Appendix A

Agency Coordination

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

March 1, 2007

Reply to Attn of: 250.W

Virginia Field Office
Attn: Mr. Eric Davis
Assistant Field Supervisor
U.S. Fish and Wildlife Service
6669 Short Lane
Gloucester, VA 23061

Subject: Description of the Proposed Action Alternatives for the Shoreline Restoration and Sediment Management Programmatic Environmental Assessment at NASA, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia and Biological Assessment for Impacts to the Piping Plover

The Wallops Flight Facility (WFF) has retained URS Group, Inc. (URS) to conduct a Programmatic Environmental Assessment (PEA) for Shoreline Restoration and Sediment Management Alternatives at the WFF on Wallops Island, Virginia. In compliance with the Endangered Species Act, WFF respectfully requests that the U.S. Fish and Wildlife Service (USFWS) review and provide comments on the attached Description of the Proposed Action Alternatives (DOPAA) and the following Biological Assessment (BA). The DOPAA contains all the project data and figures. The BA describes the potential impact of the proposed project on the piping plover (*Charadrius melodus*) only. No other federally listed species within USFWS' jurisdiction are present within the project area. The National Marine Fisheries Service (NMFS) has been consulted about potential impacts to marine mammals and sea turtles.

Biological Assessment

Wallops Island features various ecological succession stages, including beaches, dunes, swales, maritime forests, and marsh. These natural vegetative zones form a series of finger-like stands that merge or grow into each other. The northern and southern dune vegetation on Wallops Island directly border salt marshes.

The dune system from east to west includes the sub-tidal zone, inter-tidal zone, and upper beach zone. The inter-dune swale zone includes the area located between the westernmost portion of the dune zone and the maritime zone. The dune and swale zone is an extremely harsh environment. Biotic resources in this zone must be very adaptable to contend with high temperatures, high winds, salt, sandblasting, drought, and low nutrient levels in the sandy soil medium. Dominant species within the dune system include seabeach orach (*Atriplex*

arenaria), common saltwort (*Salsola kali*), sea rocket (*Cakile edentula*), American beachgrass (*Ammonphila breviligulata*), and seaside goldenrod (*Solidago sempervirens*).

The sub-tidal zone on the eastern side of Wallops Island extends from the lower limit of low tide to the seaward-most limit of wave action. Because of the dynamics of wave action, few plants exist in the sub-tidal zone. Phytoplankton are prevalent, as well as macroalgae, algae attached to substructure, and eelgrass (*Zostera marina*) in areas of diminished wave action.

The inter-tidal zone is a transition zone exposed during low tide and totally submerged at high tide. The inter-tidal zone is an extremely dynamic area. Plant species are virtually nonexistent in the inter-tidal zone located on the eastern portion of Wallops Island because of the deleterious effects of wave action on the stability of the zone. Microscopic plants and animals exist in the minute spaces between individual sand grains in the eastern inter-tidal zone.

The upper beach zone extends from the high-tide mark to the crest of the eastern-most dune. On Wallops Island this zone is found on the northern and extreme southern sections of the island. The remaining eastern section of the island is an operational area that is protected by an extensive seawall built where the upper beach zone would normally exist. Vascular plant life maintains a tenuous foothold in this area. Such plants as sea rocket and beach grass are scattered on the northern part of the island.

On the southern part of Wallops Island, the dune and swale zone extends to the tidal marsh on the western side of Wallops Island without any maritime forest. In the middle and northern areas, the dune and swale zone extends to the maritime zone that starts where the secondary dune line once existed. The northern part of Wallops Island within the dune and swale zone is in an almost-natural state, and is dominated by northern bayberry (*Morella pensylvanica*), wax myrtle (*Morella cerifera*), groundsel-tree (*Baccharis halimifolia*), and American beachgrass.

The central portion of Wallops Island is dominated by common reed (*Phragmites australis*) and maintained lawn areas. Common reed is an invasive species and has the ability to grow in areas with very low habitat value; it is considered by many to be an undesirable plant. Due to its successful competition with many other plant species, the common reed has virtually taken over much of the area in the center of Wallops Island.

A small area of maritime forest zone exists on the central portion of the island, with an expansive thicket zone on the northern part. The thicket zone is dominated by extensive clusters of northern bayberry, wax myrtle, and groundsel-tree. The thicket zone in some areas is virtually impenetrable due to dense stands of poison ivy (*Toxicodendron radicans*) and greenbriar (*Smilax* spp.), which is also pervasive on other areas of Wallops Island. The northern maritime forest zone is dominated by loblolly pine (*Pinus taeda*) and cherry trees (*Prunus* spp.), with an understory of northern bayberry, wax myrtle, and groundsel-tree. A few places in this forest have freshwater depressions containing aquatic plants such as duckweed (*Lemna minor*).

Between Wallops Island and Wallops Mainland extends 1,140 acres (461.3 hectares) of tidal marsh. A tidal marsh is an area of low-lying wetlands that is influenced by the tides. The marsh is interlaced with small streams known locally as "guts." The marsh itself can be divided into the low marsh and the high marsh – each a distinctive community. The low marsh, which is inundated at high tide, is dominated by saltmarsh cordgrass (*Spartina alterniflora*). The high marsh, which is flooded by approximately 50 percent of the high tides,

is dominated by salt meadow cordgrass (*S. patens*). The marshes are of tremendous importance to marine life and to the terrestrial and avian species that depend on the marshes for their existence.

Protected Species Present

Piping Plover (*Charadrius melodus*)
Federally listed as Threatened

Piping plover nesting habitat has been delineated on Wallops Island dune and overwash areas at the northern and southern reaches of the barrier island (Figure 11, taken from the draft PEA). Between 1996 and 2006 piping plovers were observed feeding every year, although exact numbers were not recorded. During 2006, one pair of plovers nested but the nest was abandoned due to attempted predation by a fox. Nests were also observed in 2005 (2 pairs, 1 nest lost to fox predation and 2nd pair chicks were lost); 2004 (1 pair – 3 chicks fledged); 2001 (1 pair unsuccessful); 1998 (1 pair unsuccessful); 1996 (3 pairs with 2 chicks total fledged). There were no nests observed in 2003, 2002, 2000, 1999, and 1997.

Piping plover nests are situated above the high tide line on coastal beaches, sandflats at the ends of sand spits and barrier islands, gently sloping foredunes, blowout areas behind primary dunes, and washover areas cut into or between dunes. They may also nest on areas where suitable dredge material has been deposited. Nest sites are shallow scraped depressions in substrates ranging from fine grained sand to mixtures of sand and pebbles, shells or cobble. Nests are usually found in areas with little or no vegetation, although, on occasion, piping plovers will nest under stands of American beachgrass (*Ammophila breviligulata*) or other vegetation (USFWS, 2000).

Plover foods consist of invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks. Feeding areas include intertidal portions of ocean beaches, washover areas, mudflats, sandflats, wrack lines, and shorelines of coastal ponds, lagoons, or salt marshes (USFWS, 2000)

Employment of buffer areas (0.5-1 mile) between the beach re-nourishment operations and the potential nesting areas at the northern and southern portions of the island should provide adequate protection for nesting piping plovers. Alternatively, re-nourishment operations could be conducted during the winter (late September through late February) which would avoid disturbances during the nesting and migratory periods.

Expansion of total beach area may be beneficial for both nesting and migrating piping plovers. The species is known to nest in areas where appropriate dredge substrate has been placed. Additionally, proper planting of beach vegetation at low densities may prove to be attractive to the plovers for nesting purposes.

NASA Determination

In accordance with Section 7 of the Endangered Species Act, NASA has determined that the proposed project is "not likely to adversely affect" or jeopardize the continued existence of the piping plover. The proposed project is neither likely to result in the destruction nor adverse modification of critical habitat for these species.

Please contact me at (757) 824-2319, or Ms. Shari Silbert at (757) 824-2327, if you have any questions or require any additional information.

Joel Mandell for
Joshua A. Bundick
NEPA Program Manager

2 Enclosures
1. Description of the Proposed Action Alternatives
2. Figure 11

cc:
200/Ms. C. Massey
250/Mr. A. Lopez
250/Mr. J. Mitchell
NMFS/Ms. J. Crocker
URS/Mr. R. Thompson

Reference:

U.S. Fish and Wildlife Service. 2000. "Piping Plover Atlantic Coast Population Recovery Plan: Life History and Ecology." Site Accessed December 6, 2006. http://www.fws.gov/northeast/pipingplover/recplan/ecology.html

United States Department of the Interior

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

Date: April 24, 2007

Project name: NASA- PROGRAMMATIC EA - SHORELINE RESTORATION, WALLOPS ISLAND

Project number: 2007-TA-0300 City/County ACCOMACK Co., VA

The U.S. Fish and Wildlife Service (Service) has reviewed your request for information on federally listed or proposed endangered or threatened species and designated critical habitat for the above referenced project. The following comments are provided under provisions of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

✓ We have reviewed the information you have provided and believe that the proposed action will not adversely affect federally listed species or federally designated critical habitat because no federally listed species are known to occur in the project area. Should project plans change or if additional information on listed and proposed species becomes available, this determination may be reconsidered.

_____ We recommend that you contact **both** of the following State agencies for site specific information on listed species in Virginia. Each agency maintains a different database and has differing expertise and/or regulatory responsibility:

Virginia Dept. of Game & Inland Fisheries
Environmental Services Section
P.O. Box 11104
Richmond, VA 23230
(804) 367-1000

Virginia Dept. of Conservation and Recreation
Division of Natural Heritage
217 Governor Street, 2nd Floor
Richmond, VA 23219
(804) 786-7951

If either agency indicates a federally listed species **is present**, please resubmit your project description with letters from both agencies attached.

_____ If **appropriate habitat may be present**, we recommend surveys within appropriate habitat by a qualified surveyor. Enclosed are county lists with fact sheets that contain information the species' habitat requirements and lists of qualified surveyors. If this project involves a Federal agency (Federal permit, funding, or land), we encourage the Federal agency to contact this office if appropriate habitat is present and if they determine their proposed action may affect federally listed species or critical habitat.

_____ Determinations of the presence of waters of the United States, including wetlands, and the need for permits are made by the U.S. Army Corps of Engineers. They may be contacted at: Regulatory Branch, U.S. Army Corps of Engineers, Norfolk District, 803 Front Street, Norfolk, Virginia 23510, telephone (757) 441-7652.

Our website http://virginiafieldoffice.fws.gov contains many resources that may assist with project reviews. Point of contact is Mike Drummond at (804) 693-6694, ext. 114.

Sincerely,

Karen L. Mayne

Karen L. Mayne
Supervisor
Virginia Field Office

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

May 9, 2007

Reply to Attn of: 250.W

Office of Protected Resources
Attn: Ms. Patricia Kurkul
Regional Administrator
National Marine Fisheries Service
1 Blackburn Drive
Gloucester, MA 01930

Subject: Request for Formal Consultation under Section 7(c) of the Endangered Species Act (ESA) of 1973 as part of the National Aeronautics and Space Administration's Proposed Wallops Island Shoreline Restoration and Infrastructure Protection Program.

The National Aeronautics and Space Administration (NASA) has retained URS Group, Inc (URS) to conduct a Programmatic Environmental Assessment (PEA) for Shoreline Restoration and Sediment Management Alternatives at the Goddard Space Flight Center's Wallops Flight Facility (WFF) on Wallops Island, Virginia. In compliance with the Endangered Species Act (ESA) and Marine Mammal Protection Act, NASA respectfully requests that the National Marine Fisheries Service (NMFS) review and provide comments on the attached Description of the Proposed Action Alternatives (DOPAA) and the attached Biological Assessment (BA). The DOPAA contains all the project data and figures. The BA describes the potential impact of the proposed project on species listed in the table below. No other federally listed species within NMFS jurisdiction are present within the project area. The U.S. Fish and Wildlife Service (USFWS) has been consulted about potential impacts to species within its jurisdiction

Common Name	Scientific Name	Federal Status
Humpback whale	*Megaptera novaeangliae*	Endangered
Fin whale	*Balaeanoptera physalus*	Endangered
Right whale	*Eubalaena glacialis*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempi*	Endangered
Atlantic Green sea turtle	*Chelonia mydas*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered

NASA Determination

In accordance with Section 7 of the ESA, NASA has determined that the proposed action "may affect, not likely to adversely affect" the humpback, fin and right whale species that may occur in the project area Additionally, NASA has concluded that the proposed action "may affect, not likely to adversely affect" hawksbill, Atlantic green and leatherback turtles in the project area.

NASA did determine that the proposed action "may affect, likely to adversely affect" the loggerhead and Kemp's ridley sea turtle species in the project area. As such, NASA is requesting a formal consultation as part of Section 7 of the ESA. Please find attached the BA evaluating potential impacts to species listed under the ESA and outlining how the determinations listed above were derived

Please contact me at (757) 824-2319, or Shari Silbert at (757) 824-2327, if you have any questions or require any additional information.

Joshua A. Bundick
NEPA Program Manager

2 Enclosures:
1. DOPAA
2. BA

cc (w/o encls.):
200/Ms. C. Massey
250/Mr. A. Lopez
250/Ms. C. Turner
NMFS/Ms J. Crocker
USFWS/Mr. E. Davis
URS/Mr. R. Thompson

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

April 23, 2007

Reply to Attn of: 250

National Marine Fisheries Service
Attn: Peter Colosi
Habitat Conservation Division
National Marine Fisheries Service
One Blackburn Drive
Gloucester, MA 01930

Subject: Request for Consultation under the Magnuson-Stevens Act as part of the National Aeronautics and Space Administration's Proposed Wallops Island Shoreline Restoration and Infrastructure Protection Program.

The National Aeronautics and Space Administration (NASA) has retained URS Group, Inc (URS) to conduct a Programmatic Environmental Assessment (PEA) for Shoreline Restoration and Sediment Management Alternatives at the Goddard Space Flight Center's Wallops Flights Facility (WFF) on Wallops Island, Virginia. In compliance with Section 305(b) of the Magnuson-Stevens Act (16 U.S.C. 1855[b][2] and 50 CFR 600 905-.930, subpart K), NASA respectfully requests that the National Marine Fisheries Service (NMFS) review and provide comments on the attached Description of the Proposed Action Alternatives (DOPAA) and the attached Essential Fish Habitat (EFH) assessment. The DOPAA contains all the project data and figures. The EFH assessment has been prepared in accordance with the requirements set forth in 50 CFR 600.920(e). The NMFS Office of Protected Resources and U.S. Fish and Wildlife Service (USFWS) have been consulted about potential impacts to species within their jurisdiction.

NASA Determination

This project will result in some unavoidable adverse impacts to habitats designated as EFH for several federally managed species. This includes temporary disturbance to a small area of non-vegetated bottom and temporary degradation of the marine water column due to an increase in suspended sediment concentrations. No long-term, operational EFH impacts are anticipated. NASA does not believe that these effects will have a substantial, adverse impact on EFH or that any additional mitigation is necessary for the proposed project.

Please contact me at (757) 824-2319, or Shari Silbert at (757) 824-2327, if you have any questions or require any additional information.

Josh A. Bundick
WFF NEPA Program Manager

2 Enclosures:
DOPAA
EFH Assessment

cc (w/o encl.)
200/Ms. C. Massey
250/Mr. A. Lopez
250/Mr. J. Mitchell
NOAA/ Mr. J. Nichols
USFWS/Mr. E. Davis
URS/ Mr. R. Thompson

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Habitat Conservation Division
Chesapeake Bay Program Office
410 Severn Ave , Suite 107A
Annapolis, Maryland 21403

May 14, 2007

MEMORANDUM TO: Joshua A. Bundick
NEPA Program Manager
National Aeronautics and Space Administration
Goddard Space Flight Center, Wallops Flight Facility
Wallops Island, VA 2337-5099

FROM: John S. Nichols
Fishery Biologist

SUBJECT: Shoreline Restoration & Infrastructure Protection Program

This pertains to your request for Essential Fish Habitat (EFH) consultation, dated April 9, 2007, for the proposed Shoreline Restoration and Infrastructure Protection Program at the NASA Wallops Flight Facility on Wallops Island, Virginia. We have reviewed your EFH Assessment for this proposal, and in accordance with Section 305(b)(4)(A) of the Magnuson-Stevens Fishery Conservation & Management Act, we offer the following comments and EFH Conservation Recommendations.

Your Assessment, although detailed and well prepared, should have more thoroughly addressed long-term and cumulative impacts to coastal bottom habitat off Wallops Island from this proposal. Our concerns relate primarily to proposed offshore borrow activities, which would provide a short-term and/or long-term source of sand material for nourishing the facilities' shoreline. Although no estimates were provided on borrow volumes, sand requirements for nourishing 22,309 linear feet of shoreline will likely be significant (i.e., millions of cubic yards of material), particularly if the beach fill only option is selected, and would require borrow from off-shore sites in perpetuity. Such long-term borrow activities have the potential to significantly alter the bottom topography off Wallops Island.

Coastal waters off mid-Atlantic barrier islands possess bottom features, such as sand knolls, which are important to many of the managed species covered in your EFH Assessment. In particular, coastal migratory species, such as cobia, king mackerel, Spanish mackerel, and various sharks make use of coastal topographic bottom features for migratory orientation. The presence of sand knolls has also diversified coastal bottom habitat, forming troughs between the knolls with finer-grained sediments and rich benthic communities, which provide forage for migratory fish. Sand knolls are geologically ancient formations, and once removed (i.e., by borrow actions), will not reform. The proposed borrow activities should, therefore, be designed to conserve ecologically important topographic features that may exist in proposed borrow areas off Wallops Island.

In order for NMFS to fully evaluate the impacts of this proposal on EFH, more detailed information is needed on proposed borrow areas (e.g., Sectors 1-3). We offer the following EFH Conservation Recommendations pertaining to the borrow requirement issue.

1) The forthcoming Programmatic Environmental Assessment (PEA) should provide more detailed information on the physiography of preferred borrow site(s) for this project. Much of this information should focus on the following physical parameters.
   a. Bathymetry, and topographic bottom features
   b. Substrate, including predominant surficial substrates, and sedimentary profiles showing areas of preferred substrate, depths to which preferred substrates extend, and substrates underlying layers of preferred material.

2) Your agency should identify measures that will be used to minimize adverse changes to the topography of borrow site(s) selected for this project. Such measures may include avoidance of areas with unique topographic bottom features (e g., sand knolls), and/or use of borrow methods that conserve such bottom features; and, post-borrow monitoring to determine the effectiveness of conservation-based borrow methods.

3) The PEA should identify and describe recreational and commercial (trawling, gill-netting) fishing activities that occur in proposed borrow areas. It is preferred that important fishing grounds be avoided for borrow, to conserve existing bottom features that may be responsible for sustaining fisheries in those areas.

4) Chincoteague Bay is a highly important nursery for larval and juvenile summer flounder Following offshore spawning by adults, planktonic larval flounder move inshore and into Chincoteague Bay through the Chincoteague Inlet, from mid-autumn into spring. Many larvae metamorphose, move to the bottom, and over-winter in coastal waters prior to entering Chincoteague Bay as juveniles. Consequently, coastal bottom off Wallops Island, including Borrow Sectors 1-3, may be important to over-wintering and migratory activities of early stage flounder. The PEA should consider alternative borrow sites, and borrow measures for minimizing impacts on larval and juvenile summer flounder. We suggest consulting with Virginia Institute of Marine Science fisheries staff regarding local flounder ecology, and areas off Wallops Island where, and/or seasonal periods when borrow activities should be avoided.

5) The PEA should address the cumulative impacts of the proposed borrow action on fish and fisheries within mid-Atlantic coastal waters

We also have provided the following EFH Conservation Recommendations regarding other project issues.

6) NMFS prefers options that include the use of sand-retention structures to reduce the long-term need for offshore borrow.

7) Stone is the preferred material for constructing sand-retention structures. Geo-textile fabric tubes do not possess the resilience for protecting high-energy shorelines, such as along Wallops Island, for short or long-term duration.

8) NMFS strongly recommends against Alternative 2/Option 4 (i.e , building a levee around the entire island), which would result in significant long-term and cumulative impacts to marine and estuarine fauna, and their essential habitats

9) Cross-sectional profiles should be provided in the PEA reflecting the extent of channelward encroachment of preferred nourishment options, and in relation to MHW and MLW

Protected Resources

Any questions or new information pertaining to the on-going Endangered Species Act Section 7 Consultation for this proposal should be directed to Julie Crocker of our Protected Resources Division, Gloucester, MA; Julie.Crocker@NOAA.GOV, (978) 281-9328, ext. 6530.

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

February 28, 2007

Reply to Attn of: 250.W

Office of Environmental Impact Review
Attn: Ms. Ellie Irons
Virginia Department of Environmental Quality
629 East Main Street, Room 631
Richmond, VA 23219

Subject: Description of the Proposed Action Alternatives for the Shoreline Restoration and Sediment Management Programmatic Environmental Assessment at NASA, Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia

The NASA, Wallops Flight Faciltiy (WFF) has retained URS Group, Inc. (URS) to conduct a Programmatic Environmental Assessment (PEA) for Shoreline Restoration and Sediment Management Alternatives at the Goddard Space Flight Center's Wallops Flights Facility (WFF) on Wallops Island, Virginia. The US Army Corps of Engineers (USACE) has been retained to design the plan and manage the operations for the beach nourishment portion of the project. NASA respectfully requests that the Virginia Department of Environmental Quality (DEQ) review and provide comments on the attached Description of the Proposed Action Alternatives (DOPAA). The DOPAA contains all project data and figures.

Consultation with the Virginia Department of Historic Resources and Virginia Coastal Zone Management Program office has been initiated separately. No additional information will need to be forwarded to these agencies.

Please contact me at (757) 824-2319, or Ms. Shari Silbert at (757) 824-2327, if you have any questions or require any additional information.

Joshua A. Bundick
NEPA Program Manager

Enclosure

cc: (w/o encls.)
200/Ms. C. Massey
250/Mr. A. Lopez
250/Mr. J. Mitchell
NMFS/Ms. J. Crocker
URS/Mr. R. Thompson

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
Fax (804) 698-4500 TDD (804) 698-4021
www deq.virginia gov

L Preston Bryant, Jr
Secretary of Natural Resources

David K. Paylor
Director

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

March 20, 2007

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

RE: Shoreline Restoration and Infrastructure Protection Program, Request for Scoping Comments for the Preparation of a Programmatic Environmental Assessment

Dear Mr. Bundick:

This is in response to your February 28, 2007 letter (received March 5) announcing the preparation of a Programmatic Environmental Assessment for shoreline restoration and sediment management at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center, Wallops Flight Facility (WFF), at Wallops Island, Virginia, and soliciting comments on the scope of the document.

According to the Description of the Proposed Action and Alternatives Programmatic Environmental Assessment Shoreline Restoration and Infrastructure Protection Program, NASA has developed two Alternatives and a No Action Alternative to implement the Proposed Action on Wallops Island. The Proposed Action is comprised of Alternative 1: Shoreline Restoration Measures, and Alternative 2: Flood Protection Measures. Alternative 1: Shoreline Restoration Measures consists of six options:

- Option 1 - Optimum Shore Protection Plan: Sand-Retention Structures and Beach Fill;
- Option 2 – Shore Protection: Beach Fill Only;
- Option 3 – Sand-Retention Structure Construction Only;
- Option 4 – Emergency Actions;
- Option 5 – Installation of Geotextile Tubes; and
- Option 6 – Sand Dunes with Various Cores.

