Comments Received from Federal Agencies

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1849 C Street, NW - MS 2462 - MIB
WASHINGTON, D.C. 20240

TAKE PRIDE IN AMERICA

April 14, 2010

In Reply Refer To:
ER 10/198

250/NEPA Manager
WFF Shoreline Restoration and Infrastructure
Protection Program
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, Virginia 23337

Re: **Draft Programmatic Environmental Impact Statement (PEIS) for the Wallops Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP)**

Dear NEPA Manager:

This letter is submitted in response to the National Aeronautics and Space Administration's (NASA) Notice of Availability of Draft Programmatic Environmental Impact Statement (DPEIS) for the Wallops Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP), published in the *Federal Register*, February 26, 2010. This letter represents the comments of the Department of Interior (Department) and its bureaus, the U.S. Fish and Wildlife Service (FWS), the National Park Service (NPS), and the U.S. Geological Survey (USGS). Our comments are provided under the authority of the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852) as amended, the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e, 48 Stat. 401) as amended, and the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712, 40 Stat. 755) as amended. The NASA has also requested formal consultation under section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended. The FWS will address section 7 consultation in separate correspondence, and endangered species comments provided herein are provided to the extent that they contribute to the evaluations under the other authorities mentioned.

FWS COMMENTS

We are concerned about the potential magnitude and duration of the effects to fish and wildlife resources and conservation lands, including cumulative effects that may result from this project. The long duration of the project, and the large amount and frequency of

potential impacts to fish and wildlife and their habitats are the primary reasons for our concern. In the context of the regional significance of the habitats around and adjacent to the project area, these effects may be significant. The benefits of this project, as expressed in the purpose and need do not appear to justify the effects that are likely to occur. The project, as proposed, is not being designed or implemented to prevent loss or damage of infrastructure, but to reduce the likelihood of damage or loss. Based on the design criteria cited, with the implementation of the proposed project, over its full lifetime, there remains nearly a 50 percent chance that the impacts to infrastructure and mission that this project is intended to protect will occur anyway as a result of a storm that exceeds design criteria.

Considering the significant cost and impact to the environment that may result, and the partial protection that will result, we recommend that NASA consider other alternatives, provide additional analysis of the effects of the evaluated alternatives, and seek to mitigate the potential effects to the maximum extent practicable. There are ample opportunities to incorporate mitigative activities into the proposed action such as timing implementation of project activities to avoid sensitive periods for fish and wildlife, working to improve habitat quality in conjunction with project features, and monitoring and adaptive management to specifically address environmental issues and minimize effects.

Based on our review of the document, we recommend revision to include additional description of the proposed action and affected analysis and additional analysis of effects to better explain the action, the environmental context, and its effects. Specific comments are provided below:

Description and Comparison of Alternatives

While the DPEIS states that the actual renourishment cycle would be determined by the magnitude and frequency of storm events and would vary throughout the 50-year life of the proposed action, all subsequent discussion references only the assumed renourishment of 616,000 m^2 of sand every five years, and nine renourishment cycles. This description does not adequately represent the range of reasonably foreseeable outcomes or provide any way to assess whether this estimate of renourishment frequency and projected fill volumes is an average estimate, or what range of variation might be appropriate to expect. Based on our experience from similar types of projects, we believe it would not be unreasonable to expect this amount to vary by 25 percent or more over the life of the project, and expressing the appropriate expectation is critical to appropriately consider the environmental impacts of the project.

Similarly, the proposed action indicates that topography and bathymetry monitoring would occur as part of the project. The description of monitoring proposed indicates the types of information that would result, but does not provide information about how monitoring results will be used to make decisions about renourishment, to evaluate environmental impacts, or to evaluate the performance or efficacy of the proposed action. We fully expect that NASA has developed an understanding of the proposed use of monitoring information, and we

recommend providing it in detail within the EIS to further provide an expectation of the outcome and NASA's future decisions regarding implementation of the project. We recommend revising the alternatives discussed to be more consistent with the implementation and intent of a programmatic EIS. There appears to be unexplained discrepancy in the level of detail provided for individual project components. For example, beach fill and sand borrow/mining activities are very loosely defined, yet the analysis only discusses a limited amount and frequency of sand placement. In these cases, there is acknowledged uncertainty about the performance of the project, the environmental factor that will affect the project performance and implementation of future renourishment. However, this makes it very difficult to foresee what types of future actions, and the limits of these future actions, may be considered analyzed within this document.

In contrast, the sand retention structures described in alternatives 2 and 3 are described in specific detail, including location, size, and material. In addition, several other configurations of these features were apparently considered and dismissed with only cursory mention in the EIS. As a result of this treatment, it appears that only the specific designs mentioned in this document could be considered analyzed. While we again understand the reason for this treatment, we do not think the combination of these different approaches lends to a full and programmatic consideration of the project and the alternatives.

The north Wallops borrow site description does not appear to adequately express the intent or extent of the proposed activity in the area and use of this material. As delineated in the DPEIS, the area is identified as 150 acres. Constraints of vegetation and wildlife are identified as limiting the extent of the area, but these constraints are not identified. The proposed area appears to include all recent nesting habitat for the federally listed threatened piping plover, nesting areas for the loggerhead sea turtle (*Caretta caretta*) and most of the other existing high-quality beach habitat on Wallops Island. These factors do not appear to be considered constraints. We recognize the reasons why it may not be appropriate to delineate or limit an area where sand may be removed, but the extent of effects to the habitats should be described, even if only in a relative sense (e.g., is removal of the entire beach habitat in that generally area under consideration, or will some portion of the beach and beach vegetation be left unaffected). Throughout the DPEIS, there are references to beneficial effects resulting from introducing sand into the long shore transport system, but these benefits are not weighed against the losses of habitat that may result from use of northern Wallops as a borrow site. We recommend revision to address these points.

Affected Environment and Environmental Consequences

The section on the affected environment does not adequately describe the environment on site or the environmental context of the project area. The DPEIS fails to adequately describe the context of the adjacent conservation lands and their significance to regional and national fish and wildlife populations. In addition to the referenced National Wildlife Refuge ownership of adjacent lands, Wallops Island lies within a network of conservation lands that constitutes the longest expanse of coastal wilderness remaining on the eastern seaboard of the United States. This region has received several designations based on its ecological

significance, including its inclusion within the Barrier Island/Lagoon System Important Bird Area (IBA). IBAs are identified by the National Audubon Society for their significance to bird conservation. Audubon's website (http://www.audubon.org/bird/iba/virginia/) describes this IBA in the following manner:

> "The Virginia Barrier Island Lagoon System includes the seaward margin of the lower Delmarva Peninsula from the mouth of the Chesapeake Bay to the Maryland-Virginia border. This location is the most important bird area in Virginia and one of the most important bird areas along the Atlantic Coast of North America. The area has been designated as a UNESCO Biosphere Reserve, a Western Hemisphere Shorebird Reserve Site with international status, is the site of a National Science Foundation Long-Term Ecological Research site, and is the focus of a multi-organizational partnership dedicated to bird conservation. The area includes the most pristine chain of barrier islands along the Atlantic Coast, maritime forests, extensive salt marshes, inter-tidal mudflats, and open water."

