1	2	13	180	0.21	0.68	2.7	8.38	0.89	0.402	1	6	18	2	1
Skid steer loader	1	4	38	67	0.23	0.5213	2.3655	5.5988	0.93	0.473	3	12	29	5	2
Small diesel engines	1	4	26	10	0.43	0.7628	4.1127	5.2298	0.93	0.4474	1	4	5	1	0
Dump truck (12 CY)	1	0.5	26	275	0.21	0.68	2.7	8.38	0.89	0.402	1	4	14	1	1
<b>Subtotal</b>											40	157	452	52	24

Volume of hot mix asphalt 56,250 ft<sup>3</sup>  
 Average density of HMA 145 lb/ft<sup>3</sup>  
 CARB EF for HMA 0.04 lb/ton  
 VOC emissions from HMA paving 163 lb

**Fugitive Dust Emissions:**

<b>PM<sub>10</sub></b> tons/acre/mo	acres	days of disturbance	<b>PM<sub>10</sub></b> Total	<b>PM<sub>2.5</sub>/PM<sub>10</sub></b> Ratio	<b>PM<sub>2.5</sub></b> Total
0.42	2.5	180	6.3	0.1	0.63

Heavy duty truck trips to/from site (primarily for fill and gravel):  
 Assume 50 mile roundtrip:

<i>Equipment</i>	<i>Distance</i>	<i># Trips</i>	<b>VOC</b> g/mi	<b>CO</b> g/mi	<b>NOx</b> g/mi	<b>SO2</b> g/mi	<b>PM</b> g/mi	<b>VOC</b> lb	<b>CO</b> lb	<b>NOx</b> lb	<b>SO2</b> lb	<b>PM</b> lb
Dump Truck (Heavy Duty Diesel Vehicle)	50	3694	0.4216	2.0378	7.853	0.0132	0.22902	172	830	3,198	5	93

**2016 Emission Totals:**

<b>VOC</b> T/yr	<b>CO</b> T/yr	<b>NOx</b> T/yr	<b>SO2</b> T/yr	<b>PM<sub>10</sub></b> T/yr	<b>PM<sub>2.5</sub></b> T/yr
0.34	1.09	3.14	0.20	6.47	0.80