Alternative 2: Flood Protection Measures consists of four options:

- Option 1 – Critical Structure Ring Levees;
- Option 2 – Elevation of Critical Structures and Roadways;
- Option 3 – Elevate the Island and Structures by Pumping Sand; and
- Option 4 – Build a Levee Around the Entire Island.

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 (this Office) will coordinate Virginia's review of any environmental documents 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 that must be provided pursuant to the Coastal Zone Management Act (CZMA). If the federal consistency determination is included as part of the EA or EIS, there can be a single review.

Environmental Review and Scoping

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
- Marine Resources Commission*
- Department of Agriculture and Consumer Services
- Department of Historic Resources
- Virginia Institute of Marine Science
- Accomack-Northampton Planning District Commission
- Accomack County.

In order to ensure an effective coordinated review of the Environmental Assessment and the consistency determination, we will require 15 copies of the document when it is published. 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. 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 documents for the proposed project.

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 federal consistency determination 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.

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,

Ellie L. Irons
Program Manager
Office of Environmental Impact Review

cc: Michelle Hollis, DEQ-TRO
Kotur S. Narasimhan, DEQ-Air
Paul Kohler, DEQ-Waste
Dave Davis, DEQ-Water Protection
Andrew K. Zadnik, DGIF
Robbie Rhur, DCR
Tony Watkinson, MRC
Ethel R. Eaton, DHR
Keith Tignor, VDACS
Paul Berge, Accomack-Northampton PDC
Steven Miner, Accomack County

COMMONWEALTH of VIRGINIA

L. Preston Bryant Jr
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address 629 East Main Street, Richmond, Virginia 23219
Mailing address P. O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

David K. Paylor
Director

(804) 698-4000
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.

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.

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

May 10, 2007

Reply to Attn of: 250.W

Division of Environmental Enhancement
Attn: Ms Laura McKay
Coastal Zone Management Program Manager
Virginia Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Subject: Request for Project Review – Description of the Proposed Action Alternatives for the Shoreline Restoration and Sediment Management Programmatic Environmental Assessment at NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia

The National Aeronautics and Space Administration (NASA) has retained URS Group, Inc. (URS) to conduct a Programmatic Environmental Assessment (PEA) for Shoreline Restoration and Sediment Management Alternatives at the Goddard Space Flight Center's Wallops Flight Facility (WFF) on Wallops Island, Virginia. The US Army Corps of Engineers has been retained to design the plan and manage the operations for the beach re-nourishment portion of the project. NASA respectfully requests that the Division of Environmental Enhancement review and provide comments on the enclosed Description of the Proposed Action Alternatives (DOPAA) and federal consistency determination in accordance with the Coastal Zone Management Act. The DOPAA contains all the project data and figures.
Please contact me at (757) 824-2319, or Ms. Shari Silbert at (757) 824-2327, if you have any questions or require any additional information.

Joshua A. Bundick
NEPA Program Manager

Enclosure

cc (w/o encl.):
200/Ms. C. Massey
250/Mr. A. Lopez
250/Mr. C. Turner
URS/Mr. R. Thompson

Coastal Zone Management Act Consistency Determination

This document provides the Commonwealth of Virginia with the National Aeronautics and Space Administration's (NASA) Consistency Determination under Coastal Zone Management Act (CZMA) Section 307(c)(1) and 15 CFR Part 930, Sub-part C, for shoreline management activities at NASA's Wallops Flight Facility (WFF), Wallops Island, Virginia. The information in this Consistency Determination is provided pursuant to 15 CFR Section 930.39.

NASA has determined that proposed shoreline management activities at Wallops Island would affect the land or water uses or natural resources of Virginia in the following manner (Proposed Options not discussed below were determined to have no impact):

Topography and Drainage
Under the No Action Alternative, impacts to topography and drainage would occur since shoreline retreat would continue and drainage patterns may shift. Topography and drainage would not be adversely impacted by any of the Proposed Action's alternatives and options. Alternative 1 Options 1, 2, 5, and 6 would have beneficial impacts to topography associated with the return of the shoreline to its natural slope. Alternative 1 Options 1, 3, 4, 5, and 6 would have a beneficial impact on topography by retaining sand along the shoreline.

Geology and Soils
Under the No Action Alternative, minor impacts to soils would occur because loss of soils would continue as the shoreline retreats and vehicles and equipment would disturb soils during construction activities. Temporary, minor impacts to soils would occur under all of the Proposed Action's alternatives and options because of vehicles and equipment that would disturb surface soils on the beach and around the facilities during construction activities. The six options under Alternative 1 would beneficially impact the island's soils because they would mitigate the rate of shoreline retreat that is currently taking place.

Atlantic Ocean Substrate
Under the Proposed Action, the three options that include dredging, Alternative 1 Options 1 and 2 and Alternative 2 Option 3, could modify the substrate at and near an offshore borrow site in several ways. Potential changes in the nearshore bathymetry due to movement of finer fill material transported from the newly placed beach sand via tidal wave action may occur. Over several months of wave and tidal action, however, the nearshore substrate elevations and slopes would naturally return to pre-placement conditions. The impact, then, to the Atlantic Ocean substrate as a result of dredging would be temporary.

Surface Water
Under the No Action Alternative and all alternatives and options under the Proposed Action, except Alternative 1 Option 3, temporary impacts to surface water would occur from the use of construction equipment and heavy machinery on the beach, which may

result in the introduction of petroleum products, heavy metals, or other contaminants to nearshore waters.

Alternative 1 Options 1 and 2 and Alternative 2 Option 3 would cause temporary impacts to surface water from the disposal of dredged material on the beach, and Alternative 1 Option 5 would cause temporary impacts on surface water from the slurry mix flowing through the geotubes and onto the beach. The placement of dredged material on the beach or the flow of slurry mix onto the beach would result in turbidity and suspended solids concentrations that are elevated over normal background levels of the surf zone in the immediate area of operation.

Marine Waters
Minor, temporary impacts to marine waters could occur as a result of implementation of all options under Alternative 1 and Alternative 2 Option 3 during dredging activities or the construction of sand-retention structures. Dredging at borrow sites, placement of dredged material, and the construction of sand-retention structures will result in turbidity and suspended solids concentrations that are elevated over normal background levels of the surf zone in the immediate area of operation.

Wetlands
The emergency actions associated with Alternative 1 Option 4 and all four options under Alternative 2 would temporarily impact wetlands depending on the location and scope of project activities.

Coastal Zone Management
Project activities associated with all of the Proposed Action's alternatives and options would occur within the coastal zone and would have temporary, minor impacts on coastal resources.

Air Quality
The No Action Alternative and all of the Proposed Action's alternatives and options would have short-term, minor impacts to air quality during the construction period. Impacts to air quality would be from construction equipment and vehicle emissions and would depend on the length and frequency of the activity, but no significant increases in criteria pollutants are anticipated.

Vegetation
Construction activities associated with the No Action Alternative, Alternative 1 Option 4, 5, and 6, and Alternative 2 Options 1, 2, and 4 would have minor, temporary impacts on vegetation; vegetated areas disturbed by activities would be revegetated. Over time, because these alternatives and options would not prevent shoreline retreat, vegetation on the northern and southern portions of the island may be negatively affected.

Alternative 1 Options 1 and 2 and Alternative 2 Option 3 would have a beneficial impact on vegetative species associated with dune and swale systems because beach habitat would increase. Beach fill would reduce inundation from storms and dissipate wave energy. This would help prevent overtopping of the seawall and inland flooding and would prevent further loss of sand

from the backside of the seawall. It would also restore the beach, allowing grasses to repopulate the upper dune areas.

Terrestrial Wildlife and Migratory Birds
Alternative 1 Options 1 and 2 and Alternative 2 Option 3 would have a beneficial impact on terrestrial wildlife and migratory birds. Under these alternatives and options, the shoreline would be restored and shoreline retreat slowed, thereby protecting facilities on the island by moving the zone of wave breaking well away from vulnerable infrastructure. An increase in the intertidal and upper beach habitat would benefit shorebirds that are known to forage in these areas and the raptor species that prey on them. Additionally, coastal invertebrates and mammals known to rely on these habitats for shelter and foraging would benefit. Species of birds, mammals, reptiles and amphibians occupying shrub and thicket habitats would benefit from decreased shoreline retreat and associated habitat loss pressures.

Construction associated with all four options under Alternative 2 would temporarily impact terrestrial wildlife and migratory birds. Areas that are disturbed during construction activities would be revegetated after construction.

Threatened and Endangered Species
It is anticipated that Alternative 1 Options 1 and 2 and Alternative 2 Option 3 may adversely impact sea turtles, are not likely to adversely impact whales, and will beneficially impact the piping plover.

Entrainment in hopper dragheads during dredging operations in the borrow areas is the primary risk to sea turtles. Whales may traverse near or through dredging areas during migration. As such, there exists a small potential for incidental take of a whale should a collision with a dredge occur.

As a result of the work associated with Alternative 1 Options 1 and 2 and Alternative 2 Option 3, the amount of intertidal and upper beach habitat would increase, with a beneficial impact on the piping plover.

Marine Mammals and Essential Fish Habitat
Alternative 1 Options 1, 2, 3 and Alternative 2 Option 3 would result in short-term, minor impacts to Essential Fish Habitat due to increases in suspended sediment concentration associated with construction activities.

The Virginia Coastal Resources Management Program contains the following applicable enforceable policies:

- **Fisheries Management**. Administered by the Virginia Marine Resources Commission(VMRC), this program stresses the conservation and enhancement of shellfish and finfish resources and the promotion of commercial and recreational fisheries;

- **Subaqueous Lands Management.** Administered by the VMRC, this program establishes conditions for granting permits to use State-owned bottomlands;
- **Wetlands Management.** Administered by the VMRC and the DEQ, the wetlands management program preserves and protects tidal wetlands;
- **Dunes Management.** Administered by the VMRC, the purpose of this program is to prevent the destruction and/or alteration of primary dunes;
- **Non-point Source Pollution Control.** Administered by the Virginia Department of Conservation and Recreation (DCR), the Virginia Erosion and Sediment Control Law is intended to minimize non-point source pollution entering Virginia's waterways;
- **Point Source Pollution Control.** Administered by the State Water Control Board, the NPDES permit program regulates point source discharges to Virginia's waterways;
- **Shoreline Sanitation.** Administered by the Virginia Department of Health, this program regulates the installation of septic tanks to protect public health and the environment;
- **Air Pollution Control.** Administered by the State Air Pollution Control Board, this program implements the Federal Clean Air Act (CAA) through a legally enforceable State Implementation Plan (SIP); and
- **Coastal Lands Management.** Administered by the Chesapeake Bay Local Assistance Department, the Chesapeake Bay Preservation Act guides land development in coastal areas to protect the Chesapeake Bay and its tributaries.

Based upon the following information, data, and analysis, NASA finds that the proposed shoreline management activities at Wallops Island are consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program:

Virginia Policy	Consistent?	Analysis
Fisheries Management	Yes	Implementation of NASA's proposed shoreline management plan is not expected to significantly impact finfish or shellfish species, nor will it have any impact on commercial or recreational fishing. Construction of breakwaters and placement of sand would occur in the nearshore area along the coast of Wallops Island. It is expected that some finfish would be present in this area during project activities, and there may be some fish mortality as a result of the placement of sand in the nearshore environment. However, impacts are not expected to be significant due to the limited extent of the project area and the ability of fish to leave the project area during the duration of project activities. Additionally, the proposed action would not violate the provisions outlined in

Virginia Policy	Consistent?	Analysis
Fisheries Management (cont.)	Yes	Code of Virginia § 28.2-200 thru 28.2-713 and Code of Virginia § 29.1-100 thru 29.1-570. The borrow site is expected to be located outside of Virginia's 3-mile territorial boundary; therefore, impacts to fishery resources associated with dredging operations have not been analyzed in this document.
Subaqueous Lands Management	Yes	NASA will obtain all necessary permits from the Commonwealth of Virginia prior to placing sand or constructing breakwaters in Virginia waters.
Wetlands Management	Yes	Project activities would not occur in tidal wetland areas. NASA would obtain a Clean Water Act (CWA) Section 404 permit if a project will impact wetlands.
Dunes Management	Yes	Project activities would not involve the destruction or alteration of existing dunes. Installation of the geotextile tubing and placement of sand would occur seaward of the mean high water mark, where no dunes exist. Best management practices (BMPs) would be implemented to ensure that any dunes in the vicinity are protected from accidental disturbance during construction activities.
Non-point Source Pollution Control	Yes	Construction activities along the Wallops Island shoreline could temporarily increase non-point source runoff to the Atlantic Ocean during the duration of the project. NASA would implement appropriate soil and erosion BMPs to minimize the impact. NASA would conduct all land-disturbing activities in accordance with Virginia regulations and would obtain any necessary permits prior to project implementation.
Point Source Pollution Control	Yes	The project does not involve a point source discharge to Virginia waters. The discharge of dredged material would be regulated and permitted under CWA Section 404. In conjunction with the Section 404 permit, NASA would obtain Section 401 water quality certification from Virginia.
Shoreline Sanitation	Yes	The project does not involve the construction of septic tanks.
Air Pollution Control	Yes	This project does not involve the construction or installation of a point source air pollution source. The use of heavy machinery during construction activities may temporarily increase emissions in the local area; however, these impacts are not expected to be significant or to last over the long-term. The project would not violate Federal or Commonwealth of Virginia air quality standards.

Virginia Policy	Consistent?	Analysis
Coastal Lands Management	Yes	The proposed project does not include land development activities that would impact the Chesapeake Bay or its tributaries.

Pursuant to 15 CFR section 930.41, the Virginia Coastal Resources Management Program has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR Section 930.41(b). Virginia's concurrence will be presumed if its response is not received by NASA on the 60th day from receipt of this determination. The State's response should be sent to:

Mr. Joshua A. Bundick
NEPA Program Manager
Environmental Office
NASA Wallops Flight Facility
Wallops Island, VA 23337
(757) 824-2319

Appendix B
National Marine Fisheries Service
Biological Assessment

DRAFT REPORT

BIOLOGICAL ASSESSMENT FOR NASA WALLOPS FLIGHT FACILITY SHORELINE RESTORATION PROJECT

Prepared for

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

February 2007

URS Group, Inc.
200 Orchard Ridge Drive, Suite 101
Gaithersburg, MD 20878
15299035

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Table 1 Threatened and Endangered Species in Project Area

Figure 1 Project Location

Figure 2 Proposed Dredging Area

Attachment 1 Description of Proposed Action and Alternatives

1.1 PURPOSE OF THIS DOCUMENT

The Marine Mammal Protection Act of 1972 and the Section 7(c) of the Endangered Species Act (ESA) of 1973 requires that a Biological Assessment (BA) be prepared for all major federal actions involving construction when federally listed or proposed endangered or threatened species may be affected. The purpose of this BA is to examine the potential impacts associated with a dredging operation in one or more borrow areas for the National Aeronautics and Space Administration's (NASA) Wallops Island Shoreline Restoration and Sediment Management Project. As part of this project, an undetermined number of marine structures (breakwaters) may be placed offshore to deflect and dissipate wave energy and reduce the rate of sediment erosion.

NASA has prepared this BA, which considers the potential impacts to listed threatened and endangered species under the jurisdiction of the National Marine Fisheries Service (NMFS) that may occur within the proposed project area. Listed species that may occur within the project area include humpback, right, and fin whales, as well as loggerhead, leatherback, Kemp's ridley, hawksbill, and green sea turtles. All of these species are listed as endangered, except for the loggerhead sea turtle, which is classified as threatened.

1.2 ENDANGERED SPECIES ACT

This BA is a component of the formal consultation process provided under Section 7 of the ESA. More detailed procedures for this formal consultation process are defined in 50 CFR 402.14(c). This BA falls within the early consultation clause of the ESA. Early consultation is conducted when the action agency is planning a project or program that may affect protected species; however, not every project detail may be known. In this case, the general vicinity of the borrow area is known; however, the specific borrow area(s) off the coast of Wallops Island have not been identified. NASA intends to complete early consultation for its dredging project by submitting this draft BA and receiving a draft Biological Opinion (BO) from NMFS. As more specific details of the borrow area(s) are revealed, NASA will finalize the BA and complete the Section 7 consultation process by obtaining any required incidental take permits from NMFS. In addition, binding clauses may be built into the BO requiring NASA to consult again for future dredging activities; however, this document and the BO will lay the groundwork for the consultation process and allow both agencies to finalize future consultations for this project efficiently by teiring off this document. It is anticipated that the dredging would continue at varying degrees of intensity for the next 50 years.

In addition to Section 7 consultation, NASA is preparing a Programmatic Environmental Assessment (PEA) to assess the general environmental and socioeconomic impacts from the Shoreline Restoration and Sediment Management Project. More information on the alternatives can be found in Attachment 1, Description of Proposed Action and Alternatives.

1.3 SPECIES POTENTIALLY IN JEOPARDY

The primary concern is whether impacts associated with the proposed action will "jeopardize" the continued existence of sea turtles and whales. Federal regulation (50 CFR 402.02) defines "jeopardize" as "engaging in an action that reasonably would be expected, directly or indirectly,

to reduce appreciably the likelihood of both the survival and recovery of the listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

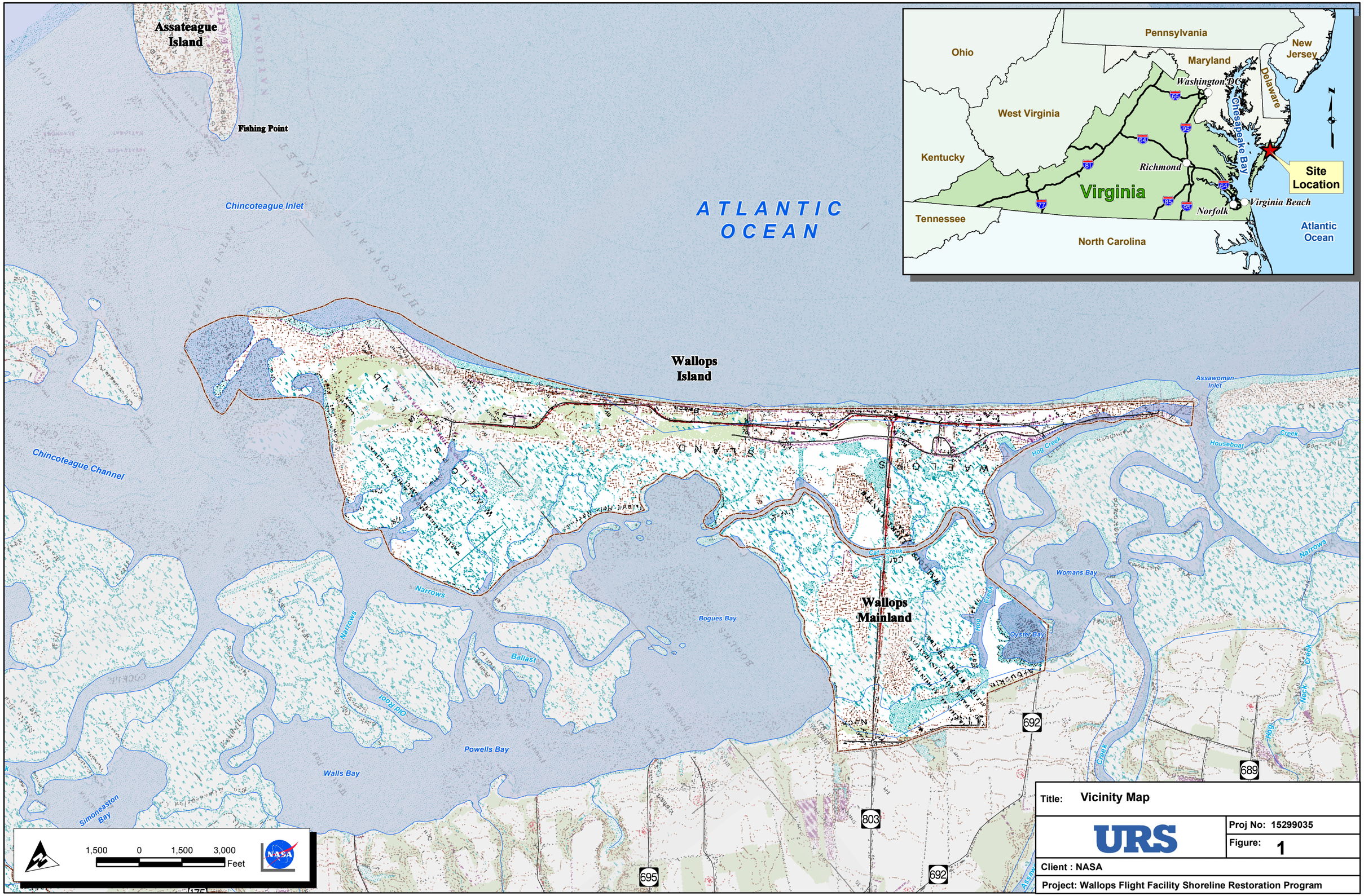
1.4 LOCATION AND NEED FOR PROPOSED ACTION

The Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF) has been occupied by NASA since the 1940s. WFF's launch sites are located on the Eastern Shore of Virginia facing the Atlantic Ocean, on the barrier island known as Wallops Island, north of Assawoman Inlet (Figure 1). During this time WFF has experienced erosion along the coast. The ocean has encroached substantially toward launch pads, infrastructure, and test and training facilities belonging to NASA, the U.S. Navy, and the Mid-Atlantic Regional Spaceport (MARS). These assets are valued at over $800 million and are increasingly at risk from larger than normal storm events, storm waves, and flooding damages. The risks to WFF could cause the interruption of missions supported by the facility and/or permanent loss of capabilities supported by the facility.

The purpose of the proposed project is to reduce the potential for the risks listed above, by rebuilding the beach with a sand fill along the entire island and moving the zone of wave breaking well away from the infrastructure. The project would not protect against flooding and other impacts during major hurricanes and exceptional northeasters. The U.S. Army Corps of Engineers (USACE) has been retained to design the plan and manage the operations for this project.

Shoreline retreat on Wallops Island has averaged about 3.7 meters (12 feet) per year since 1857. The first attempt to reduce erosion occurred in 1961 with the construction of a wooden seawall. As erosion continued and the seawall deteriorated, stone rubble-mound rocks were used as a replacement for the wooden seawall. The current stone seawall installed in 1999 temporarily fixed the shoreline. However, because the seawall is porous, it has allowed sediments to flow out of the area, but not be replenished. The integrity of the seawall is at risk due to the lack of protective beach sand, which enables waves to break directly on the rocks. The current shoreline is at an elevation on 2.1 meters (6.88 feet) above mean sea level (msl).