We believe that providing this type of context is necessary to adequately understand and consider the potential environmental effects of the project.

The DPEIS indicates that the Assateague National Seashore does not extend into Virginia. While the Virginia portion of the island is owned by The National Wildlife Refuge system, the beach in this area is still within the Assateague National Seashore.

The migratory birds identified and considered in the DPEIS do not sufficiently address or represent the species that may occur in the area or the potential effects on them. For example, the discussion of marine birds fails to mention the sea ducks, mergansers, and similar species that are closely associated with the offshore shoals in the region, including those proposed as borrow areas. As we recommended in our previous letter on this project, we encourage NASA to develop appropriate monitoring to allow assessment of the effects of dredging on these species.

The DPEIS does not sufficiently describe the effects of the project on upland wildlife species and migratory birds in particular. While the cumulative effects discussion does recognize that NASA mission-related disturbance may occur to birds occupying the beaches that are created, it does not describe or characterize the effects. While the proposed project is expected to result in a larger amount of beach habitat, the location of much of this habitat immediately adjacent to NASA facilities including launch pads, the existing UAV runway, and other infrastructure, reduces the value of this habitat, and may effectively result in the creation of an attractive nuisance by providing otherwise suitable habitat in an area where wildlife will be regularly (and potentially significantly) disturbed. In this context, it is not clear that the addition of this habitat is beneficial, except during those times when no NASA activities are under way. While a larger amount of beach may result, it is unclear whether this beach will provide suitable or equivalent beach habitat because the relatively frequent renourishment and associated activities may prevent development of normal beach communities (e.g., insect and plant species composition and abundance).

The cumulative effects section describes the impacts from onshore activities in the following manner: "The proposed SRIPP would create a beach where one currently does not exist and augment the existing beach at the northern and southern ends of Wallops Island." This description does not appear to address the potential use of the north Wallops borrow site. The potential removal of beach habitat from the northern end of Wallops Island for renourishing the southern beaches may further exacerbate the reduced habitat suitability of these beaches resulting from their proximity to disturbance because the northern Wallops beaches that will be removed are generally persistent, extensive, and relatively isolated from the more disruptive activities that NASA conducts (e.g., rocket launches and UAV flights). The proposed action will result in significant degradation or complete removal of all existing beach habitat that is protected from disturbance to create an ephemeral beach proximate to numerous disturbances. We recognize that use of the northern borrow area would help to reduce impacts to offshore borrow areas, but as we expressed in our previous letter, we believe that a thorough discussion and evaluation of these tradeoffs and the different impacts to different species and resources is needed.

We recommend providing a more detailed and comprehensive analysis of cumulative effects on all resources beyond stating that cumulative effects will occur. A cursory treatment of cumulative effects, particularly in light of the ecological significance of the region, does not provide a sufficient understanding of the type and magnitude of cumulative effects.

NPS COMMENTS

Potential Impacts on Assateague Island National Seashore

Congress established Assateague Island National Seashore (ASIS) to preserve the natural and recreational resources of Assateague Island, including the oceanic and bayside beaches that are maintained by natural coastal processes, portions of the surrounding waters of the Atlantic Ocean and Chincoteague Bay, and the living resources that depend on these aquatic and terrestrial habitats. Those living resources include sea turtles, marine mammals, shorebirds, sea birds that feed on offshore shoals, and fish[i] that use both offshore shoals and Chincoteague Bay for different life stages. The coastal processes that shape the island are controlled by regional factors, including sediment supply and sediment transport pathways, offshore and nearshore bathymetry, and wave direction, height, and energy.

ASIS is concerned about the potential impacts that the Preferred Alternative may have on the wave climate, cross-shore sediment supply, and pelagic habitat value of ASIS.

Potential Impacts to Wave Climate

The Preferred Alternative plans to dredge two shoals that are located 7 and 11 miles offshore of ASIS. Recognizing that offshore shoals dissipate incoming wave energy, and thereby help to shelter shorelines from the erosive effects of large waves, ASIS is concerned that the proposed dredging will significantly reduce the volume, height, and associated sheltering

effect of the targeted shoals and will ultimately impact shoreline conditions on Assateague Island.

We appreciate NASA's effort to model the potential impacts of shoal dredging on the wave climate and longshore transport off of Assateague Island, but we are concerned about the apparent discrepancy between the modeling results[ii] (Volume II of the Draft PEIS) and the Executive Summary of those modeling results (Table ES-1). Although the modeled Impact Factor is lower than a Minerals Management Service (MMS) threshold of 1.0, it is still higher than 0.75 along portions of the already vulnerable Assateague Island shoreline. The modeling report goes on to clarify that "it is not clear that a value for this factor of < 1 equates to a negligible long term shoreline impact." The Executive Summary, in contrast, states that "dredging of the offshore shoals would result in [...] no impact to the Assateague Island shoreline." In consideration of the largely unknown consequences of dredging the shoals, and with the recognition that our regional sediment transport pathways are poorly understood, ASIS is concerned about the potential impacts of the project on the wave climate that shapes Assateague Island's shoreline.

We recommend that the Preferred Alternative use site-specific dredging methods that protect existing geomorphologic integrity and wave sheltering properties by following two new MMS guidelines[iii]:

1. Avoid the crests[iv] of the two targeted shoals to maximize the shoals' wave attenuation function; to maintain the shallowest water wave-action processes, which are likely important for long-term shoal maintenance; and to maintain coarse-grained lag deposits in-place since these may serve to ensure crest stability by increasing resistance to wave erosion[v,vi].

2. Avoid longitudinal dredging (i.e., dredging from the entire length of the shoal, along the longer axis), which affects wave focusing processes[vii].

We also recommend that the Preferred Alternative consider the possibility that future research may identify increased impacts to the Assateague Island shoreline, so subsequent dredging for beach renourishment may need to include mitigation of shoreline impacts on Assateague Island and consideration of alternative dredging locations.

Potential Impacts to Cross-Shore Sediment Supply

We are concerned that potential dredging impacts on cross-shore sediment transport pathways were not addressed in the Draft PEIS, as we requested during the scoping process. We remain concerned that removal of such a large volume of either shoal may impact the regional sediment budget and sediment transport pathways, specifically the sediment transport from the shoal and nearshore areas to Assateague Island, to the detriment of the island's shoreline, topography, natural coastal processes, and ability to keep pace with sea level rise. Multiple mapping and modeling studies[viii,ix,x,xi,xii,xiii,xiv,xv,xvi] have indicated that cross-shore transport is an important sediment pathway linking offshore shoals, shelf, and

shorelines, on time scales ranging from years to decades, far beyond the expected depths of closure[xvii,xviii,xix]. We believe that a similar linkage may exist between southern Assateague Island and the offshore shoals proposed as dredging targets. Recognizing that cross-shore sediment transport budgets are poorly understood and quantified in the Chincoteague Inlet area, we recommend that the Preferred Alternative incorporate research efforts to clarify and quantify the cross-shore sediment transport pathways and budgets through the collection and analysis of additional geophysical and hydrodynamic data offshore of Assateague Island. The lack of information on regional cross-shore dynamics also compels us to recommend that the Preferred Alternative consider dredging sediments that are farther offshore and that are unlikely to contribute to onshore sediment transport, either as a sediment source or as a conduit for that sediment.