The proposed project involves the use of one or more borrow sites for beach fill for future nourishment of the beach. Breakwaters may also be placed offshore in an effort to retain sand and reduce the number of future dredging activities needed. The exact location and size of the borrow area(s) have not been determined at this time. Borrow area selection will depend on geotechnical and archeological survey results and may be located either within or beyond the 3-mile limit. NASA has researched the historic use of Wallops Island as an off-shore bombing and firing range. The result of the research is a limited off-shore area (South 1) that can be dredged without the risk of coming into contact with unexploded ordinance (Figure 2). The projected timeline for this project in its entirety is 50 years.


Assateague Island
Fishing Point
Chincoteague Inlet
ATLANTIC OCEAN
Wallops Island
Chincoteague Channel
Narrows
Bogues Bay
Ballast
Old Roof
Powells Bay
Walls Bay
Simoneaston Bay
Wallops Mainland
Cat Creek
Hog Creek
Oyster Bay
Womans Bay
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Houseboat Creek
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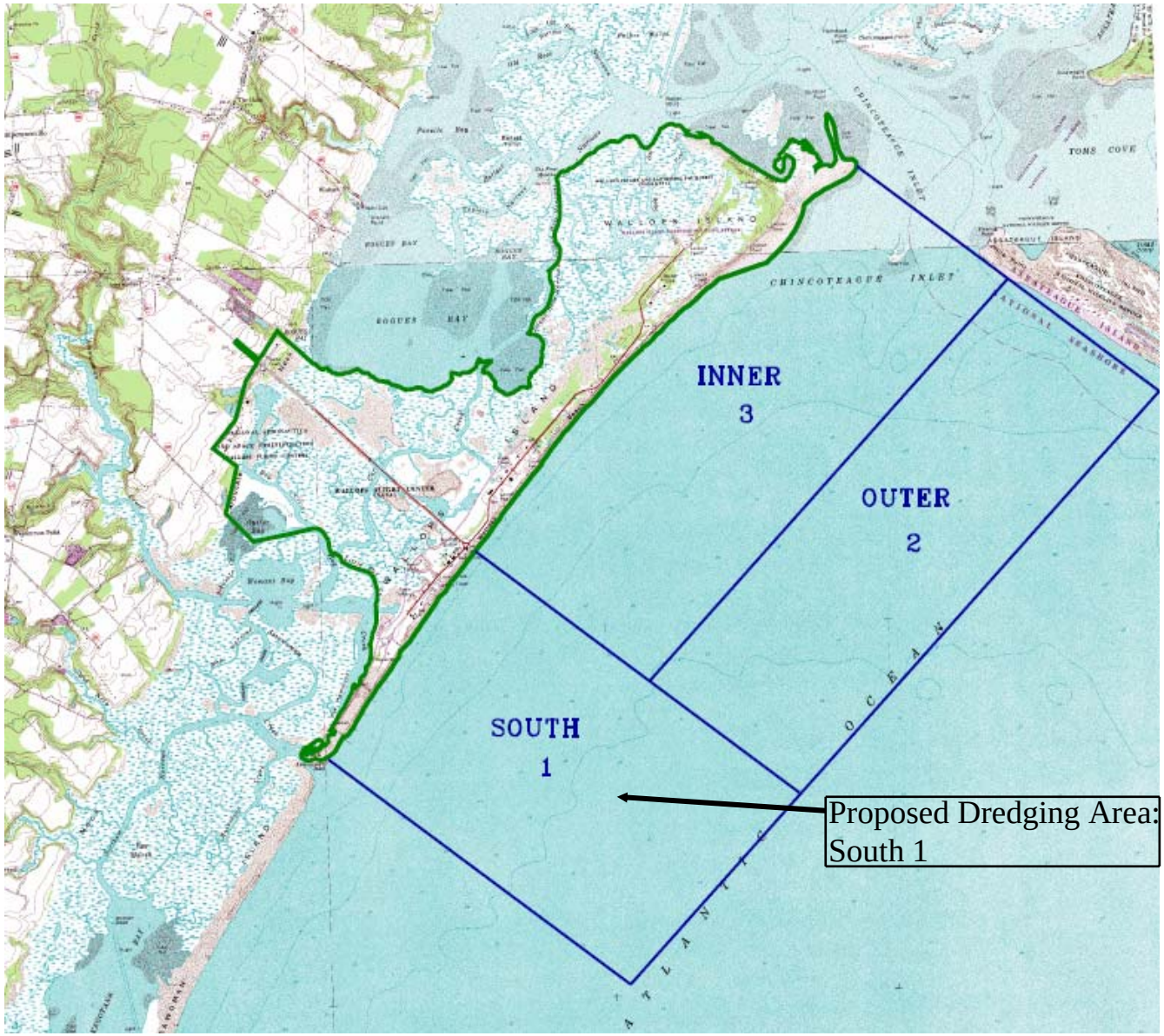
Maryland
New Jersey
Delaware
Washington DC
West Virginia
Kentucky
Richmond
Virginia
Chesapeake Bay
Norfolk
Virginia Beach
Tennessee
North Carolina
Atlantic Ocean
Site Location
Title: Vicinity Map
URS
Proj No: 15299035
Figure: 1
Client : NASA
Project: Wallops Flight Facility Shoreline Restoration Program



Source: U.S. Army Corps of Engineers

CLIENT	NASA				TITLE **Proposed Dredging Area**
PROJ	Wallops Island Shoreline Restoration Program				
REVISION NO		DES BY	X	X	URS
SCALE	NOT TO SCALE	DR BY			PROJ NO 15299903
FILE	MAPS.PPT	CHK BY			FIGURE 2

1.5 DESCRIPTION OF ATLANTIC OCEAN OFFSHORE AREAS

The nearshore coastal zone extends out to approximately 9.6 kilometers (6 miles) offshore of the Wallops Island coast. This zone is located on the inner perimeter of the Outer Continental Shelf (OCS) and extends to about 80 to 100 miles off of the Atlantic Coast. The water depths within the nearshore zone reach a maximum of approximately 16.7 meters (55 feet).

Numerous invertebrate species may be found in the benthic substrate and open water of the nearshore zone. Invertebrate phyla existing along the coast are represented by corals, anemones, jellyfish; flatworms; ribbon worms; chitons, clams, mussels, etc.; sea urchins, sea cucumbers, sand dollars; and the tunicates. Surf clam, sea scallops, whelks, horseshoe crabs, blue crabs, and rock crabs are present in the nearshore zone of the Virginia Atlantic coast. Many of these organisms are an important food source for fish, birds, and sea turtles, as well as humans.

1.6 DESCRIPTION OF ATLANTIC OCEAN SHORELINE BEACH NOURISHMENT AREA

WFF is located in the northeastern portion of Accomack County, Virginia, on the Delmarva Peninsula, and is comprised of the Main Base, Wallops Mainland, and Wallops Island. Southern Wallops Island includes the open burn area, the launch complexes, Unmanned Aerial Vehicle (UAV) runway and associated structures. Northern Wallops Island includes rocket storage facilities and the Navy's AEGIS and Ship Self Defense System Facilities. The sea wall on Wallops Island is approximately 5,029 meters (16,500 feet) in length. The sea wall is the primary shoreline protection feature for Wallops Island and consists of large stone and riprap piled to a height of approximately 4.6 meters (15 feet). The sea wall is currently repaired or enhanced as needed.

Development is relatively sparse along the Atlantic Ocean coastline on the Eastern Shore of Virginia because most of the barrier islands in this region are protected by either federal agencies (U.S. Fish and Wildlife Service, National Park Service) or conservation organizations (e.g., The Nature Conservancy). Chincoteague Inlet and Chincoteague Island are located to the north of Wallops Island. Assawoman Inlet defines the southern end of Wallops Island. The closed inlet separates Wallops Island from the more southerly Assawoman Island.

2.1 DREDGING EQUIPMENT AND METHODS

There are many types of dredges and techniques that may be employed on a project-specific basis. Specific selections depend on the characteristics of the borrow material, availability of borrow areas, local environmental regulations, types of material to be removed, and proposed timing of the dredging.

Under normal circumstances, the USACE does not require a contractor to specify the type of equipment that must be used, as each type of dredging equipment has different strengths and weaknesses. However, hopper dredges are the most likely dredges to be used for this beach restoration project at Wallops Island. These dredges are self-propelled seagoing vessels and are equipped with propulsion machinery, a sediment container (i.e., hopper), dredge pumps, and other specialized equipment required to perform the essential function of excavating sediments from the sea floor. Hopper dredges have enough horsepower for required free-running speed and dredging against strong currents and have excellent maneuverability. These characteristics allow hopper dredges to provide a safe working environment for crew and equipment to dredge areas that may be subject to rough seas. Dredging is usually done parallel to shore. However, sometimes a waffle or crisscross pattern may be utilized. This movement is called trailing and may be accomplished at speeds of 1 to 6 knots, depending on sediment type, sea conditions, and numerous other factors.

A hopper dredge removes material from the bottom of the sea floor in thin layers, usually 5 to 30 centimeters (2 to 12 inches), depending on the density and cohesiveness of the dredged material (Taylor, 1990). Centrifugal pumps within the hull, sometimes mounted on the dragarm, create a region of low pressure or centrifugal force around the dragheads. This low pressure forces water and sediment up the dragarm and into the hopper. The more closely the draghead is maintained in contact with the sediment, the more efficient the dredging.

A hopper dredge works by dredging sand from the borrow site (usually distant from the shoreline) into a hopper (storage area) and then transporting the material to a pump-out buoy located just off-shore of the nourishment area. Once the hopper dredge arrives at the pump-out buoy, the dredge connects to the discharge pipeline on the buoy. The dredge mixes the dredged material with water to form a slurry and pumps the slurry from its discharge manifold through the hoses and pipeline. The material is pumped from the hopper, through the discharge line which runs along the ocean floor, and up onto the beach nourishment area. Because dredging stops during the trip to the placement site, the overall efficiency of a hopper dredge is dependent on the distance between the dredging and placement sites (i.e., the more distant the placement site, the less efficient the hopper dredge).

2.2 TURTLE DEFLECTOR EQUIPMENT ON HOPPER DREDGES

The greatest danger to animals during dredging operations is referred to as “entrainment” or drawing into the hopper dredge. Sea turtles are at the greatest risk (Magnuson et al., 1990). The centrifugal force of the pump, located behind the intake pipe of the draghead, draws the animal into the pipe. The animal may be killed by the pump and is then pulled into the hopper. It is believed that entrainment primarily takes place when the draghead is operating on bottom sediments. Affected animals are usually feeding or resting near the bottom at the time the

draghead moves along the bottom. In some rare instances, suction may be created when currents flow around the draghead as it is placed or moved.

The USACE has enacted contractual specifications for deflectors on all hopper dredges. They are as follows:

Hopper dredge dragheads shall be equipped with rigid sea turtle deflectors that are rigidly attached. No dredging shall be performed without a turtle deflector device that has been approved by the Contracting Officer. A conceptual design detail of a turtle deflector is described in Appendix A of this Assessment.

The leading vee-shaped portion of the deflector shall have an included angle of less than 90 degrees. Internal reinforcement shall be designed to have a plowing effect of at least 6 inches in depth when the draghead is being operated. Appropriate instrumentation or indicator shall be used and kept in proper calibration to ensure the critical "approach angle," which refers to the lower drag pipe relative to the plane of the sediment. If the lower drag head pipe angle varies significantly from the design approach angle, the 6-inch plowing effect does not occur and the deflector does not function to repel the sea turtles. When the deflector is in operation during dredging, operators need to make every effort to maintain the design approach angle and to ensure that the dredge is disengaged before it is lifted from the floor of the ocean.

In a USACE field test experiment, the rigid deflector, properly installed and operated, blocked 95 percent of mock turtles from entrainment in the dredge. This rate is probably low given that mock turtles do not have the ability to flee from danger (USACE 1997).

Federally listed species that may occur along the Atlantic coast of Virginia are listed in Table 1. Sea turtle species potentially impacted include loggerhead, Kemp's ridley, green, leatherback, and hawksbill sea turtles. Whale species include right, humpback, and fin whales. The loggerhead sea turtle is listed as threatened; all the other species listed are classified as endangered. Additionally, there are no critical habitat areas for any listed species within the proposed project area.

Table 1. Threatened and Endangered Species in Project Area

Common Name	Scientific Name	Federal Status
Humpback whale	*Megaptera novaeangliae*	Endangered
Fin whale	*Balaeanoptera physalus*	Endangered
Right whale	*Eubalaena glacialis*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempi*	Endangered
Atlantic Green sea turtle	*Chelonia mydas*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered

3.1 HUMPBACK WHALE

3.1.1 Description

The humpback whale is one of the rorquals, a family that also includes the fin whale and blue whale among others. Rorquals have two characteristics in common: dorsal fins on their backs, and ventral pleats running from the tip of the lower jaw back to the belly area. The humpback whale was listed as endangered in 1973.

3.1.2 Life History and Distribution

The shape and color pattern on the humpback whale's dorsal fin and flukes (tail) are as individual in each animal as are fingerprints in humans. This discovery changed the course of cetacean research, and the new form of research known as "photo-identification," in which individuals are identified, catalogued, and monitored, has led to valuable information about such things as humpback whale population sizes, migration, sexual maturity, and behavior patterns (ACS, 2004a).

Humpback whales are described as generalists in their feeding habits and are thought to be carnivores (Mitchell, 1974). Principal prey are small schooling fishes including Atlantic herring, mackerel, pollock, and the American sand eel or sand lance (Gaskin, 1982; Katona et al., 1983; Watkins and Schevill, 1979).

Humpback whales are found throughout the oceans of the world, migrating from tropical and subtropical breeding grounds in winter to temperate and arctic feeding and calving grounds in summer (Swingle et al., 1993). Several stocks occur in the northwestern Atlantic. Humpbacks use the Mid-Atlantic as a migratory path to and from calving and mating grounds. Adults and newborns of the Gulf of Maine migrate from summer feeding grounds off the coast of New England to winter breeding grounds along the Antillean Chain of the West Indies, primarily on the Silver Bank and Navidad Bank north of the Dominican Republic. Some individuals remain in the Gulf of Maine throughout the year.

Until recently, it was thought that humpback whales in the Mid-Atlantic were transients. Few were seen during aerial surveys conducted in the early 1980s (Shoop et al., 1982). However, since 1989, sightings of feeding juvenile humpbacks have increased along the coast of Virginia, peaking in the months of January through March in 1991 and 1992 (Swingle et al., 1993). Studies conducted by the Virginia Marine Science Museum indicate that the whales are feeding on, among other things, bay anchovies and Atlantic menhaden. It is currently believed that non-reproductive animals may utilize the Mid-Atlantic area as a winter feeding range since they do not take part in reproductive activities in the Caribbean. Whales in the Mid-Atlantic in winter were found to be members of both the Gulf of Mexico and Atlantic Canada feeding groups indicating a mixture of feeding populations in this region. In concert with the increased sightings, strandings of whales increased in the Mid-Atlantic during the same time period, with 32 strandings reported between New Jersey and Florida since January 1989. Sixty percent of those strandings that were closely investigated showed either signs of entanglement or vessel collision (Wiley et al., 1992).

3.1.3 Potential Direct Effect of the Proposed Dredging

Major causes of anthropogenic mortality to humpback whales include collisions with ships and fishing net entanglements. Sixty percent of Mid-Atlantic humpback mortality incidents showed signs of collisions or entanglement (Wiley et al., 1992). The only potential for direct effect on humpback whales would result from collision with the dredge. However, this potential is low, since humpback whales are not especially abundant in the nearshore Wallops Islands habitat. Numerous round trips between the borrow area and the pump buoy at the placement site will be required during the dredging cycle. When viewed cumulatively over the 50-year project life, a potential exists for collisions. However, dredge speeds are relatively low (approximately 8 knots) which should enable the operators to avoid humpback whales by maneuvering to avoid a whale strike.

3.1.4 Potential Indirect Effect of the Proposed Dredging

The proposed dredging operation is not anticipated to adversely affect the habitat, calving areas, or the food resources of the humpback whale.

3.2 FIN WHALE

3.2.1 Description

The fin whale is considered one of the more abundant large whale species, with a worldwide population estimated at around 120,000. In 1970, NMFS declared one population of fin whales in the North Atlantic to be endangered (Waring et al. 1998). This grouping is found from Cape Hatteras northward. The fin whale was placed on the list of federally endangered species in 1973. Perhaps 40,000 are located in the Northern hemisphere; however, only a few thousand fin whales are believed to exist in the North Atlantic (Gambell, 1985). Estimates of the western North Atlantic population range from 2,362, which is believed to be a low estimate (Waring et al., 2001), to 3,590 to 6,300 (Perry et al., 1999). Hain et al. (1992) put the figure at 5,000.

The fin whale is another member of the rorqual family which exhibits a dorsal fin and throat grooves that expand when the animal is feeding. The fin, or finback whale, is second only to the blue whale in size and weight. It is a swift, streamlined whale 18 to 24 meters (60 to 80 feet) long. Among the fastest of the great whales, it is capable of bursts of speed of up to 37 kilometers per hour (23 miles per hour), resulting in its description as the “greyhound of the sea.” Its most unusual characteristic is the asymmetrical coloring of the lower jaw, which is white or creamy yellow on the right side and mottled black on the left side. A single ridge extends from the blowhole to the tip of the rostrum (upper jaw). There is a series of 50 to 100 pleats or grooves on the underside of its body extending from under the lower jaw to the navel (ACS, 2004b).

3.2.2 Life History and Distribution

Fin whales are found in all oceans of the world, though they seem to prefer temperate and polar waters to tropical seas. They exhibit complex migratory patterns with their travels being less clear than humpback or right whales. During the summer in the eastern North Atlantic, fin whales can be found along the North American coast to Greenland. In the winter, their range may extend from the ice edge of the Greenland continental glacier south to the Caribbean and the Gulf of Mexico.

Fin whales in the North Atlantic are baleen whales and feed mainly on krill and schooling fish. They have been observed circling schools of fish at high speed, rolling the fish into compact balls, then turning on their right side to engulf the fish. Their color pattern, including their asymmetrical jaw color, may somehow aid in the capture of such prey. They can consume up to 1,814 kilograms (2 tons) of food a day. As a baleen whale, it has a series of 262 to 473 fringed overlapping plates hanging from each side of the upper jaw, where teeth might otherwise be located. These plates consist of a fingernail-like material called keratin that frays out into fine hairs on the ends inside the mouth near the tongue. The baleen on the left side of the mouth has alternating bands of creamy-yellow and blue-gray color. During feeding, large volumes of water and food can be taken into the mouth because the pleated grooves in the throat expand. As the mouth closes water is expelled through the baleen plates, which trap the food on the inside near the tongue to be swallowed. Fin whales feed on herring, cod, mackerel, pollock, sardines, and capelin, as well as squid (ACS, 2004b).

Peak months for breeding in the North Atlantic are December and January. A single calf, averaging about 6 meters (19 feet) in length, is produced after a gestation period of a little more than 11 months. Fully mature females may reproduce every 2 to 3 years. In the Northern Hemisphere, females reach maturity at length of over 18 meters (59 feet); males reach maturity at lengths slightly less than 18 meters. Although fin whales are sometimes found singly or in pairs, they commonly form larger groups of 3 to 20 animals, which may in turn coalesce into a broadly spread concentration of 100 or more individuals, especially in the feeding grounds (Gambell, 1985). After Norway developed the explosive harpoon in 1864, the fin whale became a prime target for commercial whaling and, subsequently, the number of whales in the North Atlantic was quickly depleted.

Fin whales are often spotted in Mid-Atlantic waters. Fin whales are thought to use North Atlantic waters for feeding and southern waters for calving. Evidence supporting this view is scarce, however. Some fin whales were seen off the Delmarva Peninsula during aerial surveys conducted in the early 1980s (Shoop et al., 1982). Since 1989, sightings of feeding juvenile fin whales have increased along the coast of Virginia in the same area as the humpback whales. Strandings of neonate fin whales along the Mid-Atlantic Coast may indicate an offshore calving area (Hain et al., 1992). However, fin whales are difficult to study due to their speed. They are larger and faster than humpback or right whales and, therefore, less likely to be found in nearshore areas. However, it is worth noting that a pair of fin whales was spotted approximately 1.5 miles offshore of Wallops Island as recently as December, 2006.

3.2.3 Potential Direct Effect of the Proposed Dredging

Major causes of anthropogenic mortality to fin whales include collisions with ships and fishing net entanglements. It is thought that fin whales are struck by large vessels with greater frequency than any other large whale species (Laist et al., 2001). The only potential for a direct effect on fin whales would result from collision with the actual dredge. However, this potential is low, since fin whales are not abundant in nearshore environments. Numerous round trips between the borrow area and the pump buoy at the placement site will be required during the dredging cycle. When viewed cumulatively over the 50-year project life, a potential exists for collisions. However, dredge speeds are relatively low (approximately 8 knots) which should allow the dredge operator to maneuver around whales to avoid a strike.

3.2.4 Potential Indirect Effect of the Proposed Dredging

The proposed dredging and placement of dredged material at the placement site is not anticipated to adversely affect the habitat, calving areas, or the food resources of the fin whale.

3.3 RIGHT WHALE

3.3.1 Description

The right whale may have received its name from whalers who thought that it was the “right” whale to kill because it was correct commercially (oil came from whales), or because it was considered “proper” or “true” which meant typical of whales in general. Right whales were relatively easy targets; they swim slowly and float when dead. The exploitation of the right

whale began in the Bay of Biscay in Spain in the 12th century and continued, especially in the North Atlantic, for many centuries. Despite being protected since the 1930s, the right whale is today the most endangered of all the great whales (ACS, 2004c). Current estimates place the total number of remaining animals at no more than 600 (NMFS, 1991) with the western North Atlantic population estimated at 300 (+/-10%) (Best et al., 2001). Right whales have been protected from commercial whaling since 1949. The right whale was listed as endangered in 1973.

A distinguishing feature of these large baleen (plankton-feeding) whales is that they lack a dorsal fin and ventral grooves. The body is black with various white markings, comprising 28 to 33 percent of the body. The rostrum is narrow and highly arched, giving a distinct curvature to the top of the head. There are paired blowholes on the top of the head. The baleen plates are long and narrow, with an anterior separation of the left and right row (Audubon, 1983). Adult right whales are generally 10.7 to 16.8 meters (35 to 55 feet) long. The largest individuals known have measured 18.3 meters (60 feet) long and weighed 106,500 kilograms (117 tons). Females are larger than males.

3.3.2 Life History and Distribution

Western North Atlantic subpopulations of right whales are often found near shore in shallow water and occur from the southeast U.S. to Canada (Waring et al., 2002). They may also be sighted in large bays. Populations concentrate in five known areas: coastal Florida; coastal Georgia; the Great South Channel east of Cape Cod, Cape Cod Bay, and Massachusetts Bay; the Bay of Fundy between New Brunswick and Nova Scotia; and Browns and Baccaro Banks, south of Nova Scotia. The population appears to migrate seasonally between low latitude winter calving grounds and high latitude summer foraging grounds (Perry et al., 1999). Right whales may be found over the continental shelf during the summer (Mate et al., 1997) as well as in deep water off the continental shelf. Right whales feed upon swarms of planktonic animals, notably small shrimp and krill.