Because of our previously expressed concerns that the proposed dredging will reduce the sheltering effect of the shoals and increase erosion along the already vulnerable Assateague Island shoreline, we support NASA's decision to dredge no deeper than the shoal base or seafloor, because that method will confine dredging to the active portion of the seafloor, and will avoid the creation of pits which could alter physical process patterns[xx].

We recommend that the Preferred Alternative use site-specific dredging methods that minimize impacts to sediment transport processes by following new Minerals Management Service guidelines[xxi] that dredged sediment be taken from the extreme downdrift accreting side of each shoal or, secondarily, from the extreme updrift eroding side of each shoal, to minimize the risk of breaking the sediment transport pathways by interrupting sand recycling and transport patterns and processes[xxii]. In those non-crest areas, we support NASA's proposal to dredge a thin uniform layer of material from a large area, because this method is likely to cause the least disturbance to existing shoal topography and geometry and, therefore, offers the least likelihood of substantial disturbance to the physical processes that maintain the shoals[xxiii].

Potential Impacts to Pelagic Habitat Value

ASIS is concerned that the proposed dredging of shoal habitat will impact pelagic fish and birds that use both shoal areas and the oceanic and estuarine waters within the ASIS boundary. Offshore shoals are known to be populated with benthic communities[xxiv] that in turn support a complex food web for fish,[xxv] turtles, marine mammals, and pelagic seabirds. Studies offshore the Maryland and Virginia coastlines indicate that the majority of the species inhabiting the shoals and reference site habitats are seasonal residents, and suggest that pelagic fish are using habitats differently between day and night,[xxvi] such as moving between the shoal sides and the surrounding seafloor.

We support NASA's decision to avoid Blackfish Bank, which is known as a rich shoal habitat, as a dredge target. Additionally, we recommend that the Preferred Alternative use site-specific dredging methods that avoid the crests of the two targeted shoals to protect habitat value[xxvii,xxviii] for finfish, which preferentially congregate around higher-relief shoals

for a variety of reasons including geomorphology, and for pelagic seabirds such as scoters, which congregate in waters less than 30 meters deep such as those above shoal crests.

USGS COMMENTS

Page 102: The text states that saltwater intrusion is not a problem "because the salt water is not hydraulically connected to the groundwater aquifer". The PEIS would benefit from a reference or data to support the contention that the system is not connected.

Use of the Barlow (2003) reference that salt water intrusion is most often caused by pumping from coastal wells (not site specific) implies that a hydraulic connection between salt and fresh water might exist.

The Barlow (2003) reference is not included in the list of references.

Barlow, P.M., 2003, Ground water in freshwater- saltwater environments of the Atlantic coast: U.S. Geological Survey Circular 1262.

EDITORIAL COMMENTS

We also provide the following recommendations for minor edits and clarifications:

- The net sand transport direction shown in Figure 7 appears incorrect and inconsistent with discussion and photographs of groins and their function.

- We recommend additional explanation of Figure 33. The identification of plover habitat areas should be explained in the context of the several recent plover nests shown outside of that area.

- In Table 22, we recommend clarifying VDGIF's joint jurisdiction concerning federally listed species that they also identify as threatened or endangered.

- We recommend adding to the account of listed invertebrates that the northeastern beach tiger beetle is not currently known to occur on Atlantic coastal beaches in Virginia.

- We recommend removing mention of potentially planting vegetation on the beach/dunes from the discussion of mitigation unless there is a commitment to conduct the planting.

Thank you for the opportunity to review and comment on the DPEIS. If you have any questions concerning our comments, please contact Tylan Dean, Assistant Supervisor, FWS, Endangered Species and Conservation Planning Assistance, at (804) 693-6694 (x166) or at tylan_dean@fws.gov; Joe Carriero, External Affairs Program Manager, NPS Environmental

Quality Division, at (303) 987-6999 or at joe_carriero@nps.gov; Gary LeCain, USGS Coordinator for Environmental Document Reviews, at (303) 236-5050 (x229) or at gdlecain@usgs.gov or Shawn Alam, of my staff, Office of Environmental Policy and Compliance, at (202) 208-5465 or shawn_alam@ios.doi.gov. We appreciate the opportunity to provide these comments.

Sincerely,

Willie Taylor
Director, Office of Environmental
Policy and Compliance

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[i] Vasslides, J.M. and K.W. Able, 2008. "Importance of shoreface sand ridges as habitat for fishes off the northeast coast of the United States." *Fishery Bulletin* 106(1), pp. 93-107.

[ii] King, D., D. Ward, G. Williams, and M. Hudgins, 2010. "Storm Damage Reduction Project Design for Wallops Island, Virginia." In: Draft Programmatic Environmental Impact Statement Wallops Flight Facility Shoreline Restoration and Infrastructure Protection Program Volume II of II. NASA, Wallops Island, Virginia.

[iii] Dibajnia, M. and R.B. Nairn, in prep. Investigation of Dredging Guidelines to Maintain and Protect the Integrity of Offshore Ridge and Shoal Regimes. U.S. Department of the Interior, Minerals Management Service, XXX OCS Region, 2010. OCS Study MMS 2010-XXX. 150 pp. and appendices.

[iv] Dibajnia, M. and R.B. Nairn, in prep.

[v] U.S. Army Corps of Engineers Baltimore District, 2008.

[vi] U.S. Army Corps of Engineers, 1998. "Appendix D Restoration of Assateague Island." In: Ocean City, Maryland, and Vicinity Water Resources Study Final Integrated Feasibility Report and Environmental Impact Statement. Baltimore, Maryland.

[vii] Dibajnia, M. and R.B. Nairn, in prep.

[viii] Wright, L.D., J.D. Boon, S.C. Kim, and J.H. List, 1991. "Modes of cross-shore sediment transport on the shoreface of the Middle Atlantic Bight." *Marine Geology* 96, pp. 19–51.

[ix] Thieler, E.R., A.L. Brill, W.J. Cleary, C.H. Hobbs III, and R.A. Gammisch,1995. "Geology of the Wrightsville Beach, North Carolina shoreface: Implications for the concept of shoreface profile of equilibrium." *Marine Geology* 126, pp. 271-287.

[x] Schwab, W.C., E.R. Thieler, J.F. Denny, and W.W. Danforth, 2000. Seafloor Sediment Distribution Off Southern Long Island, New York: U.S. Geological Survey Open-File Report 00-243.

[xi] Schwab, W.C., E.R. Thieler, J.R. Allen, D.S. Foster, B.A. Swift, and J.F. Denny, 2000. "Influence of inner-continental shelf geologic framework on the evolution and behavior of the barrier-island system between Fire Island Inlet and Shinnecock Inlet, Long Island, New York." *Journal of Coastal Research* 16(2) pp. 408-422.

[xii] Hayes, M.O., and R.B. Nairn, 2004. "Natural Maintenance of Sand Ridges and Linear Shoals on the U.S. Gulf and Atlantic Continental Shelves and the Potential Impacts of Dredging." *Journal of Coastal Research* 20(1), pp. 138-148.

[xiii] Hinton, C.L., and R.J. Nicholls, 2007. Shoreface morphodynamics along the Holland coast. In: Balson, P.S. and Collins, M.B. (eds.), Coastal and Shelf Sediment Transport. London: Geological Society
of London Special Publications 274, pp. 91–101.

[xiv] Lentz, E.E., C.J. Hapke, and W.C. Schwab, 2008. A Review of Sediment Budget Estimations at Fire Island National Seashore, New York. Technical Report NPS/NER/NRTR—2008/114. National Park Service. Boston, MA.

[xv] Park, J., P.T. Gayes, and J.T. Wells, 2009. "Monitoring beach renourishment along the sediment-starved shoreline of the Grand Strand, South Carolina." *Journal of Coastal Research*, 25(2), 336–349.

[xvi] Hapke, C.J., E.E. Lentz, P.T. Gayes, C.A. MCCoy, R. Hehre, W.C. Schwab, and S.J. Williams, in press. " A Review of Sediment Budget Imbalances along Fire Island, New York: Can Nearshore Geologic Framework and Patterns of Shoreline Change Explain the Deficit?" *Journal of Coastal Research.*

[xvii] Wright, L.D., J.D. Boon, S.C. Kim, and J.H. List, 1991.

[xviii] Thieler, E.R., A.L. Brill, W.J. Cleary, C.H. Hobbs III, and R.A. Gammisch,1995.

[xix] Hinton, C.L. and R.J. Nicholls, 2007.

[xx] U.S. Army Corps of Engineers Baltimore District, 2008. "Section 5 Development of a Borrow Plan." In: Atlantic Coast of Maryland Shoreline Protection Project Final Supplemental Environmental Impact Statement General Reevaluation Study: Borrow Sources for 2010 – 2044. Baltimore, MD.

[xxi] Dibajnia, M. and R.B. Nairn, in prep.

[xxii] U.S. Army Corps of Engineers Baltimore District, 2008.

[xxiii] U.S. Army Corps of Engineers Baltimore District, 2008.

[xxiv] Diaz, R.J., G.R. Cutter Jr., and C.H. Hobbs III, 2004. "Potential impacts of sand mining offshore of Maryland and Delaware: Part 2—biological considerations." *Journal of Coastal Research*, 20(1), pp. 61–69.

[xxv] Vasslides, J.M. and K.W. Able, 2008.

[xxvi] Slacum, H.W. Jr., E. Weber, W.H. Burton, R. Llansó, J. Vølstad, D. Wong, and J. Dew, 2006. Comparisons between Marine Communities Residing on Sand Shoals and Uniform-Bottom Substrates in the Mid-Atlantic Bight. Minerals Management Service OCS Study MMS 2005-042, 151 p. Available online: http://www.mms.gov/SandAndGravel/PDF/MMS2005-042/MMS2005-042FinalReport.pdf.

[xxvii] U.S. Army Corps of Engineers Baltimore District, 2008.

[xxviii] U.S. Army Corps of Engineers,1998. "Appendix D Restoration of Assateague Island." In: Ocean City, Maryland, and Vicinity Water Resources Study Final Integrated Feasibility Report and Environmental Impact Statement. Baltimore, Maryland.

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

April 19, 2010

Joshua Bundick
WFF NEPA Manager
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Re: Draft Programmatic Environmental Impact Statement (DPEIS), Wallops Flight Facility Shoreline Restoration and Infrastructure Protection Project, Wallops Island, Virginia, February 2010

Dear Mr. Bundick:

In accordance with the National Environmental Policy Act (NEPA) of 1969, Section 309 of the Clean Air Act and the Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1509), the U.S. Environmental Protection Agency (EPA) has reviewed the Draft Programmatic Environmental Impact Statement (DPEIS) for the Wallops Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Project (SRIPP). The proposed action involves the extension of the existing seawall and the placement of dredged sand on 3.7 miles of the Wallops Island Shoreline. Based on our review of the DPEIS, EPA has rated the environmental impacts of the preferred alternative as "EC" (Environmental Concerns) and the adequacy of the impact statement as "2" (Insufficient Information). The basis for this rating is contained in the remainder of this letter. A description of our rating system can be found at: www.epa.gov/compliance/nepa/comments/ratings.html.

The purpose and need of the proposed action is to reduce the potential for damage to, or loss of, NASA, U.S. Navy, and Mid-Altantic Regional Spaceport (MARS) assets on Wallops Island from wave impacts associated with storm events. WFF located at Wallops Island is the only research range in the US that is controlled solely by NASA. Over fifty buildings are located on Wallops Island, including runways, sounding rocket launch pads and various support facilities. These assets are valued at over $1 billion. NASA plans to protect existing and possible future infrastructure located on the barrier island by augmenting the shoreline with additional sand from offshore shoals and extending the seawall over a 50 year project lifespan.

The DEIS examines four alternatives for the SRIPP. They are: the No-Action Alternative, in which no beach fill would continue current conditions; Alternative One (the Preferred Alternative), which would extend the seawall up to 1,400m and place 3.199 million yd^3 of dredged sand over 3.7 miles of shoreline; Alternative Two, which would extend the seawall up

to 1,400m, place 2.916 million yd^3 of dredged sand over 3.7 miles of shoreline, and the construct a terminal groin; and Alternative Three, which would extend the seawall up to 1,400m, place 2.839 million cy^3 of dredged sand over 3.7miles of shoreline, and construct an offshore breakwater. Alternative One has been selected as the preferred alternative. We have rated Alternative One, the Preferred Alternative, as "EC-2" (Environmental Concerns, Insufficient Information). Alternatives other than the preferred are not rated by the EPA, but would likely to be considered to have higher potential environmental impact to adjoining barrier islands. Additional details on adverse impacts to aquatic resources, cultural resources, threatened and endangered species are needed to determine the full scale of potential impact.

The immediate actions in the preferred alternative lack the construction of hard structures; however, future replenishment cycles may include hard structures such as ones discussed in alternatives two and three. Since specific detail on future actions were not fully addressed in the DPEIS, specific information on the possible adverse impacts is unavailable. EPA is concerned about the unknown effects of future renourishment cycles. Future NEPA documentation for additional phases of the SRIPP may likely warrant the preparation of Environmental Impact Statements. EPA encourages NASA to continue to receive input from interagency teams and continue public involvement in the NEPA process. EPA looks forward to work with NASA as the life of the SRIPP continues.

EPA is concerned that sand borrow and placement operations will have adverse affects on the shoal and beach habitats, wildlife, and other environmental resources. Additional information is also needed to clarify monitoring and mitigation plans. EPA believes the DPEIS does not adequately provide analysis of secondary and cumulative effects of past, current and foreseeable future activities on the barrier island habitat and resources. Comments specific to the DPEIS can be found in an attachment to this letter. EPA cannot adequately assess the effects of the proposed undertaking on cultural resources since the location(s) of the pump-out station(s) has not been identified by WFF; detailed comments are included in the attachment. A review of Environmental Justice (EJ) portion of the document was completed by EPA's Regional Environmental Justice Coordinator, and comments provided in the enclosed attachment

Please consider the issues, questions and comments included in this letter and attachment. We would appreciate the opportunity to discuss the comments at your convenience. Thank you for allowing EPA with the opportunity to review and comment on the DPEIS. If you have questions regarding these comments, the contact for this project is Ms. Barbara Rudnick, NEPA Team Leader, at (215) 814-3322 or rudnick.barbara@epa.gov.