The bulk of their feeding takes place in colder waters off the New England and Nova Scotia coasts, where the dissolved oxygen (DO) content is greater than in warm waters, and plankton is most abundant. Migration of the animals occurs in autumn, when they begin their trek south toward Georgia and Florida. In late March and through the spring, they rendezvous off the Nova Scotia coast and the Great South Channel once more, where they spend the summer replenishing their fat stores on plankton. They also breed during this time.

According to the ESA, as of 1994 three critical habitat areas were designated for the right whale. The areas selected include portions of Cape Cod Bay and Stellwagen Bank, the Great South Channel, and coastal waters off the eastern coasts of Georgia and Florida. Several studies have indicated a decline in right whale survival in the 1990s compared to the 1980s, especially for females (Caswell et al., 1999; Best et al., 2001; Waring et al., 2002). Clapham et al. (1999) examined modeling data and determined that whale survival rates, especially of females, have declined. These declining survival rates may be due to the fact that this subpopulation is being affected by decreased reproductive rates (Best et al., 2001; Krause et al., 2001) which may be related to reduced genetic diversity, pollutants, and nutritional stress.

In February 1983, an animal stranded in New Jersey was identified as a 2-year-old northern right whale that had first been photographed in the Bay of Fundy in 1981 (NMFS, 1991). It is now

believed that a portion of the North Atlantic right whale population is migrating along the U.S. East Coast each year from Iceland to Florida. There is growing evidence that calves are born when the whales are at the southern end of their migration, in the Atlantic off northeastern Florida, Georgia, and possibly the Carolinas, from December through March. Little food is taken during this time due to the scarcity of plankton in these relatively oxygen-poor waters.

A ship strike was likely the cause of death of a pregnant right whale that washed ashore on the Outer Banks of North Carolina in February 2004, after being sighted off the Virginia Beach oceanfront as a floating carcass. It was identified as a previously tagged female known as "Slumpy," an individual documented as having previously given birth to at least five calves (Hampton Roads Pilot Online, 2004a; Federal Register, 2004).

A ship strike is also the suspected cause of the death of yet another pregnant right whale in November 2004. First sighted by a recreational boater, the injured whale was seen at the mouth of the Chesapeake Bay in Virginia; its tail had been sliced partly off. A necropsy conducted at Ocean Sands, North Carolina, showed that a large vessel had struck the animal in several areas of the body (Hampton Roads Pilot Online, 2004b).

Ship collisions are likely the leading human-caused mortality for the right whale. Large, rapidly moving vessels can travel at speeds in excess of 22 knots when at sea. Of 31 animals examined between 1970 and 2002, ship strike was the primary cause of death in 15 cases. More than one-third of all right whale deaths in the Mid-Atlantic, between the years 1991 and 2002, were the result of ship strikes. However, collisions and net entanglements are not necessarily fatal. A study of data from 1935 to 1990 estimated that 61.6% of living right whales show entanglement injuries and 6.4% display collision injuries. The long-term consequences associated with these events are unknown (Hamilton et al., 1998). The right whale north-south migration movement off the Virginia coast takes place from November through April.

3.3.3 Potential Direct Effect of the Proposed Dredging

The only potential for direct effect on right whales would result from collision with the dredge. Vessels have the potential to collide with right whales since the whales are thought to traverse near the project area. Numerous round trips between the borrow area and the pump buoy at the placement site will be required during the dredging cycle. When viewed cumulatively over the 50-year project life, a potential exists for collisions with right whales. However, dredge speeds are low (approximately 8 knots), and this should enable the dredge operator to avoid right whales by maneuvering to avoid a whale strike.

3.3.4 Potential Indirect Effect of the Proposed Dredging

The proposed dredging operations are not anticipated to adversely affect the habitat, calving areas, or the food resources of the right whale.

3.4 GENERAL SEA TURTLE INFORMATION

There are two families of sea turtles, comprising five genera, and seven species (Hopkins and Richardson, 1984; Carr, 1952). The *Cheloniidae* family contains five genera and six distinct species. These species are loggerhead, green turtle, flatback, hawksbill, Kemp's ridley, and olive

ridley. The family *Dermochelidae* is comprised of only one genus and species, commonly referred to as the leatherback sea turtle.

Sea turtles have short, thick, incompletely retractile necks, and legs that have been evolved to become flippers (Bustard, 1972; Carr, 1952). All species, excepting the leatherback, have a hard, bony carapace (top shell) modified for marine existence by streamlining and weight reduction (Bustard, 1972). The leatherback has smooth, scaleless black skin and a soft carapace with seven longitudinal keels (Carr, 1952). These physiological differences are the reason for their separate designation as the only species in the family *Dermochelidae* (Carr, 1952).

Much of a sea turtle's life is spent in the water and males of many species may never leave an aquatic environment (Hopkins and Richardson, 1984; Nelson, 1988). The recognized life stages for these turtles are egg, hatchling, juvenile/subadult, and adult (Hirth, 1971). Reproductive cycles in adults of all species involve some degree of migration in which the animals endeavor to return to nest at the same beach year after year (Hopkins and Richardson, 1984). The nesting season ranges from April through September (Hopkins and Richardson, 1984; Nelson, 1988; Carr, 1952). It is believed that mating occurs just off the nesting beach, although solid evidence of this is lacking. After mating, the nesting female comes ashore through the surf zone and lands on the beach. Assuming the sand is acceptable, she crawls to a point above the high water mark (Carr, 1952). She then proceeds to excavate a shallow pit in the sand after which the eggs are laid (Bustard, 1972). Incubation periods for sea turtles will vary from 45 to 65 days (Nelson, 1988).

Hatchlings break their shells and dig their way out of the nest at night (Carr, 1952). They orient themselves toward the sea by following the reflected light from the breaking surf (Hopkins and Richardson, 1984). After entering the surf, hatchlings engage in behavior referred to as "swim frenzy," during which they swim in a straight line for many hours (Carr, 1986). Once into the waters off the nesting beach, hatchlings enter a period known as the "lost year" which may last for several years. Little is understood about this period, including where it is spent, what habitat is preferred, or the rate of mortality. It is thought that hatchlings may become associated with floating sargassum rafts drifting in North Atlantic gyres far offshore. A gyre is a large water featuring circular currents that flow around it. These rafts within the gyre provide shelter and are dispersed randomly by the currents (Carr, 1986). Another hypothesis is that the "lost year" for some species may be spent in a salt marsh/estuarine system (Garmon, 1981).

The functional ecology of sea turtles in the marine and/or estuarine ecosystem varies by species. The Kemp's ridley sea turtle is omnivorous and feeds on swimming crabs and crustaceans. The green turtle is an herbivore and grazes on marine grasses and algae, while the leatherback is a specialized feeder preying primarily upon jellyfish. The loggerhead is primarily carnivorous and has jaws well-adapted to crushing mollusks and crustaceans, and grazing on encrusted organisms attached to reefs, pilings, and wrecks. The hawksbill turtle feeds primarily on sponges in and around reefs.

Sea turtles are believed to play a significant role in marine and estuarine ecosystems. This role has likely been greatly reduced in most locations as a result of declining turtle populations. Population declines are a result of numerous factors, such as disease and predation, habitat loss, commercial fisheries conflicts, and inadequate regulatory mechanisms for their protection. As a result, several species have been classified as endangered or threatened with extinction.

However, due to complex life histories and multiple habitats used by the various species, sea turtle populations have proven difficult to accurately census (Meylan, 1982). Because of these problems, estimates of population numbers have been derived from various indices, such as numbers of nesting females, numbers of hatchlings per kilometer of nesting beach, and number of subadult carcasses washed ashore (Hopkins and Richardson, 1984).

3.4.1 Loggerhead Sea Turtle

3.4.1.1 Description

The loggerhead sea turtle is perhaps the most common of the sea turtles and the only one that still regularly nests on the U.S. Atlantic Coast, on beaches from New Jersey to Texas. This reddish-brown turtle averages 0.9 meters (3 feet) in length and weighs about 300 pounds (136 kg). The loggerhead sea turtle's powerful jaws are well suited to eating hard-shelled prey. It feeds on crabs and other crustaceans, mollusks, jellyfish, and sometimes fish and eelgrass (New York DEC, 2006a).

The distinctly heart-shaped carapace of the adult loggerhead turtle averages 80 centimeters (31 inches) in length (Ernst and Barbour, 1972). Exclusive of hatchlings, loggerheads in Virginia's waters are mostly juveniles with carapace lengths from 20 centimeters (7.8 inches) to more than 120 centimeters (47 inches) and weights from 20 to 40 kilograms (44 to 88 pounds) (Lutcavage, 1981; Lutcavage and Musick, 1985). The top of the carapace and appendages are reddish brown to mahogany, and the plastron (bottom shell) and appendages are cream to yellow (Musick, 1988). Encrusting barnacles and other organisms are common on the carapace. Four scutes occur between the eyes (prefrontals), and there are five lateral carpacial scutes on each side. Loggerheads usually have three bridge scutes (Carr, 1952; Musick, 1988).

The loggerhead sea turtle was listed as threatened in 1978. Loggerheads are the most common of the sea turtles frequenting the project area each summer; therefore, they are the species of sea turtle most likely to be adversely impacted by hopper dredge entrainment.

3.4.1.2 Life History and Distribution

Loggerhead sea turtles are found globally, preferring temperate and subtropical waters. In the western Atlantic, they range from the Canadian Maritime Provinces south to Argentina. Within its range, this species inhabits warm waters on continental shelves and areas among islands. Estuaries, coastal streams, and salt marshes are preferred habitats. There are five known western Atlantic loggerhead subpopulations. Three of these may occur within the dredging operations area. Individuals from the northern Florida, southern Florida, and Yucatan subpopulations could be found in the project area. The southern Florida population is the largest in the Atlantic with the northern Florida subpopulation ranking as the second largest (USFWS and NMFS, 2003). Through the year 2003, nesting data indicated no apparent trend for either the southern Florida or northern Florida subpopulations (USFWS and NMFS, 2003).

Loggerhead nesting in the U.S. typically occurs from Florida to Virginia Beach, Virginia, although there are some recorded nestings as far north as New Jersey (Pritchard, 1979). Musick (1988) concluded that the occasional nestings on beaches as far north as Virginia Beach are beyond the periphery of the normal breeding range. As is common with most turtle species,

reproducing females tend to return to the beaches where they were hatched to lay their own eggs. Yntema and Mrosovsky (1979) have shown that incubation temperature is the determining factor in the sex ratio of loggerhead hatchlings. Temperatures between 26 ºC and 28 ºC produced all males and temperatures of between 32 ºC and 34 ºC produced all females. It is reasonable to conclude that male hatchlings are more likely to be produced north of the North Carolina border, with far fewer females of the species returning to these areas to lay eggs and far more females returning to beaches in more southern areas.

Survival of hatchlings in waters as far north as Wallops Island may be limited due to cold temperatures. Once the animals hatch, usually between August and October, they swim away from land for two or three days. Since the hatchlings have little control over their buoyancy, it is theorized that the nonstop swimming done at this time is an attempt to reach the sargassum rafts. Sea turtle hatchlings that leave Virginia and Maryland beaches must travel great distances to find sargassum rafts, approximately 199 to 399 kilometers (124 to 248 miles) offshore near the Gulf Stream. During this journey, many are trapped by falling temperatures. Many hatchlings survive predation, only to be surrounded by cooler waters in the range of below 20 ºC by mid-October, 15 ºC by November, and as low as 10 ºC in winter. More fortunate hatchlings arriving from southern beaches probably rest and feed in the floating rafts, travel once or twice around the North Atlantic gyre, until they develop a carapace length of 20 to 40 centimeters (7 to 15 inches), and then move back into inshore benthic communities to feed.

3.4.1.3 Loggerhead Sea Turtles in the Project Area

In Maryland and Virginia waters, loggerheads are the most common sea turtle species. They occur in the Chesapeake Bay during summer and can be found in the Bay south of Baltimore within all the major tributaries, along the Virginia and Maryland Atlantic coast, and in the lagoons and channels in the barrier island systems (Lutcavage, 1981; Lutcavage and Musick, 1985; Byles and Dodd, 1989). The horseshoe crab is an important benthic food species. This crab species favors water depths from 4 to 20 meters (13 to 67 feet).

In October or November of each year when the first severe northeaster arrives in the Bay (Musick, 1986) or when the water temperature drops to around 18 ºC (Keinath et al., 1987), sea turtles of all species migrate out of the Chesapeake Bay. According to a study conducted by Musick in 1986, loggerheads migrate south along the coast to Cape Hatteras and elsewhere. Some of these turtles from the Bay spend their winters in the warm waters of the Gulf Stream on the Florida continental shelf.

3.4.1.4 Potential Direct Effect of the Proposed Dredging

The Wallops Island project area may contain both juvenile and adult loggerheads, depending upon the season and water temperature. As such, a hopper's draghead has the greatest potential to kill loggerheads because the centrifugal force of the pump that brings the sand into the dredge hopper can entrain a turtle. The force of the centrifugal pump, located behind the intake pipe of the draghead, draws sand and any other material in its path into the pipe. Many entrained animals are then killed by the pump before being pulled into the hopper. Entrainment is believed to take place primarily when the draghead is operating on bottom sediments; it is likely that the individual animals affected were feeding or resting near the bottom at the time the draghead moved along the bottom. Turtle deflectors will be installed on the dragheads during the season

to reduce the risk of entrainment occurring. In rare instances, suction is created when currents flow around the draghead being placed or moved. Hopper dredging between the months of May and November of any year when the water temperature is above 11 ºC could result in the entrainment of loggerheads.

The feeding behavior of loggerheads also places them at greater risk, as they are benthic feeders. However, USACE field tests demonstrated that the rigid deflector, properly installed and operated, blocked 95 percent of mock turtles from entrainment in the dredge. This rate is probably low given that mock turtles do not have the ability to flee from danger (USACE 1997). Additionally, no significant adverse impacts to loggerheads are expected as a result of vessel strikes as trained spotters may be employed on the barge.

3.4.1.5 Potential Indirect Effect of the Proposed Dredging

It is possible that ongoing dredging activity will remove some horseshoe crabs and other benthic organisms from the bottom. Some of these organisms will be killed while others may survive the dredging process only to be transported from the dredging area to the dredged material placement site. Therefore, it is possible that the loggerhead food supply would thus be impacted temporarily in a localized manner. Crabs are relatively mobile and therefore should be able to rapidly re-colonize dredge-disturbed benthic areas. Therefore, potential loggerhead prey item disruption would be temporary and benthic areas would be expected to recover quickly.

3.4.2 Leatherback Sea Turtle

3.4.2.1 Description

The leatherback is the largest, deepest diving, most migratory, and widest ranging of all sea turtles. The adult leatherback can reach 1.3 to 2.4 meters (4 to 8 feet) in length and 226 to 907 kilograms (500 to 2000 pounds) in weight. Its shell is composed of a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges or keels. This blue-black shell may also have variable white spotting (Pritchard, 1983); the plastron is white. Leatherbacks normally weigh up to 300 kilograms (660 pounds), and attain a carapace length (straight line) of 140 centimeters (55 inches) (Pritchard, 1983; Hopkins and Richardson, 1984). A tooth-like cusp is located on each side of the gray upper jaw; the lower jaw is hooked anteriorly. The paddle-like clawless limbs are black with white margins and pale spotting. Hatchlings are predominantly black with white flipper margins and keels on the carapace. The leatherback sea turtle was listed as endangered in 1970.

Morphologically this species can be easily distinguished from the other sea turtles by the following characteristics: 1) a smooth unscaled carapace; 2) a carapace with seven longitudinal ridges; 3) head and flippers covered with unscaled skin; and, 4) no claws on the flippers (Nelson, 1988; Pritchard 1983; Pritchard, 1971; Carr 1952).

3.4.2.2 Life History and Distribution

Leatherbacks are distributed in all oceans, with the exception of the Arctic and the Antarctic. They occur in the Atlantic, Indian, and Pacific Oceans. They range as far north as Labrador and Alaska to as far south as Chile and the Cape of Good Hope. They are found farther north than

other sea turtle species, probably because of their ability to maintain a warmer body temperature over a longer period of time. They migrate between boreal, temperate, and tropical waters. The diet of the leatherback consists primarily of soft-bodied animals, such as jellyfish and tunicates, with juvenile fishes, amphipods, and other organisms (Hopkins and Richardson, 1984) but it also feeds on sea urchins, squid, crustaceans, blue-green algae, and floating seaweed (USFWS, 2006a).

Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually, which is a dramatic decline from the 115,000 estimated in 1980. This is due to exponential declines in leatherback nesting that have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexico leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of worldwide population), is now less than one percent of its estimated size in 1980. The largest nesting populations now occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year) and Colombia (estimated several thousand nests annually), and in the western Pacific in West Papua and Indonesia (about 600 to 650 females nesting/year). In the United States, small nesting populations occur on the Florida east coast (35 females/year), New Jersey's Sandy Point, the U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year) (USFWS 2006a).

The leatherback may inhabit nearshore environments if there is an abundant jellyfish population. Leatherbacks are susceptible to line entanglements in fishing gear including long-line operations, gillnets, and trawling gear. This may be due to their large size and attraction to potential prey species found on buoy lines or lured by light sticks. Entanglements may result in a decreased ability to feed, dive, or breathe (Balazs, 1985). The U.S. shrimp trawling industry is required to utilize Turtle Exclusion Devices (TEDs) featuring a large enough opening to provide leatherback turtles with an escape route. The species also appears to be very susceptible to marine debris ingestion of plastic and similar materials which may resemble jellyfish (Balazs, 1985).

Leatherback turtle nesting occurs on the Mid-Atlantic coast of Florida from March to September (Hopkins and Richardson, 1984). Mature females may nest 1 to 9 times per season at about 9- to 17-day intervals. Average clutch sizes vary between 50 and 170 eggs that hatch usually within 50 to 70 days (Hopkins and Richardson, 1984). Hatchlings emerge, mostly at night, travel quickly to the water, and swim out to sea. The early history of the leatherback is poorly understood since juvenile turtles are rarely observed. World population estimates for the leatherback have been revised upward to over 100,000 females in recent years, due to the discovery of new nesting beaches in Mexico (Pritchard, 1983). Population trends of the Atlantic leatherback are highly variable and uncertain.

3.4.2.3 Leatherback Turtles in the Project Area

The leatherback turtle may pass through the mid-Atlantic during migration. Concentrations may be found between the Gulf of Maine and Long Island (Shoop and Kenney, 1992).They may also be found in coastal areas of New Jersey and Delaware, as well as around the mouth of the Delaware Bay (USACE, 1995).

3.4.2.4 Potential Direct Effect of the Proposed Dredging

The proposed dredging is not anticipated to directly affect any leatherback turtles that might enter the project area. Being a pelagic species, leatherback turtles prefers habitat located further offshore than the proposed project area. Members of the species that move across the project area when migrating may risk being struck by a dredge. However, trained spotters may be used to reduce this risk. Leatherback turtles are generally too large to be entrained in the dredge draghead.

3.4.2.5 Potential Indirect Effect of the Proposed Dredging

Dredging and placement of the material in the beach restoration area is unlikely to impact food sources or nesting areas. The project will not significantly enhance or negatively impact any juvenile or adult leatherback sea turtle habitat in the Wallops Island area.

3.4.3 Kemp's Ridley Sea Turtle

3.4.3.1 Description

The Kemp's ridley is the smallest and most seriously endangered of the sea turtles. The species was listed as endangered in 1970. Nearly the entire world population of adult female Kemp's ridley turtles nests annually on a single stretch of beach in Rancho Nuevo, Tamaulipas, Mexico (Carr, 1963; Hildebrand, 1963). A number of films made in 1947 of the nesting aggregations at Rancho Nuevo show that in the late 1940s the female population may have been greater than 40,000 (Hildebrand, 1963). Recently, estimates of the total nesting population at this location number no more than 500 (Pritchard, 1990). A very small number of Kemp's ridley's nest consistently at Padre Island National Seashore, Texas (USFWS, 2006b).

This species matures at about 70 centimeters (27 inch) carapace length. Weights of adults maximize at 50 kilograms (110 pounds) (Pritchard, 1979). Those found in the Chesapeake Bay are juveniles of 20 to 58 centimeters (7 to 23 inches) carapace length and less than 20 kilograms (44 pounds) in weight (Lutcavage and Musick, 1985). The plastron and the ventral surfaces of the flippers are white, and the dorsal side of the carapace and the flippers are charcoal gray to an olive green. Older individuals have more white on their dorsal surfaces. The carapace is rounded; this differentiates the species from other sea turtles. Four prefrontal scutes are located on the top of the head, and the species is distinguished by five pleural scutes. In addition, the cervival scute touches the first pleural scute on each side. Kemp's ridleys have four inframarginals each with a posterior pore (Carr, 1952; Musick, 1988).

3.4.3.2 Life History and Distribution

The migratory patterns of Kemp's ridley hatchlings is poorly known. Meylan (1986) suggests that they may live within sargassum beds in the Gulf of Mexico and the North Atlantic Ocean and move closer to shore as they age. The juveniles are thought to allow the Gulf Stream to transport them up the Atlantic coast. The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland (USFWS, 2006b). After leaving the nesting beach, hatchlings are believed to

become trapped in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 20 centimeters (7 inches) in length, at which size they enter coastal shallow water habitats. Morreale et al. (1992) disagrees, maintaining that this would result in very few individuals and that there must be another mode of transport.

Outside of nesting areas, the major habitat for the Kemp's ridley is the nearshore and inshore waters of the northern Gulf of Mexico, especially Louisiana waters. Kemp's ridleys are often found in salt marsh habitats. The preferred sections of nesting beach are backed up by extensive swamps or large bodies of open water having seasonal narrow ocean connections (USFWS, 2006b).

The Kemp's ridley apparently actively moves northward along the Atlantic Coast to reach the Chesapeake Bay, where they feed in shallow coastal waters. After loggerheads, this species is the second most abundant in Maryland and Virginia waters, with many juveniles entering the Chesapeake Bay. The turtles arrive during May and June (Keinerth et al., 1987; Musick and Limpus, 1997) to feed in the submerged aquatic beds. Their favored prey include fish, crabs, and mollusks (Pritchard and Marquez, 1973; Bellmund et al., 1987). When approaching maturity, the individuals return to the Gulf of Mexico.

Kemp's ridleys have also been documented to die at sea and wash ashore. The NMFS Sea Turtle Salvage and Stranding Network collects stranded sea turtles along both the Atlantic and Gulf Coasts (NMFS, 1988). Based on 1987 data, 767 Kemp's ridleys were reported by the network. The largest portion was collected from the Gulf Coast (103 turtles) and mostly the western portion of the Gulf. Nearly equal numbers of Kemp's ridleys were reported from the northeast and southeast Atlantic Coasts (64 and 50, respectively).