Sincerely,

Jeffrey D. Lapp, Associate Director
Office of Environmental Programs

Attachment

Detailed Comments

Purpose and Need & Alternatives

- The relocation of at risk infrastructure was not carried forward for detailed analysis. Explain why a relocation of pad and support facilities would need to maintain the same general size and layout of the current facilities. Are other configurations possible that may allow some or the entire infrastructure to be relocated? Has the acquisition of additional property been investigated to add to the NASA controlled buffer, which may enable additional Wallops Island infrastructure to be move onto the Mainland or Main Base?

- If facilities are not going to be relocated further on inland, EPA would recommend that further investment into future infrastructure on Wallops Island be avoided. The barrier island is a dynamic and unstable system that is very vulnerable to sea-level rise and intense storms. It may be prudent to consider this dynamic nature when looking at future development projects.

- Clarify what level of storm protection has been determined and why this specific level is necessary.

- All of the alternatives presented in the DPEIS include the extension of the existing seawall by 1400 meters, yet no discussion for why this extension is needed was included. Please explain why the seawall needs to be extended beyond its existing length and what infrastructure it is intending to protect, include existing and future projects. Clarify what is meant by 'critical infrastructure.'

- Please provide more information on rationale for eliminating options during secondary screening, particularly the use of reduced beach fill. Clarify why this alternative was eliminated, the level of storm protection it would provide and how that relates to the purpose and need of the project.

- Page 64 states that if year two or three funding is pulled "the completed portions of the project would be viable projects themselves and wouldn't have negative shoreline consequences." If seawall only and seawall and partial beach fill are considered to be viable, they should both be considered as alternatives for the proposed action. Additionally, funding for the replenishment cycles should be discussed, as well as possibilities for funding not being secured for future cycles.

- Shoal B was eliminated from consideration for use during the initial beach fill for cost purposes. The environmental effects of sand borrow operations on both shoals should be evaluated prior to eliminating this option. It is not clear which shoal would be environmentally preferable for use in this project. The use of shoal A would require a greater percentage of total volume and total surface area, compared to shoal B. What analysis has been conducted to determine the ability of shoals to rebound after dredging?

Environmental Impacts

Wildlife, Endangered Sp cies and Cumulative Effects

- EPA is concerned about the potential use of North Wallops Island as a potential borrow area for future nourishment cycles. This area is known piping plover habitat, a federally listed endangered species. Recirculation activities may have an adverse effect on plover habitat and actions should be consulted with FWS. Page 203 of the document states that "short-term adverse impacts to shoreline in the period of a few months to years after excavation activities" would occur. Include a discussion of North Wallops recovery time, the relationship to plover habitat. Additional information on monitoring is needed.

- Of further concern is the possibility of expanding plover habitat resulting from initial beach fill. Future nourishment activities may result in the disruption of newly created plover habitat. The proposed activity may also result in the development of SAV beds in the project area. These resources should be monitored for and protected.

- Page 255 says that a NMFS-approved observer will be present on board the dredging vessel during certain times of year. The role of the observer on the vessel needs further clarification.

- For adverse affects on wildlife and endangered species, a detailed monitoring and mitigation plan is needed. EPA encourages NASA to coordinate with FWS to develop and approve this plan. Additional coordination with FWS and NMFS for potential impacts to birds, threatened and endangered species, and essential fish habitat. Impacts to state listed species should be coordinated with appropriate state agencies.

- It is suggested that a secondary and cumulative effects analysis begin with defining the geographic and temporal limits of the study; this is generally broader than the study area of the project. Geographic boundaries are typically shown on a map; and a historic baseline is often set at a major event changing the local environment. In the case of WFF, this could be the start of the facility in the 1940's. Analysis of the trend of the value and quantity of the resources of interest should be developed and considered as part of cumulative impacts.

- The secondary and cumulative effects analysis should provide the documentation of consultation and coordination with agencies holding expertise. For instance, consultation on marine bathymetry and sand shoal resources should be added to support conclusions. Conclusion on assessment of impacts to turtles should not be presented until consultation with National Marine Fisheries and Fish and Wildlife Service has been finalized.

- The DPEIS does not provide a complete evaluation of activities that are expected to occur within the project timeframe, most notably the proposed cycling of sand. It would benefit the document to evaluate sand replenishment projects (including other replenishment projects, structures, etc.) on the barrier island complex as a whole. A discussion of potential impacts

of the follow-up actions to the preferred alternative would be appropriate in the cumulative impacts analysis. The conclusion that WFF projects may contribute, but would not be significant impact to endangered species has not supported; for instance, appropriate studies recommended by Fish and Wildlife Service for bird and bat impacts from the proposed turbines has not been completed.

Offshore Shoals

- The proposed dredge removal method involves contour and plane dredging. What other methods were considered and which method will allow the greatest recovery of the shoal? What is the expected recovery time for shoal A based on the proposed borrow operations? Include recommendations made by resource agencies with this expertise.

- Provide a map showing proposed mined areas. Proposed borrow areas within the shoals should be delineated.

- If a sand management plan has been prepared for the proposed action, please include it in the Final PEIS. EPA recommends that a sand management plan be prepared if it has not been done already. What are the monitoring efforts for shoals? How will erosional hotspots be identified?

- Clearly present the sand grain sizes that exist at Wallops, and how this compares to grain sizes found in both shoals A & B. What grain size has been determined to be ideal for this beach nourishment project?

Other

- A 25% loss rate of material during sand dredge and placement operations is predicted for this project, which results in 2-3 million yd^3 of additional fill generated over the lifetime of the project. Please provide information supporting the use of this loss rate and what measures will be taken to reduce amounts of sand lost. Discuss any possible impacts that could result from these losses.

- Please discuss facility adaptation and the air emissions of the proposed action with respect to WFF as a whole, such as is directed by CEQ draft NEPA guidance (2010) on Considerations of the Effects of Climate Change and Greenhouse Gas Emissions.

- Existing underwater noise conditions have not been evaluated. Noise monitoring was last conducted in 1992. However, since that time conditions on the island have changed and operations have expanded. EPA recommends updating the 1992 study of baseline noise conditions at WFF.

- The DPEIS showed possible locations for MEC on WFF. Have potential shoal borrow areas been examined for possible MECs? Are any other hazardous materials beyond MECs found

in the project area or on Wallops Island? Please identify any active or past hazardous sites, CERLA or RCRA, that are known at WFF. An analysis should be conducted to determine if any of these areas have an adverse environmental effect with respect to the proposed action, as well as an MEC avoidance plan. Figure 29 presents MEC locations at WFF, which appear to cover a significant portion of the study area. Please explain how it is that MECs are not anticipated to be encountered.

- It is not clear how the proposed groin and breakwater structures will impact sand transport and effect neighboring barrier islands. What analysis has been conducted to determine these effects?

Cultural Resources

- Page 177 states, "In a letter dated December 4, 2003, the Virginia Department of Historic Resources (VDHR) concurred with the recommendations of the CRA and VDHR accepted the predictive model for archaeology at WFF, noting that many of the areas with moderate to high archaeological potential are unlikely to be disturbed by future construction or site use." A copy of the letter dated December 4, 2003 from VDHR should be included in the Appendix. It would also be beneficial to include the *Cultural Resources Assessment for Wallops Flight Facility* in the Appendix of the FEIS to understand VDHR determination concluding that future construction or site use would not disturb potential archaeological areas without knowing the type of project work that could result in the future.

- Page 177 states, "In anticipation of the need for shoreline restoration measures, NASA conducted a pedestrian survey of 6.2 km (3.85 mi) of beach/coastline on Wallops Island on September 18, 2006 (Appendix C)." Please note that the pedestrian survey referenced is not included in Appendix C.

- Page 183, "Since the 2004 report, no additional identification and evaluation of above-ground historic properties has been conducted at WFF." Considering the magnitude of the proposed project and other projects planned for WFF, it would be prudent to update the survey during the planning and environmental analysis phase of the proposed action to consider and evaluate all resources that may have the potential to be impacted. Since the location(s) of the pump-out station(s) has not been identified by WFF, this information would be useful in avoiding sites that may affect a resource.

- Page 185 states, "The archaeological predictive model presented in the CRA identified the potential to encounter pre-historic and historic sites on WFF (which was approved by VDHR in a letter dated December 3, 2003), including the Atlantic coast shoreline and near shore waters." A copy of the letter from VDHR should be provided in the Appendix. Also, it is assumed that the letter referenced on page 177 and on page 185 from VDHR is one in the same; however, the date quoted is not the same (December 3 versus December 4). Please correct this discrepancy. Again, it would be helpful to include the *Cultural Resources Assessment for Wallops Flight Facility* in the Appendix of the FEIS.

- Page 269 states, "Underwater actions, which include dredging within Unnamed Shoal A or Unnamed Shoal B, pump-out operations in the nearshore environment east of Wallops Island, and the construction of a groin or breakwater, would only affect archaeological resources." Please give more detail as to the archaeological resources that would be impacted. "The location(s) of the pump-out station(s) has not been identified by WFF." Please indicate the possible number of pump-out stations that may be needed and identify potential locations for the pump-out stations. "Additional Section 106 consultation would be required for the area(s) around the pump-out station(s) once the location(s) has been identified." It is recommended that the VDHR be consulted early and throughout the planning effort of determining pump-out station locations.

Environmental Justice Comments

- The EJ assessment should assure the protection and appropriate level of consideration for the potential adverse impacts that may have an effect on minority and low income populations living in the area near the site. The document should identify where such populations are located, and what potential impacts may occur.

- A definition of a minority community can be found on page 186 of the DPEIS. An exact definition of what constitutes a minority has not been released by EPA or the EJ Coordinators, this definition is inaccurate. We recommend, along with the removal of this statement, that minority and low income populations be compared to state and local demographics, defining minority and low income populations in relation to the state, county or local averages. More comprehensive demographic information regarding the minority and low-income populations of each community should be supplied along with maps highlighting the localization of those communities in relation to the site and any and all work that will be conducted.

- Please describe the efforts to ensure the protection of minority and low-income populations. Describe which communities were identified as potential EJ concern and how these populations are being involved through outreach in the decision making process.

- Residential displacements are not the only concern that should have been taken into consideration for potential EJ issues. Describe what other types of impacts were considered and include them in the DEIS. Potential concerns that were not included may be noise, air and water quality issues, changes in employment opportunities, and subsistence fishing impacts.

Please note that the April 19, 2010 correspondence from the National Marine Fisheries Service regarding Essential Fish Habitat is provided in Appendix K.

From: Cole, Robert H NAO [Robert.H.Cole@usace.army.mil]
Sent: Monday, April 05, 2010 3:39 PM
To: Bundick, Joshua A. (WFF-2500); Silbert, Shari A. (WFF-200.C)[EG&G, Inc. (WICC)]
Cc: Cotnoir, Audrey L NAO
Subject: NASA DEIS and EAs

Josh/Shari,

I have reviewed the DEIS for the SRIPP and the Alternative Energy EA. The cumulative impacts section lacks sufficient information and detail. Cumulative Impacts assessments should begin when NASA began using Wallops Island and needs to include, not only NASA's impacts, but Navy and any other tenant that has done work on the island, such as the Napalm testing that was accomplished on the Island.

Barrier Islands are dynamic and migrate naturally. Because of the cumulative impacts on Wallops Island a shoreline hardening project is now required to protect the resources that are now located on the Island. The impacts associated with the construction and uses of those resources need to be addressed in the cumulative impacts section of the EA. For example: the Draft EIS does not include the cumulative impacts of conversion of land use by construction of buildings and pavement resulting in an increase in impervious area and mitigation for increased stormwater runoff resulting from the conversion. The Navy has constructed a few large buildings on the Island for training. Those structures have created a significant amount of impervious land, and restricted the use of a large portion of the ocean. However these impacts are detailed in cumulative impacts section of the Draft EIS. According to a NASA representative, these impacts have resulted in the proposal to place wind turbines in a less than optimal location (tide marsh with decreased wind resources).

I am not familiar with all of the past activities; however the Cumulative Impacts section must address all impacts, past, present, and for the foreseeable future. Future expansion is being planned that is not addressed by the EIS. For Example: NASA is proposing to install an electrical loop on the southern end of the island to facilitate future development. The proposed shoreline stabilization project will protect this area; therefore the proposed expansion must somehow be addressed by the Cumulative Impacts portion of the EIS.

In conclusion, the Draft EIS needs to address cumulative impacts in more detail to pass 404(b) requirements.

Robert Cole
Environmental Scientist
Norfolk District Corps of Engineers
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757-787-7567

Comments Received from State Agencies

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage

217 Governor Street

Richmond, Virginia 23219-2010

(804) 786-7951 FAX (804) 371-2674

March 19, 2010

Mr. Joshua, Bundick
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Re: Wallops Island Flight Facility Shoreline Restoration and Infrastructure Protection Program

Dear Mr. Bundick:

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

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

Piping Plover	Charadrius melodus	G3/S2B, S1N/LT/LT

The Piping Plover inhabits coastal areas, utilizing the flat, sandy beaches of barrier islands for breeding (Cross, 1991). Threats to this species include predation of eggs and young and the development and disturbance of barrier island breeding sites (Cross, 1991). Please note that this species is listed as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

Additionally the site is also within the North Assawoman; South Wallops Island Conservation Site. The North Assawoman; South Wallops Island Conservation Site has been given a biodiversity significance

ranking of B2, which represents a site of very high significance. The natural heritage resources of concern at this site are:

Piping Plover	Charadrius melodus	G3/S2B, S1N/LT/LT
Least Tern	Sterna antillarum	G4/S2B/NL/SC
Wilson's Plover	Charadrius wilsonia	G5/S1B/NL/LE

Wilson's Plover is a rare, short-term summer visitor along the lower Chesapeake Bay and the Atlantic Coast south of Cape Henry. The summer males have a thick black bill and a white breast with a single band while the females, young, and winter males are grayish brown to reddish brown (Bergstrom, 1991).