Onboard observation of offshore shrimp trawling by NMFS in the southeast Atlantic indicated that over 2,800 Kemp's ridleys are captured in shrimp trawls annually. The estimated number of Kemp's ridley mortalities from this activity was estimated to be 767 turtles annually, and most of these (65 percent) occurred in the western portion of the Gulf of Mexico. TEDS are required on shrimp and other trawlers to reduce mortality. Based on these data it is evident that the population is in danger of extinction. However, under strict protection, the population appears to be in the early stages of recovery.

3.4.3.3 Potential Direct Effect of the Proposed Dredging

The Kemp's ridley sea turtle may move across the project areas when migrating. The possibility exists that a dredge may strike individuals. Trained spotters may be utilized to reduce this possibility. There is also the possibility that individual Kemp's ridleys could be entrained in the dredge draghead. However, turtle deflectors will be part of the normal operating equipment during turtle season and will reduce or prevent taking of Kemp's ridley turtles during the dredging project.

3.4.3.4 Potential Indirect Effect of the Proposed Dredging

Dredging and placement of the material in the beach restoration area is unlikely to impact food sources or nesting areas. The project will not enhance or negatively impact any juvenile or adult Kemp's ridley habitat in the Wallops Island area.

3.4.4 Atlantic Green Sea Turtle

3.4.4.1 Description

Green turtles are the largest of all the hard-shelled sea turtles, but have a comparatively small head. While hatchlings are just 50 millimeters (2 inches) long, adults can grow to more than 0.91 meter (3 feet) long and weigh 136 to 159 kilograms (300 to 350 pounds). Adult green turtles are unique among sea turtles in that they are herbivorous, feeding primarily on seagrasses, sea lettuce, and algae. Other organisms living on sea grass blades and algae add to the diet (Mager, 1985). This diet is thought to give the turtles greenish colored fat, from which they take their name. A green turtle's carapace is smooth and can be shades of black, gray, green, brown, and yellow. Their plastron is yellowish white (NMFS 2006).

Green sea turtles are considered threatened throughout the U.S., but the breeding colonies on the Pacific coast of Mexico and along the Florida coast are considered endangered. The Atlantic green sea turtle was listed as a threatened species in 1978, except for the above-mentioned breeding populations, which are listed endangered. The NMFS Northeast Region considers all of the green sea turtles in the Chesapeake Bay as endangered because it is impossible to distinguish between those individuals which overwinter in Florida waters and those which overwinter outside those waters. Atlantic green sea turtles are rare in the Atlantic portion of their range and are extremely rare in Virginia.

The carapace is round, and the dorsum of the carapace and the appendages are dark green to brown, often with lines radiating from the posterior margin of each scute. The plastron and the venter are white. Yellow sometimes occurs at the interface between the dorsal and ventral coloration. The species is characterized by two prefrontal and four lateral pleural scutes. The cervical scute does not touch the pleural scutes (Carr, 1952; Musick, 1988). The species was for many centuries prized as a gourmet food item, with the fat a component of the clear soup that bears the species' common name.

3.4.4.2 Life History and Distribution

The green turtle is globally distributed and generally found in tropical and subtropical waters along continental coasts and islands between 30 degrees North and 30 degrees South. Nesting occurs in over 80 countries throughout the year (though not throughout the year at each specific location). Green turtles are thought to inhabit coastal areas of more than 140 countries. In U.S. Atlantic and Gulf of Mexico waters, green turtles are found in inshore and nearshore waters from Texas to Massachusetts, the U.S. Virgin Islands, and Puerto Rico. Important feeding areas in Florida include the Indian River Lagoon, the Florida Keys, Florida Bay, Homosassa, Crystal River, Cedar Key, and St. Joseph Bay (NMFS, 2006). In the western Atlantic, several major assemblages have been identified and studied (Parsons, 1962; Pritchard, 1969; Carr et al., 1978). In the continental U.S., however, the only known green turtle nesting occurs on the Atlantic coast of Florida (Mager, 1985).

Green turtle nesting occurs on the Atlantic coast of Florida from June to September (Hopkins and Richardson, 1984). Mature females may nest three to seven times per season at about 10- to 18-day intervals. Average clutch sizes vary between 100 and 200 eggs that hatch usually within 45 to 60 days (Hopkins and Richardson, 1984). Hatchlings emerge, mostly at night, travel

quickly to the water, and swim out to sea. At this point, they begin a life stage that is poorly understood but is likely spent pelagically in areas where currents concentrate debris and floating vegetation such as sargassum (Carr, 1986). When the juveniles reach 20 to 25 centimeters (7.8 to 9.8 inches) carapace length, they leave the pelagic habitat and enter benthic feeding grounds. Juveniles, like adults, are primarily herbivorous, avoiding crustaceans and feeding almost exclusively on algae and seagrasses with an occasional hydrozoan (Bellmund et al., 1987).

The population of green sea turtles before commercial exploitation and the total population since listing is unknown. Records show drastic declines in the Florida catch during the 1800s, and similar declines occurred in other areas (Hopkins and Richardson, 1984).

The principal cause of the historical, worldwide decline of the green turtle is long-term harvest of eggs and adults on nesting beaches and juveniles and adults on feeding grounds. These harvests continue in some areas of the world and compromise species recovery efforts. Incidental capture in fishing gear, primarily in gillnets, but also in trawls, traps and pots, longlines, and dredges is a serious ongoing source of mortality that also adversely affects the species' recovery. Green turtles are also threatened, in some areas of the world, by a disease known as fibropapillomatosis (NMFS, 2006).

The loss of many nesting beaches, and the smaller number of encounters between humans and green turtles over the past eight decades, provide inferential evidence that populations are generally declining (Hopkins and Richardson, 1984).

3.4.4.3 Atlantic Green Sea Turtles in the Project Areas

Green sea turtles are occasionally encountered in the project area, but their occurrence is expected to be rare.

3.4.4.4 Potential Direct Effect of the Proposed Dredging

The area being considered as a future sand source for the purpose of this BA is sufficiently offshore and deep enough to not provide a habitat for the submerged aquatic vegetation (SAV) eaten by green sea turtles. Sea lettuce and algae do occur in these waters but are uncommon due to the water depths of the project area. Therefore, there should be no direct affect on foraging habitat.

Green sea turtles move across the project areas when migrating. The possibility exists that a dredge may collide with a green sea turtle. Spotters trained to recognize the species may be stationed aboard the dredge when it is operating in waters off the Virginia coast. They would be expected to observe and warn against a collision with the species should one be in the vicinity.

The threat to individual green sea turtles of being entrained in the dredge draghead is not likely since turtle deflectors will be part of the normal operating equipment.

3.4.4.5 Potential Indirect Effect of the Proposed Dredging

Dredging and placement of the material in the beach restoration area is unlikely to impact food sources or nesting areas. The project will not enhance or negatively impact any juvenile or adult green sea turtle habitat in the Wallops Island area.

3.4.5 Hawksbill Sea Turtle

3.4.5.1 Description

Hawksbill turtles were listed endangered throughout their U.S. range by the USFWS in 1970. Adults have a carapace length of 65 to 90 centimeters (25 to 35 inches) and weigh approximately 35 to over 125 kilograms (77 to approximately 276 pounds) (Pritchard, 1979; Witzell, 1983). The top of the carapace and the upper appendages are multicolored with black, amber, and brown. The plastron and underside of the appendages are yellow. Some individual juveniles have brown spots. The carapacial scutes overlap at the posterior edges, and the posterior margin of the carapace is distinctly serrated. The species is distinguished by the presence of four prefrontal and three pleural scutes. The cervical scute does not touch the pleural scutes (Carr, 1952; Musick, 1988). Hawksbill sea turtles were commercially harvested in the 19th century for food and for use in the manufacture of "tortoise-shell" combs.

3.4.5.2 Life History and Distribution

Hawksbill turtles are rare throughout their range (Keinath and Musick, 1991). Adult hawksbill turtles remain in the tropics, where they frequent coral reefs. Those found at higher latitudes are juveniles (Carr, 1952). In the western Atlantic, they can be found from Cape Cod, Massachusetts, south to northern Brazil. Preferred habitat consists of warm, coastal shoal water less than 15 meters (50 feet) deep with abundant submerged vegetation. Coral reefs, lagoons, inlets, and bays are ideal habitats. Hurricanes are the primary vector for bringing these juveniles to Virginia waters (NMFS, 1993). Juvenile and adult hawksbills feed on sponges and bryozoans but will eat both vegetable and animal material (Meylan, 1988).

Nesting occurs on isolated beaches in the Gulf of Mexico and the Caribbean Sea. Nesting has been documented on the Isla de Pinos of Cuba, at Tortuguero in Costa Rica, and on Mona Island off Puerto Rico. Western Atlantic nesting records extend from Brazil to Florida's southern Atlantic coast, including the Caribbean and southwestern Gulf of Mexico. Although small nesting concentrations do exist (Antigue), nesting is generally distributed at low densities across much of the Caribbean and the waters of the U.S. (New York DEC, 2006b).

The hawksbill is a difficult species to monitor for long-term trends. There tends to be a small number of nests spread over a wide geographical area mostly on remote inaccessible beaches, and large year-to-year fluctuations are common. A survey of nests in Surinam has provided a series of 13 annual estimates over 15 years. The trend is positive, but the small number of turtles and the absence of recent data make the trend questionable (NRC, 1990).

3.4.5.3 Hawksbill Sea Turtles in the Project Area

Hawksbill rarely migrate through the vicinity of the dredging area.

3.4.5.4 Potential Direct Effect of the Proposed Dredging

The proposed dredging in the project area may affect migrating hawksbill turtles. However, the food preference for this species includes sponges and reef animals that prefer a hard substrate such as an oyster reef and manmade reef structures (Keinath et al., 1991). These substrates are

uncommon within the project area. The possibility of entrainment by the draghead exists. However, utilization of turtle deflectors will minimize this risk.

3.4.5.5 Potential Indirect Effect of the Proposed Dredging

Dredging and placement of the material in the beach restoration area is unlikely to impact food sources or nesting areas. The project will not enhance or negatively impact any juvenile or adult hawksbill sea turtle habitat in the Wallops Island area.

Cumulative effects include the effects of state, tribal, local, or private actions, not involving Federal activities that are reasonably certain to occur in the action area. One of potentially significant activities to note here, as stated previously with each sea turtle species, is the negative impact from commercial, and to a smaller extent recreational, fishing. This state-regulated activity may use trawling to capture schools of fish. Frequently, endangered and threatened sea turtles are caught in the nets and are injured or drowned. In addition, ingestion of plastics, petroleum products, marine vessel-generated debris, and entanglement and drowning in crab pot lines can occur. Such incidents can be considered "takes," but these takes are usually not reported or regulated. Turtles and whales can also be injured by boat propellers and during collisions with recreational vessels.

The dredging of the offshore Wallops Island environment will neither diminish nor augment the existing threats to sea turtles, fin whales, humpback whales, and right whales. The use of the dredge and associated tow vessels will temporarily increase boat traffic in the project area. Trained spotters may be present on the dredge. Additionally, dredging operations will not significantly add pollutants or marine debris to the aquatic environment.

Although no specific data on sea turtle usage are available for the borrow sites, the characteristics of the areas to be dredged make them unlikely to be special, unique, or critical habitat for sea turtles. Due to depths at typical borrow sites that may be greater than 11 meters (35 feet) below msl, there is no abundant population of spider crabs (or rock crabs), which comprise the bulk of the diet for loggerheads and Kemp's ridleys in the region (Burke et al., 1992), and no SAV or seagrass beds exist, which are used by green sea turtles. The coarse-grained sandy substrate is a result of strong tidal currents. Thus, within the possible dredge areas, the lack of abundant food resources makes it unlikely that turtles would remain any longer than it takes for them to travel through the area.

As a result of this review, it is the opinion of NASA that these habitats are not important or critical to sea turtles. This conclusion is supported by results from similar beach renourishment projects elsewhere along the East Coast. In recent beach nourishment projects in Cape May, New Jersey (conducted by the USACE), and in Bethany, Delaware (conducted in 1992 by the Delaware Department of Natural Resources and Environmental Control), and in West Hampton, New York (completed October 1993), direct observation of hopper dredge operations revealed no evidence of interactions with turtles. In a similar dredging operation at Myrtle Beach, South Carolina, it was also the opinion of NMFS Southeast Region that sea turtles would not be concentrated in areas of offshore borrow pits, and would not likely suffer any adverse affects from hopper dredge operations (UASCE, 2004). Furthermore, USACE field tests have demonstrated that the rigid deflector blocked 95 percent of mock turtles from entrainment in the dredge. This rate is probably low given that mock turtles do not have the ability to flee from danger (USACE 1997). Given the lack of turtle/dredge interactions at these more southern sites, where densities of turtles presumably are higher, no significant negative impacts on turtles in the Wallops Island offshore borrow areas are anticipated.

Three whale species and five sea turtle species have been evaluated as part of this biological assessment for the Wallops Island Shoreline Restoration and Sediment Management Project.

The three listed whale species assessed (humpback, fin and right whale) may traverse near or through the project area during migration although they tend to prefer deeper habitats than those of the project area. As such, there exists a small potential for incidental take should a collision with a dredge occur. However, dredge speeds are relatively low (approximately 8 knots). This should enable the operators to avoid whales by maneuvering to avoid a whale strike. Therefore, NASA concludes that the proposed action "may affect, not likely to adversely affect" one or more of the three listed whale species during the months they would more likely to be in the project area.

Five listed sea turtle species (loggerhead, leatherback, Kemp's ridley, green, and hawksbill) were assessed as part of this report. Entrainment in dragheads is the primary risk regarding any incidental take of sea turtles, although for the larger leatherback species this is not a concern. Even though the mechanism is not 100% effective, turtle deflectors have been successfully utilized on dragheads to keep sea turtles from being captured and killed. Vessel collisions have been reported, especially incidents involving the leatherbacks due to size and behavior patterns.

The ranges and migratory movements of sea turtles are largely correlated with water temperature. Sea turtles are likely to be found in the project area between April and November of each year. Leatherback turtles are less affected by cold water temperatures and may stay in northern regions throughout the year. Undertaking dredging operations from December through March would decrease risk of incidental take of sea turtles. Furthermore, spotters trained to recognize turtle species may be stationed aboard the dredge when it is operating in waters off the Virginia coast.

Loggerhead turtles and Kemp's ridley turtles often forage on spider crabs, horseshoe crabs and rock crabs and other benthic organisms. Therefore, they may be attracted to prey species located in the project area during dredging operations and risk entrainment by the draghead. There is no SAV in the project area so green turtles should not be found foraging here although they may migrate through the region. Coral reefs are also absent which hawksbill turtles generally favor, so this species should not be of concern for entrainment. Given this information, NASA concludes that the proposed action "may affect, likely to adversely affect" the loggerhead and Kemp's ridley sea turtle species. However, the proposed project would not jeopardize the future existence of the species.

ACE	American Cetacean Society
BA	Biological Assessment
BO	Biological Opinion
ºC	degrees Celsius
DO	dissolved oxygen
ESA	Endangered Species Act
GSFC	Goddard Space Flight Center
MARS	Mid-Atlantic Regional Spaceport
msl	mean sea level
NASA	National Aeronautics and Space Administration
NMFS	National Marine Fisheries Service
NRC	National Research Council
OCS	Outer Continental Shelf
SAV	Submerged Aquatic Vegetation
TED	Turtle Exclusion Device
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish & Wildlife Service
WFF	Wallops Flight Facility

American Cetacean Society (ACS), 2004a. Humpback Whale *Megaptera novaeangliae* Fact Sheet. http://www.acsonline.org/factpack/humpback.htm.

ACS, 2004b. Fin Whale *Balaenoptera physalus* Fact Sheet. http://www.acsonline.org/factpack/finwhl.htm.

ACS, 2004c. Right Whale *Eubalaena glacialis* Fact Sheet. http://www.acsonline.org/factpack/RightWhale.htm.

Audubon Society, 1983. Field Guide to North American fishes, whales and Dolphins. Alfred A Knopf, Inc.

Balazs, G.H. 1985. Impact of ocean debris on marine turtles; entanglements and ingestion. U.S. Department of Commerce, NOAA Tech. Memo. NMFS_SWFSC-54:387-429.

Bellmund, S.A., J.A. Musick, R.C. Klinger, R.A. Byles, J.A. Keinath, and D.E. Barnard, 1987. Ecology of sea turtles in Virginia. Virginia Institute of Marine Science Special Science Report No. 119. Virginia Institute of Marine Science, College of William and Mary at Gloucester, Virginia.

Best, P.B., J.L. Bannister, R.L. Brownell, Jr., and G.P Donovan (eds.). 2001. Right whales: worldwide status. *J. Cetacean Res. Manage*. (Special Issue). 2. 309 pp.

Blankenship, Karl, 2003. Concerns raised that criteria might not help sturgeon. Bay Journal, Volume 13 Number 1 March. Pp. 33-39.

Burke, V.J., S.J. Morreale, P. Logan, and E.A. Standora, 1992. Diet of green turtles (*Chelonia mydas*) in the waters of Long Island, New York. In Proceedings of the Eleventh Annual Workshop on Sea Turtle Conservation and Biology. National Oceanic and Atmospheric Administration Tech. Mem. NMFS-SEFSC-302, pp 140-141.

Bustard, H.R., 1972. Sea Turtles. Natural History and Conservation. Taplinger Publishing Company, New York, 220 pp.

Byles, R.A., and C.K. Dodd, 1989. Satellite biotelemetry of loggerhead sea turtles *Caretta caretta* from the east coast of Fla. Proceeding of the 9th Annual Workshop on Sea Turtle Conservation and Biology. National Oceanic and Atmospheric Administration Tech Mem NMFS-SEFC-232.

Carr, A., 1952. Handbook of Turtles. Comstock Publishing Associates, Cornell University Press, Ithaca, NY.

Carr, A. 1963. Pan specific reproductive convergences in *Lepidochelys kempi*. Ergebn. Biol. 26:298-303.

Carr, A., 1986. New Perspectives on the Pelagic Stage of Sea Turtle Development, U.S. Dept. Comm. National Oceanic and Atmospheric Administration, NMFS, National Oceanic and Atmospheric Administration Technical Mem. NMFS-SEFC-190, 36 pp.

Carr, A., M. Carr, and A. Meylan, 1978. The ecology and migrations of sea turtles: The West Caribbean Green Turtle Colony. Bulletin of the American Museum of Natural History, 162(1):1-46.

Caswell, H.M., M. Fujiwara, and S. Brault. 1999. Declining survival probability threatens the North Atlantic right whale. Proc. Nat. Acad. Sci 96:3308-3313.

Clapham, P.J., S. B. Young, and R.L. Brownell. 1999. Baleen whales: Conservation issues and the status of the most endangered populations. Mammal Rev. 29(1):35-60.

Ernst, C.H., and R.W. Barbour, 1972. Turtles of the U.S. University of Kentucky Press, Lexington, Kentucky. 347 pp.

Federal Register, 1 June 2004. Endangered Fish and Wildlife: Advance Notice of Proposed Rulemaking (ANPR) for Right Whale Ship Strike Reduction, 50 CFR Part 224 [040506143-4143-01; I. D. 052504C].

Gambell, R., 1985. Fin whale (Balaenoptera physalus). In: Ridgeway, S.H. and R. Harrison (Eds.); Handbook of marine mammals, Vol. 3: the sirenians and baleen whales. Academic Press, London.

Garmon, L., 1981. Tortoise marsh wallow? Science News 119(14) Apr.:217.

Gaskin, D., 1982. The Ecology of Whales and Dolphins. Heinemann Educational Books Ltd. London. 459 pp.

Hain, J.H.W., M.J. Ratnaswamy, R.D. Kenney, and H.E. Winn. 1992. The fin whale *Baleanoptera physalus*, in waters of the northeastern United States continental shelf. Rep Int. Whal. Comm 42:653-669.

Hamilton, P.K., M.K. Marx, and S.D. Kraus. 1998. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*) as a methid of assessing human impacts. Final Report to the Northeast Fisheries Science Center. NMFS Contract No. 4EANF-6-0004

Hampton Roads Pilot Online (newspaper), 2004a. "Another whale death off Virginia sparks call for action." http://home.hamptonroads.com/stories/story.cfm?story=78730&ran=79710

Hampton Roads Pilot Online (newspaper), 2004b. "Government wants to slow ships to help right whales." http://home.hamptonroads.com/stories/print.cfm?story+71112&ran+60726

Hildebrand, H.H., 1963. Hallazgo del area de anidacion de la tortuga marina "loro." Lepidochelys kempi (Garman), en la costa occidental del Gulfo de Mexico. Ciencia, 22 (4): 105-112.

Hirth, H.F., 1971. Synopsis of biological data on green turtles *Chelonia mydas* (Linneaus) 1758. FAO Fish. Synop. No. 85.

Hopkins, S.R., and J.I. Richardson, eds., 1984. Recovery Plan for Marine Turtles. U.S. Dept. Comm. National Oceanic and Atmospheric Administration, NMFS, St. Petersburg, FL, 355 pp.

Katrona, S.K., V. Rough and D.T. Richardson, 1983. A Field Guide to the Whales, Porpoises and Seals of the Gulf of Maine and eastern Canada, Cape Cod to Newfoundland. Charles Scribner's Sons, New York. 255 pp.

Keinath, J.A., J.A. Musick, and R.A. Byles, 1987. Aspects of the biology of Virginia's sea turtles: 1979-1986. Virginia Journal of Science. Vol. 38, No. 4. Winter 1987: pp 329-336

Keinath, J.A., J.A. Musick, and R.A. Byles, 1991. Atlantic hawksbill sea turtle, Eretmochelys imbricata imbricata (Linnaeus). In: Teerwilliger, K. (Coord.); Virginia's Endangered

Species. McDonald and Woodward Publishing Company, Blacksburg, Virginia, pp. 450-451.

Keinath, J.A., and J.A. Musick, 1991. Loggerhead sea turtle, Caretta caretta (Linnaeus), Terwilliger, K. (Coord); Virginia's Endangered Species. McDonald and Woodward Publishing Company, Blacksburg, Virginia. Pp 445-448.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A.R. Knowlton, and C.K. Clay. 2001. reproductive parameters of the North Atlantic Right whale. J. Cetacean res. Manage. 2:231-236.

Laist, D.W., A.R. Knowlton, J.G. Mead, A.S. Collet, and M. Podesta. 2001. Collisions between ships and whales. Marine Mammals Science 17(1):35-75.

Lutcavage, M., 1981. The status of marine turtles in Chesapeake Bay and Virginia coastal waters. Masters thesis. Virginia Institute of Marine Science, College of William and Mary at Gloucester Point, Virginia.

Lutcavage, M. and J.A. Musick, 1985. Aspects of the biology of sea turtles in Virginia. Copeia 1985; 440-456.

Mager, A., 1985. Five-year Status Reviews of Sea Turtles Listed Under the Endangered Species Act of 1973. U.S. Department Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service, St. Petersburg, Florida, 90 pp.