Wilson's Plover habitat consists of the upper portions of sandy beaches on barrier islands, usually within 30 m of dune vegetation. Requirements for nesting include suitable foraging sites nearby for chicks, usually mud or sand flats. Predatory threats include foxes, herring gulls, great black gulls, and fish crows who eat the eggs and young. Nesting habitats are lost to both natural processes such as erosion and coastal development, as well as human disturbance during the nesting season. Since the eggs are a pale tan or buff with irregular black specks, they blend easily into the sand which allows for them to be overlooked by unsuspecting beach visitors who crush them. Recommendations for protecting these birds consist of predator control measures involving protection from predators for nests and discouraging development on the nesting islands. Wilson's Plover is protected under the Migratory Bird Treaty Act (Bergstrom, 1991).

The Least Tern nests on broad, flat beaches with minimal vegetation and forages in saltwater near the shore. Threats to this species include loss of nesting habitat due to development and disturbance of breeding colonies by human activities and high numbers of predators (Beck, 1991). Please note that the Least Tern is listed as a special concern species by the Virginia Department of Game and Inland Fisheries (VDGIF).
Due to the legal status of the Piping Plover and Wilson's Plover,DCR recommends coordination with the VDGIF and USFWS to ensure compliance with protected species legislation. DCR also recommends the protection of rare bird habitat (Least tern, Wilson's plover, and Piping plover) during the nesting season from April 15th to August 15th. Additionally, the source for beach nourishment should be limited to the sand shoals (Unnamed Shoal A or Unnamed Shoal B) located offshore in Federal waters and not from the Piping plover habitat on the north end of Wallops Island. Please note, DCR continues to be concerned in regards to the effects of the shoreline hardening on the islands downdrift of the project area including The Nature Conservancy and DCR properties.

Alternative One (Preferred Alternative) would be DCR's preferred alternative provided sand is not taken from the beach on the north end of Wallops Island and the proposed seawall extension is limited to the minimum length absolutely necessary for the protection of the facility. The absence of groin or breakwater for this alternative makes it less likely to disrupt sand transport for resources located to the south of the project area. DCR continues to recommend exploring the feasibility of inland relocation of existing facilities.

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

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

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

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

Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF
Tylan Dean, USFWS

Literature Cited:

Bergstrom, P.W. 1991. Wilson's Plover. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp.502-503.

Beck, R. A. 1991. Least Tern. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp. 505-506.

Cross, R.R. 1991. Piping Plover. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia. pp. 501-502.

U.S. Fish and Wildlife, Northern Florida Office. Loggerhead sea turtle. Decemeber 29, 2005. http://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/loggerhead-sea-turtle.htm

Please note that the April 14, 2010 correspondence from the Virginia Department of Environmental Quality regarding consistency with the Virginia Coastal Zone Management Program is provided in Appendix I.

COMMONWEALTH of VIRGINIA

Douglas W. Domenech
Secretary of Natural Resources

Department of Game and Inland Fisheries

Robert W. Duncan
Executive Director

April 19, 2010

Mr. Joshua A. Bundick
Wallops Flight Facility NEPA Program Manager
c/o National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

RE: Draft PEIS – NASA Wallops Flight Facility SRIPP
ESSLog # 23888

Dear Mr. Bundick:

We have reviewed the Draft Programmatic Environmental Impact Statement (draft PEIS) for the Wallops Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP) that proposes three alternative projects to restore the shoreline along Wallops Island for the purpose of securing the flight facility's infrastructure. During scoping for the PEIS, we provided our comments and recommendations to NASA via the letter which has been enclosed for your reference. The Virginia Department of Game and Inland Fisheries (VDGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises full law enforcement and regulatory jurisdiction over those resources, inclusive of State or Federally *Endangered* or *Threatened* species, but excluding listed insects. We are a consulting agency under the U. S. Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et *seq.*), and we provide environmental analysis of projects or permit applications coordinated through the Virginia Department of Environmental Quality, the Virginia Marine Resources Commission, the Virginia Department of Transportation, the U. S. Army Corps of Engineers, and other state or federal agencies. Our role in these procedures is to determine likely impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce, or compensate for those impacts.

Shoreline stabilization efforts have been ongoing at Wallops Island since the 1940's and yet the island continues to experience shoreline retreat; thus placing the increasing number of expensive

assets on the beach at risk. Oertel *et al.* (2008) refers to the area between the southern end of Assateague Island to the north tip of Parramore Island as the Chincoteague Bight and proposes that the extremely rapid retreat of the barrier islands within this major offset along the barrier island chain is due to natural processes driven by topographic features that existed during previous ice ages. Moreover, the "Storm Damage Reduction Project Design" study (Appendix A) suggests the growing cape of Fishing Point, located at the southern end of Assateague Island, is capturing sand that would otherwise be available to the neighboring islands to the south; a further indication that much of Wallops Island will continue to retreat, thereby necessitating continual and costly efforts to slow natural movement of the island over the long term. In light of this information, we caution that the shoreline along Wallops Island is likely to continue to shift under natural conditions and that attempts to delay or alter these natural fluctuations in shoreline may be futile over the long term.

Currently, management of Virginia's barrier island chain is minimal and basically allows nature to take its course. This management scheme has proven, over time, to benefit the fish and wildlife that inhabit these areas. All of the alternatives presented in the draft PEIS directly counter this management scheme. Based on this and the scope and location of the activities proposed to stabilize the shoreline at WFF, we cannot fully support any of the alternatives presented in the draft PEIS as they are all likely to result in adverse impacts upon wildlife under our jurisdiction and/or impact the resources upon which they depend (as described in the attached letter). Of the alternatives presented in the draft PEIS, however, VDGIF agrees with the decision to designate Alternative 1 as the Preferred Alternative since it no longer includes installation of a permeable groin, which would reduce the southerly longshore transport of sand thereby adversely affecting the islands south of Wallops. We continue, though, to have concerns about several aspects of the activities proposed in the Preferred Alternative. We offer the following comments and recommendations about the three alternatives presented in the draft PEIS.

Alternative 1 (Preferred Alternative): Full Beach Fill, Seawall Extension

Alternative 1, the Preferred Alternative, proposes to, during the initial construction phase, extend Wallops Island's existing rock seawall a maximum of 1,400 meters south of its currently existing southernmost point. We are concerned that extension and increase in height of the existing seawall will prevent natural island overwash processes from occurring over a large area of the island. As mentioned in the draft PEIS (chapter 4, page 195, third paragraph), this would likely result in a greater loss of surface area on the landward side of the seawall and enhance island narrowing with the rise of sea level. Over the long term (i.e., beyond the 50-year life span of the project), a reduction in land mass may seriously affect the island's natural function as the first line of protection against storm surge and other weather-related events for the marshes and mainland that lie west of the island. Moreover, it will reduce the island's value to beach and marsh-dependent wildlife through loss of beach seaward of the seawall if renourishment efforts are not be able to keep up with beach fill erosion rates, and the loss of marshes behind the island should significant island narrowing occur. Lastly, the results from the models presented in Appendix A of the draft PEIS suggest that seawall extension will have less of an impact on Assawoman Island's shoreline over the long term than the current changes in shoreline incurred by yearly variation in wave climate and storms. The draft PEIS goes on to say that any negative

impacts from the seawall would be mitigated following beach fill placement, implying that without renourishment negative impacts are possible. We recommend further explanation of possible adverse impacts resulting from any of the proposed activities and how such impacts may be mitigated.