Magnuson, J.J., J.A. Bjorndal, W.D. DuPaul, G.L. Graham, D.W. Owens, C.H. Peteron, P.C.H. Prichard, J.I. Richardson, G.E. Saul, and C.W. West, 1990. Decline of Sea Turtles: Causes and Prevention. Committee on Sea Turtle Conservation, Board of Environmental Studies and Toxicology, Board on Biology, Commission of Life Sciences, National Research Council, National Academy Press, Washington, D.C. 259 pp.

Mate, B.M., S.L. Nieukirk, and S.D. Kraus. 1997. Satellite monitored movements of the North Atlantic right whale. J. Wildl. Manage. 61:1393-1405.

Meylan, A., 1982. Estimation of population size in sea turtles. Pages 135-138 In: K. Bjorndal (ed.), Biology and Conservation of Sea Turtles. Smithsonian Institution Press, Washington, D.C.

Meylan, A.B., 1986. The riddle of the ridleys. Natural History Magazine, 11:90-96.

Meylan, A., 1988. Spongivory in hawksbill turtles: A diet of glass. Science 239:393-395.

Meylan, A.B., K.A. Bjorndal, and B.J. Turner, 1983. Sea turtles nesting at Melbourne Beach Fla. II. Post nesting movements of *Caretta caretta* Biol. Conserv. 26:79-90.

Mitchell, E., 1974. Present status of northwest Atlantic fin and other whale stocks. pp. 108-169 In: Schevill, W.E. (ed.). The Whale Problem. Cambridge, Massachusetts. Harvard University Press. 419 pp.

Morreale, S.J., S.S. Standove, and E.A. Standora, 1992. Annual occurrence and winter mortality of Lepidochelys kempi and other marine turtles in New York waters. Journal of Herpetology 26: 3:301-308.

Musick, J.A., 1986. Trail of the sea turtle; pulling the pieces together in Virginia. Virginia Wildlife (June 1986): 22-25.

Musick, J.A., 1988. The sea turtles of Virginia (2nd. Ed.) Virginia Institute of Marine Science Educational Series, No. 24, Virginia Sea Grant Program, Virginia Institute of Marine Science, Gloucester Point, Virginia.

Musick, J.A. and C.J. Limpus. 1997. Habitat Utilization and migration in juvenile sea turtles. Pp. 137-164. In: Lutz, P.L. and J.A. Musick (eds.). The Biology of Sea Turtles. CRC Press, New York. 432 pp.

National Marine Fisheries Service (NMFS), 2006. Green Turtle (*Chelonia mydas*). NOAA Fisheries, Office of Proetcted Resources. http://www.nmfs.noaa.gov/pr/species/turtles/green.htm.

NMFS, 1993. Endangered Species Act Section 7 Consultation: Biological Opinion on the channel deepening and subsequent maintenance by hopper dredge in the York River Entrance Channel, Virginia. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland. 30 March 1993.

NMFS, 1991. Endangered Species Act Section 7 Consultation: Biological Opinion on the dredging of channel in the Southeastern U.S. from North Carolina through Cape Canaveral, Florida. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, Maryland. 25 November 1991.

National Research Council (NRC), 1990. Decline of the sea turtle: Causes and prevention. Committee on Sea Turtle Conservation, Board on Environmental Studies and Toxicology, Board on Biology, Commission on Life Sciences, National Research Council. National Academy Press, Washington, D.C.

New York State Department of Environmental Conservation (New York DEC). 2006a. Loggerhead Sea Turtle Fact Sheet. http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/loggfs.html.

New York DEC. 2006b. Loggerhead Sea Turtle Fact Sheet. (http://www.dec.state.ny.us/website/dfwmr/wildlife/endspec/athafs.html

Nelson, D.A., 1988. Life History and Environmental Requirements of Loggerhead Turtles. U.S. Fish and Wildlife Service Biol. Rep. 88(23). U.S. Army Corps of Engineers TR EL-86-2(Rev.). 34 pp.

Oravetz, Charles, 1992. Personal communication (to USACE Norfolk District).

Parsons, J.J., 1962. The Green Turtle and Man. Univ. of Florida Press, Gainesville, Florida. 126 pp.

Perry, S.L., D.P. Demister, and G.K. Silber. 1999. The great whales: History and status of six species listed as endangered under the U.S. Endangered Species Act of 1973. Mar. Fish Rev. Special Edition 61(1):59-74.

Pritchard, P., 1990. Kemp's ridleys are rarer than we thought. Marine Turtle Newsletter, 49:1-3.

Pritchard, P., 1983. Leatherback Turtle. Pages 125 to 132 P. Bacon et al., eds., In Proc. Western Atlantic Turtle Symp. Vol 1. Center for Environmental Education, Washington D.C.

Pritchard, P.C.H, 1979. Encyclopedia of turtles. T.H.F. Publications, Neptune City, FL.

Pritchard, P., 1971. The Leatherback of Leathery Turtle, *Dermochelys coriacea*. IUCN Monog. No. 1, Marine Turtle Series. 39 pp.

Pritchard, P.C.H., 1969. The survival status of ridley sea turtles in American waters. Biological Conservation 2(1): 13-17.

Pritchard, P., and R. Marquez, 1973. Kemp's ridley turtles or Atlantic ridley, Lepidochelys kempi. IUCN Monog, No. 2, Marine Turtle Series. 30 pp.

Shoop, C.R., T. Doty, and N. Bray, 1982. A characterization of marine mammals and turtles in the mid- and north-Atlantic areas of the U.S. outer continental shelf: final report. University of Rhode Island, Kingston, Rhode Island. December 1982.

Shoop, C.R. and R.D. Kenney. 1992. Swason distributions and abundance of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herp. Mongraphs 6:43-67.

Swingle, M., S. Barco, T. Pitchford, W. McLellan, and D.A. Pabst, 1993. The occurrence of foraging juvenile humpback whales (*Megaptera novaeangliae*) in Virginia Coastal Waters. Marine Mammal Science (in press).

Taylor, A.C., 1990. The hopper dredge. In: Dickerson, D.D. and D.A. Nelson (Comps.); Proceedings of the National Workshop of Methods to Minimize Dredging Impacts on Sea Turtles, 11-12 May 1988, Jacksonville, Florida. Miscellaneous Paper EL-90-5. Department of the Army, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. February, 1990. Pp. 59-63.

U.S. Army Corps of Engineers (USACE), Philadelphia District, 1995. A Biological Assessment of Sea Turtles in the Cape May, New Jersey area.

USACE, Technical Report CHL-97-31, Nov. 1997, Development and Evaluation of a Sea Turtle-Deflecting Hopper Dredge Draghead, pp.87-92. http://el.erdc.usace.army.mil/seaturtles/docs/trchl97-31.pdf

USACE, Norfolk District, 2004. A Biological Assessment of Whales and Sea Turtles as part of Virginia Beach Hurricane Protection Project.

U.S. Fish and Wildlife Service (USFWS), 2006a. Leatherback Sea Turtle (*Dermoshelys coriacea*) Fact Sheet. North Florida Field Office. http://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/leatherback-sea-turtle.htm.

USFWS, 2006b. Kemp's Ridley Sea Turtle (Lepidochelys kempii) Fact Sheet. North Florida Field Office.http://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/kemps-ridley-sea-turtle.htm)

USFWS and NMFS. 2003. Notice of Petition Finding (Fed Register) September 15, 2003.

Waring , G.T., J.M. Quintal and C.P. Fairfield (eds.). 2002. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2001. NOAA Technical Memorandum NMFS-NE-169.

Waring, G.T., J.M. Quintal, S.L. Swartz (eds.) 2001. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2001. NOAA Technical Memorandum NMFS-NE-168.

Waring, G.T., D.L. Palka, P.J. Clapham, S. Swartz, M., Rossman, T. Cole, K.D. Bissak, and L.J. Hansen. 1988. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments-1988. NOAA Technical Memorandum NMFS-NE-116.

Watkins, W.A., and W.E. Schevill, 1979. Aerial observation of feeding behavior in four baleen whales: *Eubalaena glacialis, Balaenoptera borealis, Megaptera novaeangliae* and *Balaenoptera physalus*. J. Mammal. 60:155-163.

Wiley, D.N., R.A. Asmutis, and D.P. Gannon, 1992. Preliminary investigation in the strandings of the humpback whale, *Megaptera novaeangliae*, in the Mid-Atlantic and southeast regions of the U.S., 1985-1999. Report to the International Wildlife Coalition. December 1992.

Witzell, W.N., 1983. Synopsis of biological data on the hawksbill turtle, *Eretmochelys imbricata* (Linnaeus, 1766). FAO Fisheries Synopsis No. 137, Food and Agriculture Organization of the United Nations, Rome, Italy. Pp. 78.

Yntema, C.L., and N. Mrosovsky, 1979. Incubation temperature and sex ratio of hatchling loggerhead turtles; a preliminary report. Marine Turtle Newsletter 11 (March, 1979). 9-10.

Appendix C

National Marine Fisheries Service Biological Opinion

The NMFS BO has not been received to date.

Appendix D

Cultural Resources Correspondence

Code 228 January 24, 2007

Ms. Kathleen Kilpatrick
Federal Review and Compliance Coordinator
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, Virginia 23221

Subject: **Request for Project Review** – Geotextile Tubing Installation,
Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia

Dear Ms. Kilpatrick:

The National Aeronautics and Space Administration (NASA) has recently initiated emergency measures to slow the current rate of erosion along the coast of Wallops Island. The ocean is encroaching substantially toward launch pads, infrastructure, and test and training facilities belonging to NASA, the U.S. Navy, and the Mid-Atlantic Regional Spaceport (MARS) at a rapid rate. Currently, assets on Wallops Island are valued at over $800 million and are increasingly at risk from larger than normal storm events, storm waves, and flooding damages. The risks to WFF could cause the interruption of missions supported by the facility and/or permanent loss of capabilities supported by the facility. At this time, NASA is installing geotextile tubes (GeoTubes®) along the southern portion of the beachfront (Photograph 1). Because this Undertaking has the potential to effect historic resources, NASA is initiating consultation with the Virginia Department of Historic Resources (VDHR) in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations as provided in 36 CFR Part 800.

Previous studies in this area included the creation of an archaeological predictive model for potential pre-historic and historic sites in the vicinity (which was approved by VDHR in a letter dated December 3, 2003). In December 2004, the *Historic Resources Survey and Eligibility Report for Wallops Flight Facility* (URS/EG&G) was submitted to VDHR and included an evaluation of structures in the area for National Register eligibility. The information gathered from these reports was the basis for the current evaluation of the affected beachfront.

Current plans consist of installing approximately 1,402 meters (4,600 feet) of GeoTubes® from the southern terminus of the seawall to the camera station at the southern end of NASA property (Figure 1). This project area falls within the moderate sensitivity zone for historic archaeology, a sensitivity model approved by VDHR in a letter dated December 4, 2003. The tubes are 14 feet wide, 5.5 feet high and have a 34 foot circumference (Figure 2). GeoTubes®

are composed of durable textile material formed into long cylinders that are filled with sand. The tubes, which are used instead of hard structures such as riprap, are normally placed in the backbeach parallel to the shore. Two temporary staging areas for sand and slurry have been created: one at the northernmost boundary of the GeoTube® line and the second midway down the beachfront. These two slurry pits will be restored after the project is complete. Water would be pumped through one temporary pipe extending from Hog Creek and one temporary pipe extending from the Atlantic Ocean.

On January 22, 2007 on behalf of NASA, a URS Senior Archaeologist and Architectural Historian inspected the current GeoTube® installation work in progress. An Area of Potential Effect (APE), taking into consideration viewsheds for adjacent structures and ground disturbing activities associated with the proposed work, was created (Figure 3). The topography of this portion of the beachfront prevents the visibility of the GeoTubes® from off the beach because of the severe level of erosion at the highwater mark (Photographs 2 and 3). Three buildings are located on the beach within the APE, one of which was surveyed for its National Register eligibility in *Historic Resources Survey and Eligibility Report for Wallops Flight Facility*, 2004 URS/EG&G (Table 1 and Figure 3). The two remaining buildings within the APE are not eligible for listing in the National Register. These buildings, an abandoned concrete block storage unit (Wallops # Z-42; Photographs 4 and 5) and operating Launch Control Center (Wallops # Z-40, Photograph 1), are ineligible for the National Register as they do not meet the 50-year criterion for listing nor do they embody the necessary exceptional importance to be listed under Criteria Consideration G.

Building Name	Date of Construction	National Register Eligibility Determination
Launch Control Center (WFF #Z-40)	1960	Ineligible for Listing on the National Register – less than 50 years of age.
Tracking Camera No. 2 (WFF #Z-35)	1951	Surveyed in 2004, *Historic Resources Survey and Eligibility Report for Wallops Flight Facility*, URS/EG&G, and found ineligible for listing on the National Register (VDHR # 001-0027-0122).
Vacant Storage Unit (WFF #Z-42)	1969	Ineligible for Listing on the National Register – less than 50 years of age.

Table 1 – Buildings within the Area of Potential Effects (APE)

Ground disturbances includes the preparation of the 4,600 ft corridor for the placement of GeoTubes® and the excavation of two sand slurry pits to facilitate GeoTube® filling. Approximately 1,000 ft of the northern portion of the GeoTube® corridor had been machine graded during the time of site visitation. Visual observations of this segment of the corridor revealed no artifacts or evidence of culturally derived features. In general, machine grading was shallow (< 1 ft below ground surface) and did not extend below the recent accumulation of storm related sand deposit on the beach (Photographs 7 and 8). Accordingly, the potential for the discovery of artifacts or intact cultural deposits was very low in the area of the GeoTube® corridor.

Monitoring of the northern sand slurry pit involved the inspection of fill material (i.e. backdirt). Actual excavation monitoring of the north pit was not possible as GeoTube® filling

was already in progress (Photograph 9). However, an inspection of the backdirt pile surrounding the pit did not reveal any cultural material. In general, dark yellowish brown loamy sand representing A-horizon soils were observed at the base of backdirt pile, while pale brown sands with light to moderate shell fragments comprised the remaining bulk of the backdirt accumulation (Photograph 10). The sand deposits containing shell is consistent with natural unconsolidated beach deposits. No cultural materials were apparent in this area.

An examination of soil profile from the southern sand slurry pit was possible. The rectangular pit measured approximately 40 by 13 ft, with its long axis perpendicular to the adjacent roadway to the west. Maximum depth of the pit extended approximately 6 ft below ground surface. Upon initial inspection it was clear that an abrupt soil anomaly and an associated dense scatter of lumber and trash were present along the southwest portion of the profile (Photograph 11). Sections of 2 by 4 ft and 2 by 6 ft machine milled lumber were also present in the backdirt pile (Photograph 12). A closer examination of the pit profile and backdirt revealed that most of the associated trash consisted of modern aluminum and plastic soft drink containers, as well as what appeared to be plastic electrical fittings and rubber cable sheathing. Personal communication with Shari Silbert (WICC Team Member) indicated that this area was used to construct an asphalt pad for the operation of a modern electrical panel. A portion of the pad and electrical panel is still present immediately south of the southern sand slurry pit. A reconnaissance of the general area revealed a wide scatter of similar material on the surface, along with a number of other utility related material and cabling. As the materials encountered in the southern slurry pit do not constitute an archaeological resource, no impacts to any cultural resources have been sustained as a result of the ongoing construction activity in this area.

Because there were no historic structures identified within the APE and because the archaeological review of recent ground disturbance in the area found no archaeological resources NASA concludes that no historic or prehistoric resources are affected by the emergency measures on the beachfront. NASA is requesting that VDHR review this project and concur with the finding that no historic properties are affected by the emergency measures on the beachfront.

If you have any questions of comments regarding this portion of the project, please contact me, Kent Stover, at 757-824-1342 or Shari Silbert, at 757-824-2327.

Sincerely,

Kent Stover
Facility Historic Preservation Officer

Enclosures:
(1) VDHR Project Review Application Form
(1) VDHR DSS Map of Project Area
(2) Area of Potential Effect (APE) Map for GeoTube® Installation
(3) Photographic Log

Project Review Application Form

This application must be completed for all projects that will be federally funded, licensed, or permitted, or that are subject to state review. Please allow 30 days from receipt for the review of a project. All information must be completed before review of a project can begin and incomplete forms will be returned for completion.

I. GENERAL PROJECT INFORMATION

1. Has this project been previously reviewed by DHR? YES ___ NO X DHR File # _____

2. Project Name Geotube Installation Along Wallops Island, Wallops Flight Facility

3. Project Location

City	Town	County
Wallops Island		Accomack

4. Specify Federal and State agencies involved in project (providing funding, assistance, license or permit). Refer to the list of agencies and abbreviations in the instructions.

Lead Federal Agency NASA

Other Federal Agency _____

State Agency _____

5. Lead Agency Contact Information

Contact Person	Kent Stover, Facility Historic Preservation Officer		
Mailing Address	NASA Wallops Flight Facility Wallops Island, VA 23337		
Phone Number	757-824-1342	**Fax Number**	757-824-1831
Email Address	Dalton.K.Stover@nasa.gov		

6. Applicant Contact Information

Contact Person	Shari Silbert, Environmental Scientist		
Mailing Address	EG&G NASA Wallops Flight Facility Wallops Island, VA 23337		
Phone Number	757-824-2327	**Fax Number**	757-824-1819
Email Address	Shari.A.Silbert@nasa.gov		

II. PROJECT LOCATION AND DESCRIPTION

7. USGS Quadrangle Name Wallops Island

8. Number of acres included in the project A length of 4,600 feet of shoreline approximately 14 feet in width running parallel to the ocean.

MAIL COMPLETED FORM AND ATTACHMENTS TO:
Virginia Department of Historic Resources
Attention: Project Review
2801 Kensington Avenue, Richmond, VA 23221
www.dhr.virginia.gov

9. Have any architectural or archaeological surveys of the area been conducted? **YES_X_ NO___**

If yes, list author, title, and date of report here. Indicate if a copy is on file at DHR.
1. *Cultural Resources Assessment, NASA Wallops Flight Facility,* URS/EG&G, Nov 2003 – copy on file at DHR
2. *Historic Resources Survey and Eligibility Report, Wallops Flight Facility,* URS/EG&G, Dec. 2004 – copy on file at DHR
3. *Integrated Cultural Resource Management Plan for NASA Wallops Flight Facility,* URS/EG&G, Dec. 2006 – copy on file at DHR

10. Are any structures 50 years old or older within or adjacent to the project area? **YES_X_ NO___**
Three buildings are located within the APE. Two of these are less than 50 years of age. The third was constructed in 1951 and was previously evaluated for its National Register eligibility. It was found ineligible for listing in the National Register in *Historic Resources Survey and Eligibility Report, Wallops Flight Facility,* URS/EG&G, Dec. 2004 (VDHR # # 001-0027-0122).
If yes, give date(s) of construction and provide photographs.
See attached photo log for photographs of the three buildings within the APE.

11. Does the project involve the rehabilitation, alteration, removal, or demolition of any structure, building, designed site (e.g. park, cemetery), or district that is 50 years or older? If *yes*, this must be explained fully in the project description. **YES___ NO_X_**

12. Does the project involve any ground disturbance (e.g. excavating for footings, installing sewer or water lines or utilities, grading roads, etc.)? If *yes*, this must be explained fully in the project description.
The project involved the excavation of two sand slurry pits and the preparation of a 4,600 ft corridor for placement of a geotextile tube as part of an ongoing beach restoration project. **YES_X_ NO___**

(Please see attached letter report.)

13. DESCRIPTION: Attach a complete description of the project. Refer to the instructions for the required information. See attached DOPAA and Reconnaissance Level Archaeology Survey for further information.

To the best of my knowledge, I have accurately described the proposed project and its likely impacts.

__Kristin Leahy, URS Corp._____ _____1/23/07___
Signature of Applicant/Agent Date

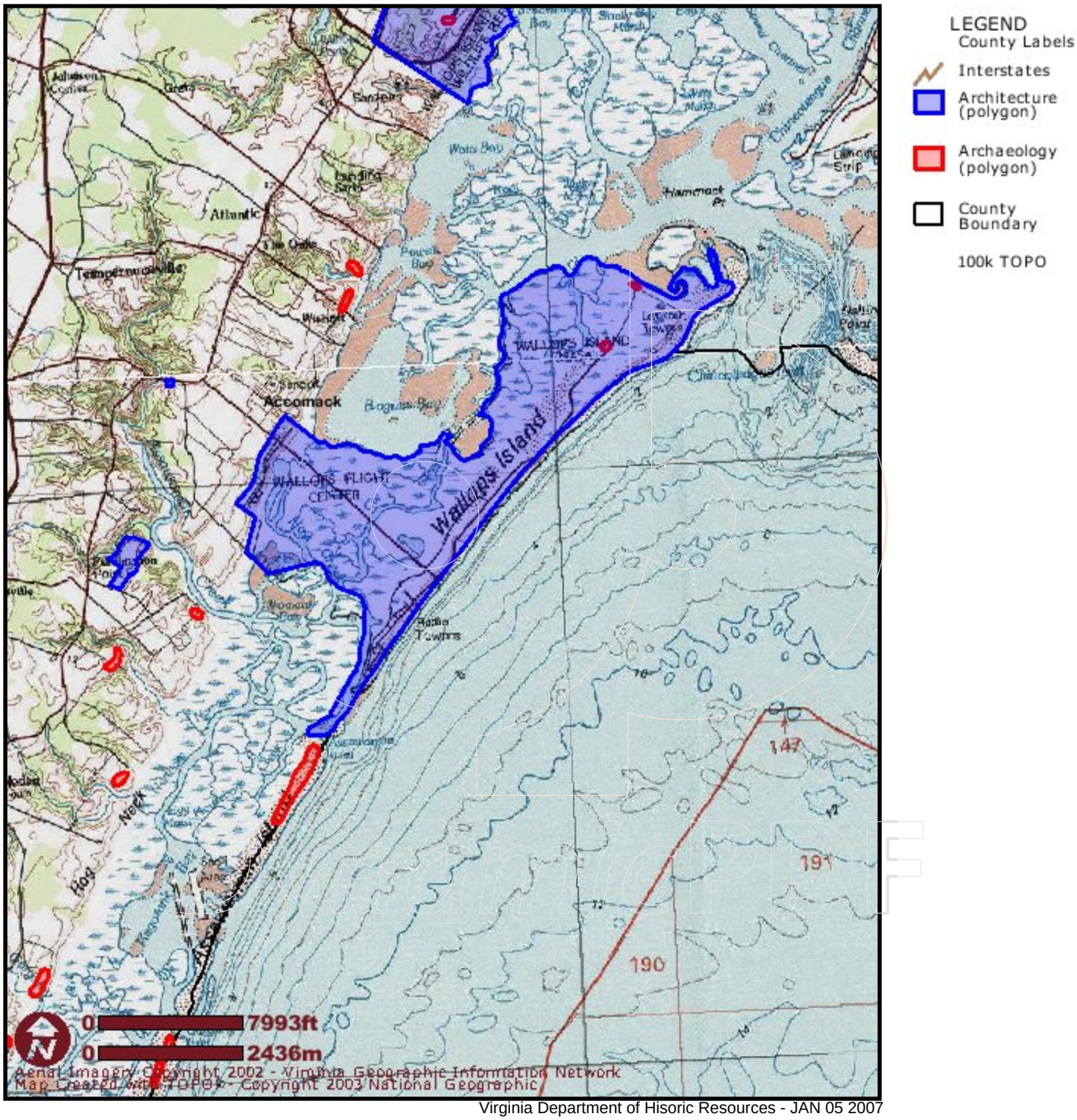
The following information must be attached to this form:

_X_ Completed DHR Archives search
_X_ USGS map with APE shown
_X_ Complete project description
_X_ Any required photographs and plans

MAIL COMPLETED FORM AND ATTACHMENTS TO:
Virginia Department of Historic Resources
Attention: Project Review
2801 Kensington Avenue, Richmond, VA 23221
www.dhr.virginia.gov

Evaluating unlicensed DynamicPDF feature. DynamicPDF.com [1:0:s1]

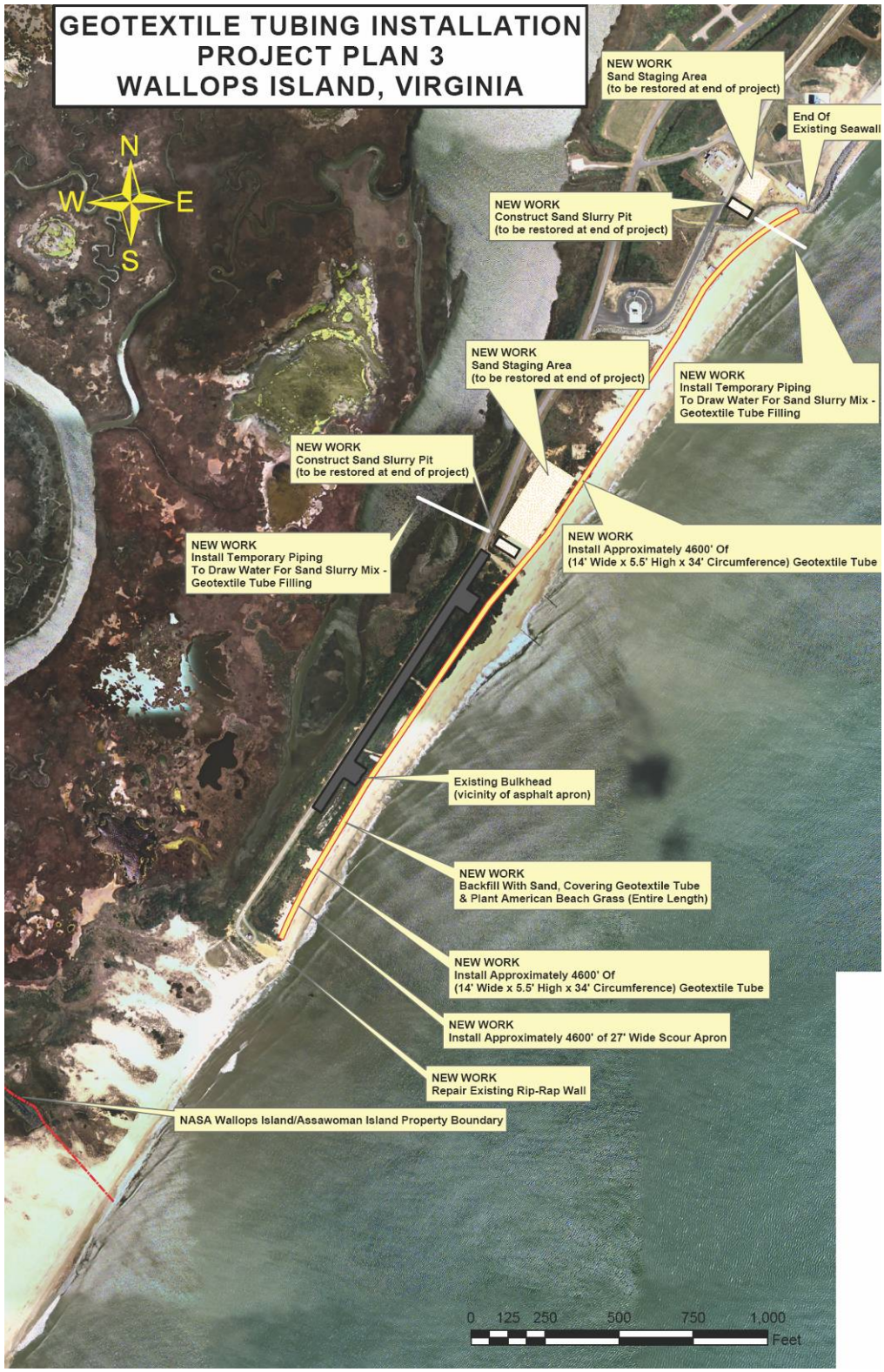
Virginia Department of Historic Resources Data Sharing System, 01/23/2007



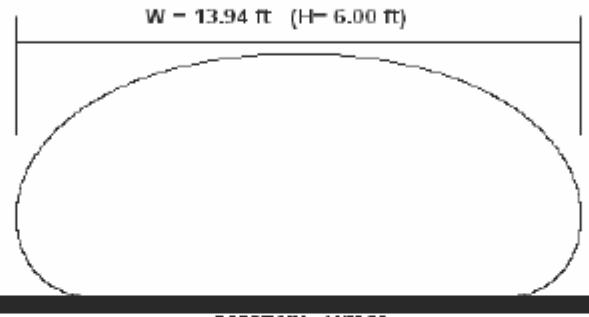
Virginia Department of Hisoric Resources - JAN 05 2007

Wallops Island

Geotube installation along beachfront of Wallops Island.



CLIENT NASA	TITLE **Geotube Installation**	
PROJ Wallops Flight Facility Shoreline Restoration – Geotube Installation	URS	PROJ NO 15299035
		FIGURE **1**



Miratech

ver02s

SOFFTWIN - 11/29/06

GIVEN C = 34.00 ft H = 6.00 ft SPG = 1.60 FS = 4.00

DENSITY OF SLURRY	=	99.84 pcf
TUBE CIRCUMFERENCE, C	=	33.99 ft
EX PRESS -TOP OF TUBE, P	=	1.323 ft (water) 0.5732 psi
WORKING CIRCUM FORCE, Tcir	=	95.57 lbs/in 1146.8 lbs/ft
WORKING AXIAL FORCE, Tax	=	71.33 lbs/in 855.91 lbs/ft
TOTAL HEIGHT OF TUBE, H	=	6.005 ft
TOTAL WIDTH OF TUBE, W	=	13.94 ft
BASE CONTACT WIDTH OF TUBE	=	10.37 ft
END AREA OF TUBE	=	70.76 sq ft 77.00 % FULL
TUBE VOLUME, V	=	2.621 cu yd/ft 529.3 gal/ft
FABRIC AREA TO VOL RATIO,R	=	1.441 sq yd/cu yd
BASE PRESSURE	=	4.737 psi 10.93 ft (water)
REQ'D CIRCUM STRENGTH T	=	382.3 lbs/in 4587.4 lbs/ft
REQ'D AXIAL STRENGTH	=	285.3 lbs/in 3423.6 lbs/ft

TenCate Geotube

NASA - Wallllops Island

No warranty or guarantee, expressed or implied, is made regarding the performance of any product, since the manner of use and handling are beyond our control.
This document should not be construed as engineering advice and the final design will be the responsibility of the project engineer and/or registered engineer.

CLIENT NASA

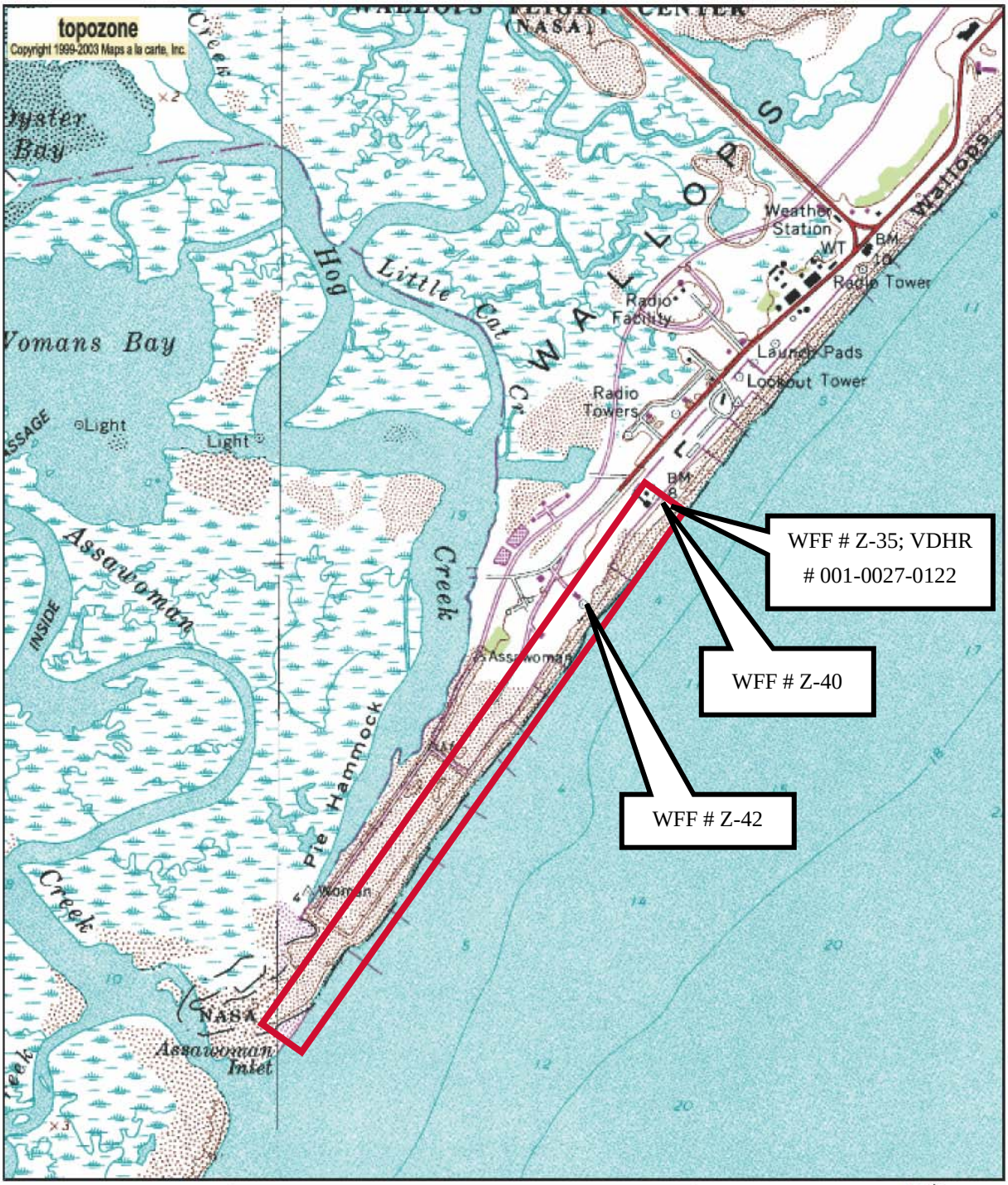
PROJ Wallops Flight Facility Shoreline Restoration Program

TITLE **Geotube Dimensions – Wallops Flight Facility**

URS

PROJ NO 15299035

FIGURE 2



0 0.3 0.6 0.9 1.2 1.5 km

0 0.1 0.2 0.3 0.4 0.5 mi

UTM 18 456737E 4187125N (NAD27)

USGS Wallops Island (VA) Quadrangle

Projection is UTM Zone 18 NAD83 Datum

M=-11.561
G=-0.301

CLIENT NASA	TITLE **Geotube Installation – Structures located within the Area of Potential Effects (APE)**
PROJ Wallops Flight Facility Shoreline Restoration – Geotube Installation	**URS**
	PROJ NO 15299035
	FIGURE **3**

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No.	Date:
1	1/22/07

Direction Photo Taken:

Northeast

Description:

Photograph of Geotube Construction at Northernmost end of APE. Two of three buildings within identified APE in background - Launch Control Center (WFF #Z-40) and Tracking Camera No. 2 (WFF #Z-35; VDHR # 001-0027-0122).

Photo No.	Date:
2	1/22/07

Direction Photo Taken:

Southwest

Description:

Photograph of Beach Erosion to high water mark.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No. 3	Date: 1/22/07

Direction Photo Taken:

Northeast

Description:

View of beachfront from southernmost end of anticipated Geotube construction. Note that no structures are found in the vicinity of the beachfront at the southernmost end of the project area APE.

Photo No. 4	Date: 1/22/07

Direction Photo Taken:

Northeast

Description:

Photograph of vacant storage building (Z-42).

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No.	Date:
5	1/22/07

Direction Photo Taken:

Southwest

Description:

Photograph of vacant storage building (Z-42). Note level of sand deposited into vacant building during previous storm events.

Photo No.	Date:
6	1/22/07

Direction Photo Taken:

Southwest

Description:

Geotube construction from northern limit of APE. Note vacant storage building (Z-42) south of current construction along beachfront.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No.	Date:
7	1/22/07

Direction Photo Taken:

Southwest

Description:

Geotube Corridor Grading

Photo No.	Date:
8	1/22/07

Direction Photo Taken:

Northeast

Description:

Geotube grading showing present beach surface.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No.	Date:
9	1/22/07

Direction Photo Taken:

North

Description:

Northern sand slurry pit.

Photo No.	Date:
10	1/22/07

Direction Photo Taken:

West

Description:

Northern sand slurry pit and backdirt pile.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No.	Date:
11	1/22/07

Direction Photo Taken:

Northwest

Description:

Southern sand slurry pit.

Photo No.	Date:
12	1/22/07

Direction Photo Taken:

South

Description:

Southern sand slurry pit

____ No historic properties affected ___✓___ No adverse effect

____ Additional information is needed in order to complete our review

____ We have previously reviewed this project. A copy of our correspondence is attached.

Comments: _____

Signature _____ Date 25 Jan 07

Phone number 804-367-2323 x140 DHR File # 2007-0087

This Space For Department Of Historic Resources Use Only

MAIL COMPLETED FORM AND ATTACHMENTS TO:

Virginia Department of Historic Resources
Attention: Project Review
2801 Kensington Avenue, Richmond, VA 23221
www.dhr.virginia.gov

National Aeronautics and
Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337-5099

February 28, 2007

Reply to Attn of: 228

Virginia Department of Historic Resources
Attn: Ms. Kathleen Kilpatrick
Federal Review and Compliance Coordinator
2801 Kensington Avenue
Richmond, VA 23221

Subject: Description of the Proposed Action Alternatives for the Beach Erosion Mitigation and Sediment Management Programmatic Environmental Assessment at NASA, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia and Reconnaissance Level Archaeological Survey of Project Area.

The Wallops Flight Facility (WFF) has retained URS Group, Inc. (URS) to conduct a Programmatic Environmental Assessment (PEA) for Beach Erosion Mitigation and Sediment Management Alternatives at WFF on Wallops Island. In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations as provided in 36 CFR Part 800, WFF respectfully requests that the Virginia Department of Historic Resources (VDHR), which serves as the Virginia State Historic Preservation Office (SHPO), review and provide comments on the attached Description of the Proposed Action Alternatives (DOPAA) for this PEA.

A walk-over archaeological survey of 3.85 miles of heavily eroded beachline was conducted on September 18, 2006, by URS archaeologists. The purpose of the walk-over survey was to visually examine the beachfront and identify any potentially significant cultural resources, including both above ground resources, i.e., historic structures, and archaeological sites, which may be eligible for listing in the National Register of Historic Places, along the beachfront. For this project, the beachfront is defined as the high water mark and extends into the ocean a distance of 100 feet. The investigation was conducted in accordance with the *Guidelines for Archaeological Investigations in Virginia* (VDHR 1996). No significant cultural resources were discovered during the survey. Please find attached a thorough summary of this evaluation for your review.

As alternatives enumerated in the attached DOPAA have the potential to affect other cultural resources beyond the area reviewed in this walk-over archaeological survey on Wallops Island, further investigation will be necessary both off-shore and potentially farther inland. Once an alternative is chosen and more detailed information is available, a Supplemental Environmental Assessment (SEA) will be drafted, and VDHR will be consulted for potential impacts to historic resources as a result of the proposed work.

Subsequent cultural resource evaluations of one or more off-shore sand borrow areas and/or the identified inland areas potentially impacted by construction alternatives will be sent to VDHR for review as necessary components of the above-cited PEA. It is anticipated that a Phase I marine remote sensing survey of one or more sand borrow areas will be conducted once exact locations of areas associated with each alternative are identified by the Army Corps of Engineers, Norfolk District.

At this time and on behalf of WFF, URS is requesting that VDHR review the finding that no National Register eligible properties are present along the specified beachfront (from the high water line extending 100 feet into the ocean) based on the walk-over archaeological survey. All work that may affect off-shore sites or resources farther inland, including viewsheds, will be reviewed in subsequent correspondence with VDHR.

If you have any questions of comments regarding this portion of the project, please contact either myself, at 757-824-1342 or Ms. Shari Silbert at 757-824-2327.

W D Phillips

for Dalton K. Stover
Facility Historic Preservation Officer

3 Enclosures:
1. Project Areas Affected by Proposed Actions
2. Description of the Proposed Action Alternatives
3. Reconnaissance Level Archaeological Survey of Beachfront

Project Review Application Form

This application must be completed for all projects that will be federally funded, licensed, or permitted, or that are subject to state review. Please allow 30 days from receipt for the review of a project. All information must be completed before review of a project can begin and incomplete forms will be returned for completion.

I. GENERAL PROJECT INFORMATION

1. Has this project been previously reviewed by DHR? YES ___ NO X DHR File # _____

2. Project Name DOPAA for Beach Erosion Mitigation and Sediment Management Alternatives, Wallops Flight Facility

3. Project Location Wallops Island (City) / (Town) / Accomack (County)

4. Specify Federal and State agencies involved in project (providing funding, assistance, license or permit). Refer to the list of agencies and abbreviations in the instructions.

Lead Federal Agency NASA

Other Federal Agency _____

State Agency _____

5. Lead Agency Contact Information

Contact Person Kent Stover, Facility Historic Preservation Officer

Mailing Address NASA Wallops Flight Facility
Wallops Island, VA 23337

Phone Number 757-824-1342 **Fax Number** 757-824-1831

Email Address Dalton.K.Stover@nasa.gov

6. Applicant Contact Information

Contact Person Shari Silbert, Environmental Scientist

Mailing Address EG&G
NASA Wallops Flight Facility
Wallops Island, VA 23337

Phone Number 757-824-2327 **Fax Number** 757-824-1819

Email Address Shari.A.Silbert@nasa.gov

II. PROJECT LOCATION AND DESCRIPTION

7. USGS Quadrangle Name Wallops Island

8. Number of acres included in the project 3.85 miles of beachfront on Wallops Island

MAIL COMPLETED FORM AND ATTACHMENTS TO:
Virginia Department of Historic Resources
Attention: Project Review
2801 Kensington Avenue, Richmond, VA 23221
www.dhr.virginia.gov

9. Have any architectural or archaeological surveys of the area been conducted? **YES_X_ NO___**

If yes, list author, title, and date of report here. Indicate if a copy is on file at DHR.
1. *Cultural Resources Assessment, NASA Wallops Flight Facility,* URS/EG&G, Nov 2003 – copy on file at DHR
2. *Historic Resources Survey and Eligibility Report, Wallops Flight Facility,* URS/EG&G, Dec. 2004 – copy on file at DHR
3. *Integrated Cultural Resource Management Plan for NASA Wallops Flight Facility,* URS/EG&G, Dec. 2006 – copy on file at DHR

10. Are any structures 50 years old or older within or adjacent to the project area? **YES_X_ NO___**
There are buildings over 50 years of age off the beach, all of these buildings have been previously surveyed and have been found ineligible for listing on the National Register. VDHR concurred with this finding. There are no structures built on the beachfront.
If yes, give date(s) of construction and provide photographs.
See *Historic Resources Survey and Eligibility Report, Wallops Flight Facility*

11. Does the project involve the rehabilitation, alteration, removal, or demolition of any structure, building, designed site (e.g. park, cemetery), or district that is 50 years or older? If *yes*, this must be explained fully in the project description. **YES___ NO_X_**

12. Does the project involve any ground disturbance (e.g. excavating for footings, installing sewer or water lines or utilities, grading roads, etc.)? If *yes*, this must be explained fully in the project description. **YES_X_ NO___**
NASA is not requesting clearance of all potential APE's associated with all the Beach Erosion Mitigation Alternatives here attached. There will be subsequent consultation with VDHR once further details are available. At this time, NASA is requesting VDHR's review of the attached Reconnaissance Level Archaeology Survey and the finding that there are no historic properties present on the beachfront (from the highwater mark extending 100 feet into the ocean). All other construction, including that on the beachfront that will alter viewsheds from further inland, will be reviewed in subsequent consultation letters to VDHR.

13. DESCRIPTION: Attach a complete description of the project. Refer to the instructions for the required information. See attached DOPAA and Reconnaissance Level Archaeology Survey for further information.

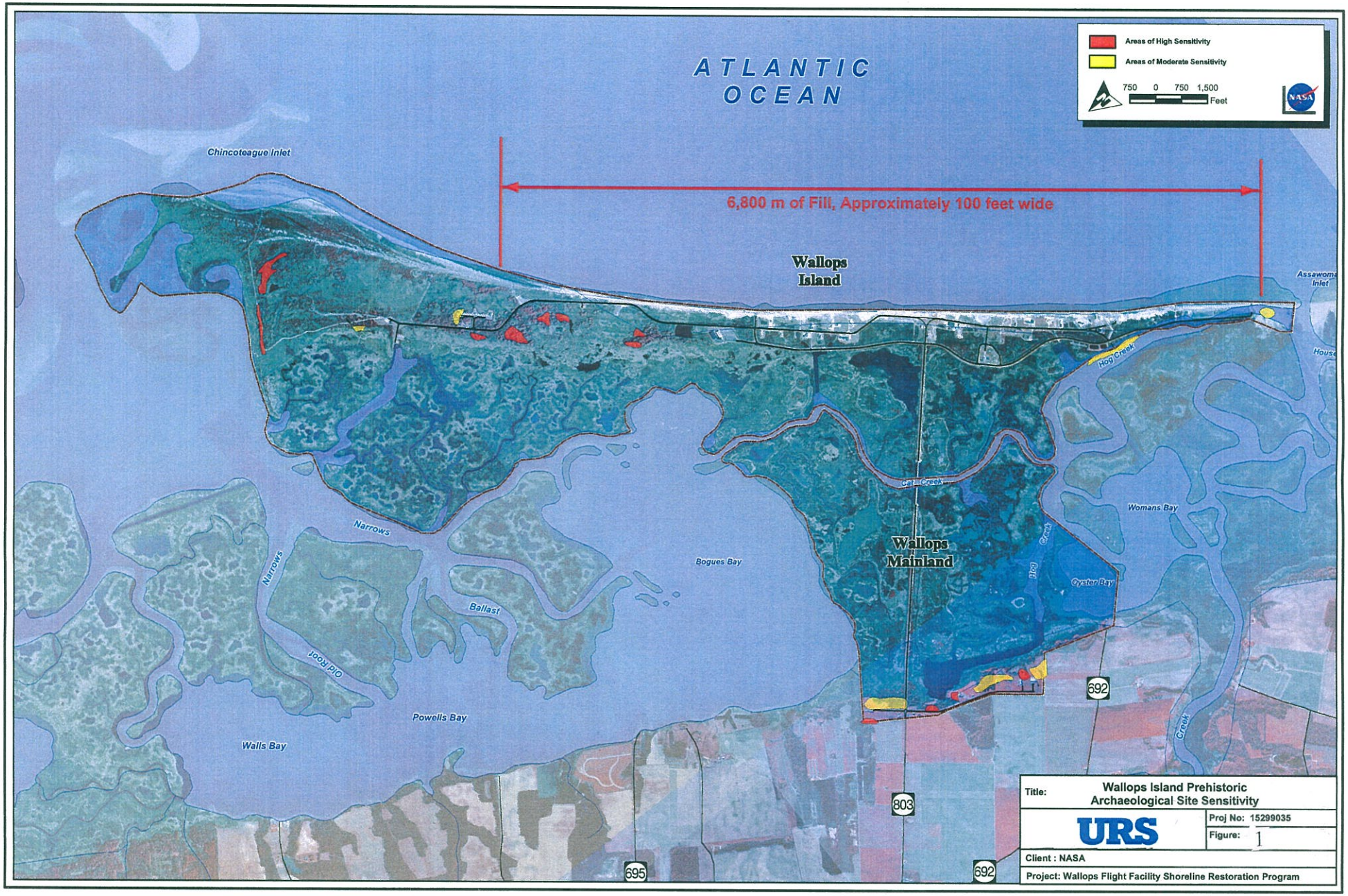
To the best of my knowledge, I have accurately described the proposed project and its likely impacts.

Kristin Leahy, URS Corp. _____ 1/17/07
Signature of Applicant/Agent Date

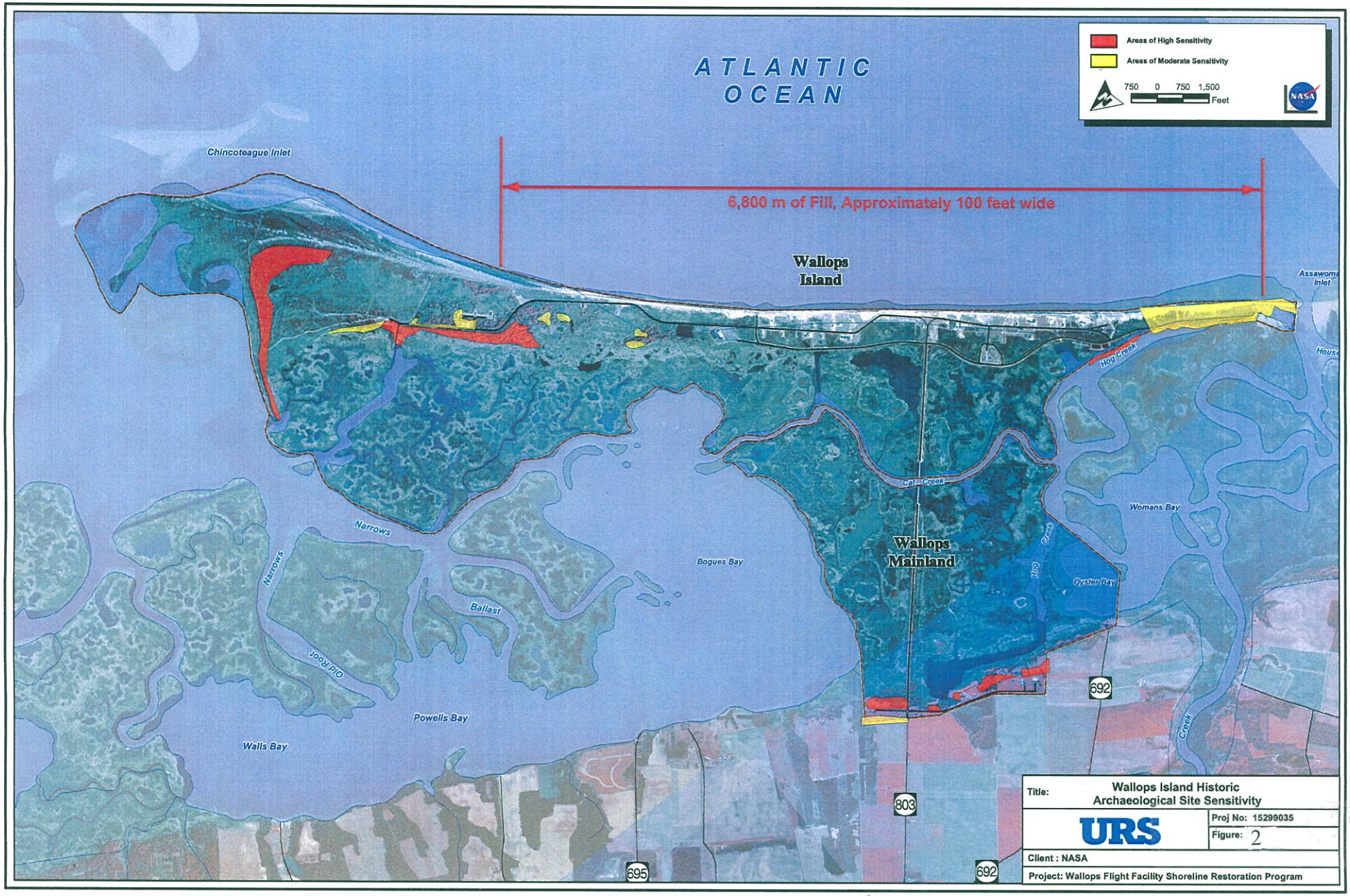
The following information must be attached to this form:

____ Completed DHR Archives search
____ USGS map with APE shown
____ Complete project description
____ Any required photographs and plans

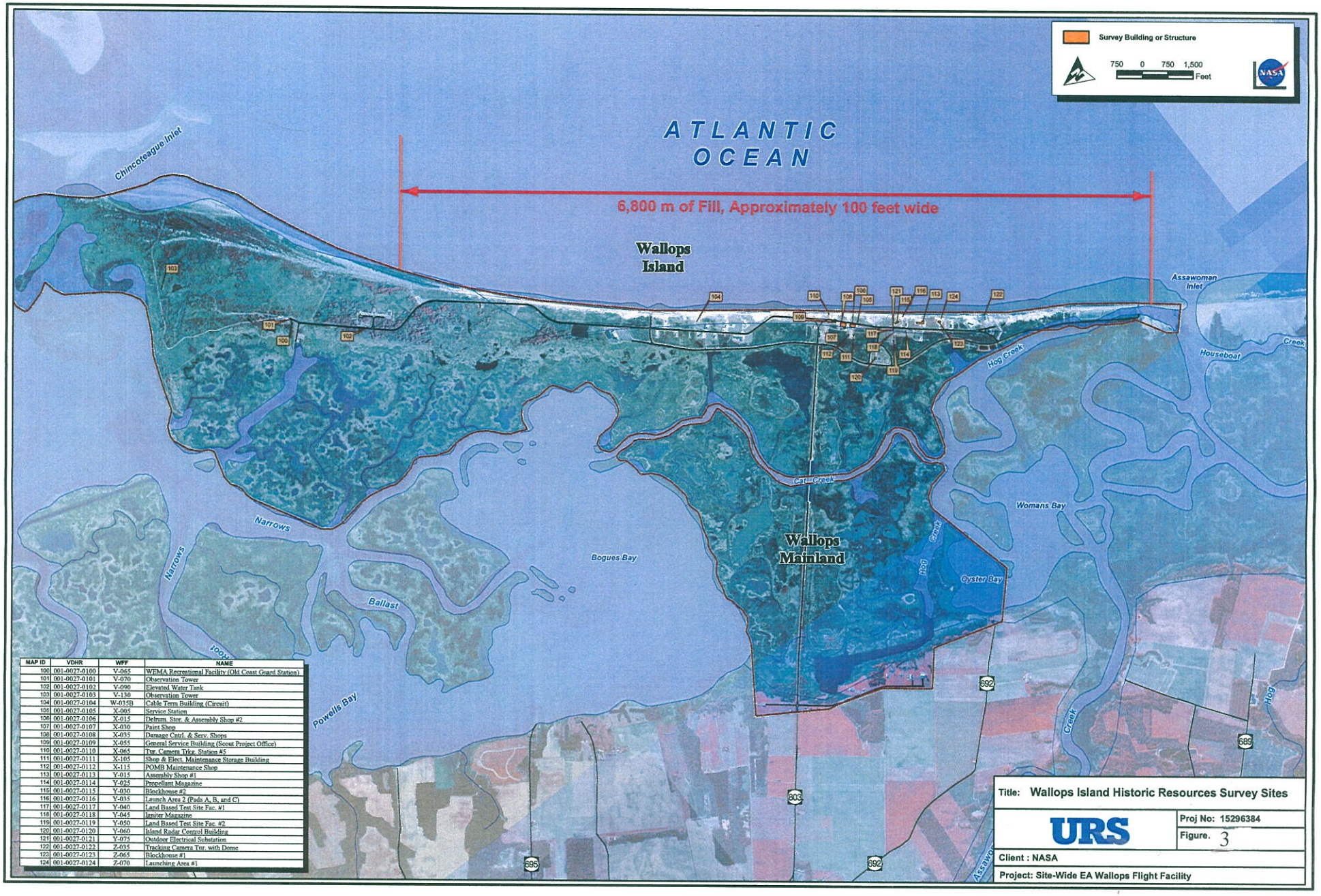
MAIL COMPLETED FORM AND ATTACHMENTS TO:
Virginia Department of Historic Resources
Attention: Project Review
2801 Kensington Avenue, Richmond, VA 23221
www.dhr.virginia.gov



Title:	Wallops Island Prehistoric Archaeological Site Sensitivity
URS	Proj No: 15299035
	Figure: 1
Client : NASA	
Project: Wallops Flight Facility Shoreline Restoration Program	



Title:	Wallops Island Historic Archaeological Site Sensitivity
URS	Proj No: 15299035
	Figure: 2
Client : NASA	
Project: Wallops Flight Facility Shoreline Restoration Program	



MAP ID	VDHR	WFF	NAME
100	001-0027-0100	V-065	WEMA Recreational Facility (Old Coast Guard Station)
101	001-0027-0101	V-070	Observation Tower
102	001-0027-0102	V-090	Elevated Water Tank
103	001-0027-0103	V-130	Observation Tower
104	001-0027-0104	W-035B	Cable Term Building (Circuit)
105	001-0027-0105	X-005	Service Station
106	001-0027-0106	X-015	Delrum, Ster. & Assembly Shop #2
107	001-0027-0107	X-030	Paint Shop
108	001-0027-0108	X-035	Damage Cntrl. & Serv. Shops
109	001-0027-0109	X-055	General Service Building (Scout Project Office)
110	001-0027-0110	X-065	Tur. Camera Trkg. Station #5
111	001-0027-0111	X-105	Shop & Elect. Maintenance Storage Building
112	001-0027-0112	X-115	POMB Maintenance Shop
113	001-0027-0113	Y-015	Assembly Shop #1
114	001-0027-0114	Y-025	Propellant Magazine
115	001-0027-0115	Y-030	Blockhouse #2
116	001-0027-0116	Y-035	Launch Area 2 (Pads A, B, and C)
117	001-0027-0117	Y-040	Land Based Test Site Fac. #1
118	001-0027-0118	Y-045	Igniter Magazine
119	001-0027-0119	Y-050	Land Based Test Site Fac. #2
120	001-0027-0120	Y-060	Island Radar Control Building
121	001-0027-0121	Y-075	Outdoor Electrical Substation
122	001-0027-0122	Z-035	Tracking Camera Tur. with Dome
123	001-0027-0123	Z-065	Blockhouse #1
124	001-0027-0124	Z-070	Launching Area #1

Title: Wallops Island Historic Resources Survey Sites

URS

Proj No: 15296384

Figure. 3

Client : NASA

Project: Site-Wide EA Wallops Flight Facility

INTRODUCTION

The National Aeronautics and Space Administration (NASA), Goddard Space Flight Center's Wallops Flight Facility (WFF) contracted with URS Corporation, Inc. (URS) to conduct an archaeological survey of 6.2 kilometers (km) (3.85 miles) of beach/ coastline in Accomack County, on Virginia's Eastern Shore. The project area has been slated for beach replenishment after damage inflicted by a series of recent storm events (Figures 1-3).

The purpose of the archaeological survey was to identify any potentially significant cultural resources, including both above ground resources, i.e., historic structures, and archaeological sites, which may contribute to our knowledge of the archaeological heritage of Accomack County. The investigation was conducted in accordance with the *Guidelines for Archaeological Investigations in Virginia* (VDHR 1996).

WALLOPS ISLAND BEACH REPLENISHMENT ARCHAEOLOGICAL SURVEY

The current Wallops Island project area spans 6.2 km (3.85 miles) of coastline of Wallops Island. The topography of the parcel was that of a flat barrier island beach and dune face that varied in width between approximately 91 meters (250 feet) and bare rock seawall. Vegetation was composed of a light scatter of marsh grasses (*sportina alterflora*, *sportina patens* and *phragmites Australis*) and beach grasses (American Beachgrass and Sea Rocket) growing along the western fringe of the beach. The beach in the central portion of the surveyed coastline (approximately 56.1 percent of the project area) was completely eroded to rock seawall (see Photo Log #2) during recent storm events, and no systematic survey was possible in this area. Beaches to the northeast and southwest of this rock seawall (see Photo Log #1 and 4) became the focus of the archaeological investigation.

Due to the flat topography and constantly shifting sediments of a beach environment, the northeast and southwest extremities of the survey area were subjected to a systematic pedestrian survey in which three archaeologists traversed transects along the existing beach from the surf line to the fringe of the marsh or seawall at 20 meters (65 feet) intervals. The position of any significant cultural resource discovered during the survey was to be plotted via a Global Positioning System (GPS) unit and photographed.

Based on previous research and evaluation on Wallops Island in the *Cultural Resource Assessment of Wallops Flight Facility* completed by URS in 2003, archaeologists were particularly interested in the possible remnants of a U.S. Coast Guard Station established in 1883 on the northern half of the island, a small civilian occupation that dated to the first half of the twentieth century along the southern beach remnant, and prehistoric shell middens. The team also targeted recent flotsam that may have been washed to the beach from previously buried shipwrecks located near the coastline of Wallops Island.

RESULTS

A total of 6.2 km (3.85 miles) of beach line was traversed during the Wallops Island archaeological survey on September 18, 2006. No significant cultural remains or archaeological sites were discovered during this evaluation. The north and south beaches were littered with modern materials thrown to shore during recent storm events. These materials included wooden pallets, portions of wooden decks, and fishing nets (see Photo Log #3). The southern portion of the beach also contained evidence of structures at the surf line and in the sea itself, including caisson foundation posts (see Photo Log #5) and weir remnants (see Photo Log #6). Although these structural features relate to the previously discussed civilian occupation of Wallops Island, they were previously noted in the *Cultural Resource Assessment of Wallops Flight Facility* completed by URS in 2003 and will not be discussed further (URS Group Inc, 2003). None of the identified features appears to be eligible for listing in the National Register of Historic Places.

CONCLUSION

After completion of the Wallops Island Beach Replenishment archaeological survey, it became clear that there were no significant cultural remains on the identified beachfront. Based upon this information, no further archaeological evaluation of this beachfront is merited or recommended.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No. 1	Date: 9/18/06

Direction Photo Taken:

Southwest

Description:

Photograph of northern beachline.

Photo No. 2	Date: 9/18/06

Direction Photo Taken:

Southwest

Description:

Photograph of Beach Erosion to Rock Seawall.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No. 3	Date: 9/18/06

Direction Photo Taken:

Description:

Deck Remnant Washed Ashore During Recent Storm Event

Photo No. 4	Date: 9/18/06

Direction Photo Taken:

Southwest

Description:

Photograph of southern beachline.

PHOTOGRAPHIC LOG

Client Name: NASA	Site Location: Wallops Flight Facility, Wallops Island, Accomack County, Virginia	Project No. 15299035

Photo No. 5	Date: 9/18/06

Direction Photo Taken:

Southeast

Description:

Caisson Foundation Post

Photo No. 6	Date: 9/18/06

Direction Photo Taken:

Southeast

Description:

Pier Remnant

COMMONWEALTH of VIRGINIA

Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.state.va.us

December 4, 2003

Mr. Mark R. Edwards
URS Group, Inc.
7101 Wisconsin Avenue, Suite 700
Bethesda, Maryland 20814-4870

RE: Draft Cultural Resource Assessment
NASA Wallops Flight Facility
Accomack County, Virginia
DHR File No. 2003-0571

Dear Mr. Edwards:

We have received the report titled "Draft Cultural Resources Assessment of NASA Wallops Flight Facility Accomack County, Virginia" for our review and comment. It is our understanding that the subject document is an effort by the National Aeronautics and Space Administration (NASA) to comply with the requirements of Section 106 and Section 110 of the National Historic Preservation Act, as amended. The study is an assessment-level investigation of the entire 6000-acre Wallops Flight Facility (WFF) located in Accomack County, Virginia. The ultimate compliance objective is to develop an Integrated Cultural Resources Management Plan (ICRMP) for the entire WFF.

1949

An inventory of WFF identified 166 buildings and structures fifty years old or older. A majority (ninety-nine) of these properties, dated to between 1936 and 1942 before the federal government purchased the land. The federal government built the remaining buildings between 1950 and 1955, an era when the government used the area as an experimental aircraft facility. The property did not become associated with NASA until 1959. The report recommends that two resources as potentially eligible for listing in the National Register of Historic Places under Criterion C for their architectural or engineering merits. These resources are the WEMA Recreational Facility (V-065)/Coast Guard station and an Observation Tower (V-070).

Administrative Services
10 Courthouse Avenue
Petersburg, VA 23803
Tel: (804) 863-1624
Fax: (804) 862-6196

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

Portsmouth Region Office
612 Court Street, 3rd Floor
Portsmouth, VA 23704
Tel: (757) 396-6707
Fax: (757) 396-6712

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

Winchester Region Office
107 N. Kent Street, Suite 203
Winchester, VA 22601
Tel: (540) 722-3427
Fax: (540) 722-7535

A review of the Section Three: Cultural Context reveals that there is insufficient research and narrative dedicated to WFF during the period prior to the federal government's ownership. Although ninety-nine of the 166 buildings inventoried dated between 1936 and 1942, there is no attempt in the study to place these in historic context. Similarly, there is little space dedicated in Section Three to the history of the National Advisory Committee for Aeronautics (NACA) and the Langley Research

Center using Wallops Island as a test site for rocket propelled models. This despite the assertion on page 2-3 that this activity "was an essential step in the nation's efforts to conduct aerodynamic research at high speeds, leading to advances in aeronautics and space science." The omission of a more detailed discussion of the NACA/Langley Research Center association with Wallops Island is particularly surprising since "launch sites are still located on the island, and are actively used today" (page 2-3). We believe that there is a need for additional research into the period extending from 1936 to 1942 and the NACA/Langley Research Center era in order to place the resources from these times into proper historic context. We, therefore, concur with the report's recommendation that NASA develop a specific historic context for WFF architecture related to the Cold War and Space Race.

The methodology used to produce the subject study concentrates too heavily on individual buildings is not sufficient to evaluate WFF as an historic district. The selection of properties that "are well-preserved or least-altered examples of certain resource types" for the windshield survey omits those resources that may not be individually eligible for the National Register but may retain enough historic integrity to be included as contributing elements of an historic district. As such, we concur with the recommendation that a more comprehensive reconnaissance level survey is necessary in order to determine if WFF has the potential to be eligible for the National Register as an historic district. We also agree that intensive level survey documentation of the most important resources is necessary in order to make a formal determination of National Register eligibility. NASA should pursue listing of those resources evaluate as eligible.

We concur that WEMA Recreational Facility (V-065)/Coast Guard station and the Observation Tower (V-070) appear to be potentially eligible for listing in the National Register for the purposes of Section 106. However, more information is required to make a formal determination of eligibility. The DHR is available to provide technical assistance to NASA if that agency decides to initiate nominating these resources to the National Register.

With regards to archaeology, we find the predictive model acceptable and believe that it is representative of the archaeological potential of WFF. We look forward to reviewing the results of testing guided by this model. We understand that, although existing construction, erosion, and site use have compromised the potential of much of the WFF, much of the area determined to be of moderate to high archaeological potential is unlikely to be disturbed by construction or site use. Any ICRMP or other planning document developed following survey of the WFF should include a framework for future protection or avoidance of these areas as well as implementation of the Section 106 process.

If you have any questions about the Section 106 process or our comments please contact me at (804) 367-2323, Ext. 114.

Sincerely,

Marc Holma, Architectural Historian
Office of Review and Compliance

COMMONWEALTH of VIRGINIA

Department of Historic Resources
2801 Kensington Avenue, Richmond, Virginia 23221

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Kathleen S. Kilpatrick
Director

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Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.state.va.us

December 8, 2004

Mr. William B. Bott
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337-5099

RE: Site-Wide Environmental Assessment
NASA Wallops Flight Facility
Accomack County, Virginia
DHR File No. 2003-0571

Dear Mr. Bott:

We have received for our review and comment the site-wide Environmental Assessment (EA) for Wallops Flight Facility (WFF), Accomack County, Virginia." The document addresses reoccurring activities and future projects a WFF.

Through Section 110 consultation with the Department of Historic Resources (DHR), the National Aeronautics and Space Administration (NASA) has identified two architectural resources at WFF that are potentially eligible for listing in the National Register of Historic Places. These resources are the Wallops Beach Lifeboat Station (DHR Survey No. 001-0027-0100; WFF #V-065) and Coast Guard Observation Tower (DHR Survey No. 001-0027-0101; WFF #070). In a November 4, 2004 letter, DHR concurred with the eligibility of these two properties, however, commented that the Coast Guard Observation Tower should be considered a contributing resource to the lifeboat station. We also concurred that there is not the potential for a historic district at WFF due to a large amount modern infill construction and a lack of historic integrity for most of the buildings and structures from the period of significance. We request that NASA consult with DHR regarding any planned activities that may affect the Wallops Beach Lifeboat Station and the Coast Guard Observation Tower.

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Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7588

Winchester Region Office
107 N. Kent Street, Suite 203
Winchester, VA 22601
Tel: (540) 722-3427
Fax: (540) 722-7595

Regarding archaeological resources we remain in concurrence with the results of the November 2003 Cultural Resources Assessment. Please continue to consult with DHR regarding any known or potential effects to the six identified archaeological sites or to those areas designated "high probability" in the predictive model for this facility.

If you have any questions about our comments please contact me at (804) 367-2323, Ext. 114.

Sincerely,

Marc Holma, Architectural Historian
Office of Review and Compliance