Because of these and other potential impacts this project may have on wildlife resources beyond the project area, we requested that the PEIS present a threshold at which WFF considers the environmental cost of the project to outweigh the benefits to its mission and goals as detailed in the attached letter. We recommend that the cost/benefit analysis not only examine monetary costs, but also take into account costs to fish and wildlife resources, physical integrity of the barrier island chain, and other stakeholder interests. We also requested that the PEIS include a discussion on the availability of funding for continuous beach renourishment since it is being presented as a key element to the project's success. We do not believe that either request was adequately addressed, making it far more difficult to assess the project's risk to the broader environment over the lifetime of the project.

The project's predicted success is the main theme presented throughout the draft PEIS. What it does not include is a plan of action should SRIPP fail within the project's lifetime (i.e., it does not adequately protect the physical assets on the beach and/or it significantly interrupts the natural geologic processes on the islands to the south of the project area). According to the draft PEIS, the project's success is highly dependent on regular beach renourishment, which is expensive and its required frequency unpredictable. The PEIS did not explain what actions would be taken should future funding for renourishment activities be significantly reduced or withdrawn and/or should the availability of beach compatible sand from offshore sources become depleted. Without adequate renourishment, the seawall would serve as the last line of defense against storms; a strategy that has been recently tried and failed on Wallops Island. We recommend that a contingency plan that details the steps to be taken if the proposed project fails be developed and provided to us for review so that we may better understand the long term environmental impacts of the proposed project.

The Preferred Alternative also proposes placing sand dredged from offshore federal waters along a 6-kilometer stretch of shoreline 460 meters north of the Wallops-Assawoman Island property boundary. Sand for initial fill will be dredged from Unnamed Shoal A, a portion of the renourishment fill volumes would be excavated from the north Wallops Island borrow site, and the remaining portion would be dredged from either Unnamed Shoal A or Unnamed Shoal B. We are strongly opposed to using the north end of Wallops Island as a borrow site for beach fill during renourishment cycles. In 2009, four pairs of federally-threatened Piping Plovers nested in the area proposed for sand excavation. Collectively they fledged 10 young, which resulted in the highest reported fledge rate in Virginia last year, clearly indicating this portion of the island provides suitable habitat for the species.

The total potential area for sand excavation at the north end of Wallops Island encompasses 150 acres and the proposed excavation depth is 1 meter. The draft PEIS states that the area proposed for excavation was developed in consideration of "wildlife habitat constraints", but this is not further explained. We recommend a detailed explanation of what wildlife habitats at this end of

the island are being avoided during excavation. While only a portion of the proposed area will be excavated during each renourishment cycle, this will likely result in direct loss of an appreciable amount of nesting habitat for Piping Plovers, state-threatened Wilson's Plovers, and other avian beach nesting species, many of which have been identified as Species of Greatest Conservation Need (SGCN) in Virginia's Wildlife Action Plan (VDGIF 2005). Sand excavation activities also result in loss of nesting habitat for Diamondback Terrapins, a Tier II SGCN, as well as for federally-threatened Loggerhead Sea Turtles (it should be noted that the Northwest Atlantic Loggerhead population, whose range includes Virginia, is currently being proposed as an endangered Distinct Population Segment (FR 2010)). Although this loss may not be permanent as indicated by the north end's current accretion rates, the excavated areas will likely remain unsuitable for beach nesting species until they build back up to their original elevations. The draft PEIS predicts the recovery period may range from a few months to a few years following excavation activities (page 203, last paragraph). It appears the draft PEIS did not consider the possibility that excavated sites may not have the opportunity to fully recover because the 1 meter reduction in elevation will allow a greater volume of water to come ashore, which may hinder sand deposition through frequent flooding and scouring of artificially created low areas on the beach. Even if excavated areas on the north end are able to recover within several years, it is possible that adequate recovery time will not be provided if renourishment occurs every two – three years rather than every five years as currently predicted. We recommend consideration of the actual recovery time and analysis of the sustainability of beaches at the north end of Wallops Island.

The draft PEIS does not include any measurement of the density, abundance or species composition of benthic invertebrates in the proposed sand excavation area. The draft PEIS also does not address the potential effects sand removal to a depth of 1 meter will have on the benthic community and the species that forage on these organisms, such as Piping Plovers, Red Knots, a candidate species for federal listing (in recent years, up to 25% of the Virginia's weekly Red Knot population occurred on Wallops Island during spring migration;Watts and Truitt, unpubl. data), and other migrant and breeding shorebirds. These omissions in analysis of environmental consequences represent a serious oversight and a discussion of such analysis should be included in future iterations of the document. The draft PEIS does briefly discuss biological impacts to the benthic community from beach fill deposition (chapter 4, page 242 – 243), which may last as long as eight months or more (Bishop *et al.* 2006). We believe the combination of sand excavation on the north end and beach renourishment activities to the south may substantially reduce the benthic invertebrate prey base at Wallops Island for prolonged periods of time, diminishing the quality of the island's shorebird foraging (and breeding) habitat.

The draft PEIS reports that the sand on the north end of Wallops Island is not an optimal grain size for use as beach fill, but that it offers potential renourishment material without the mobilization and operational costs associated with offshore dredging (chapter 2, page 48, first paragraph). We are concerned that the Preferred Alternative sacrifices important and unique wildlife habitat in the only section of undeveloped beach on Wallops Island, to acquire fill material at the lowest cost. Moreover, this counters the mitigation measure developed for sand placement activities (chapter 5, page 300), which states that beach nourishment will be done so

that the beach is restored to a comparable sediment type (a similar percentage of sand, silt and clay), grain size and color as the existing beach material.

The proposed mitigation measures for sand removal on the north end of Wallops Island listed in Table 11 (Chapter 2, page 73-74) state that a qualified biologist would closely monitor the area during excavation activities to ensure that impacts to any listed species and their nests would be avoided or minimized, thereby implying the work would be conducted during the nesting season. However, in Chapter 5, page 302, Section 5.1.5.2, it states that work in the proposed north Wallops Island borrow site area would be limited to the non-nesting season for the Piping Plover (September-March). This contradiction in the draft PEIS needs to be addressed. We want to reiterate that we are opposed to using the north end of Wallops Island as a borrow site. However, if it is used for this purpose, we recommend that all excavation and related activities on the beach at the north end occur outside of the nesting season for Piping Plover and sea turtles. Therefore, we recommend that all work at the site occur from November – March of any year.

In addition, we note that a State Threatened bald eagle nest has been documented on the north end of Wallops Island. To ensure protection of this species from harm during excavation activities, we recommend that no large machinery be operated within 660 feet of the bald eagle nest from December 15 through July 15 of any year. We note that eagles have high nest site fidelity and will typically return to the same nest each year to raise young. However, eagle pairs may also build alternate nest sites within their territory for use. We recommend that prior to each excavation cycle, the north end of Wallops be surveyed to determine if any new nests are built within 660 feet of the excavation area and that the same excavation time of year restriction be applied to any new or alternate active nest sites.

Based on information included in the draft PEIS, it appears that no effort was made to measure the density, abundance and species composition of infaunal organisms at the two offshore borrow sites during the benthic habitat survey (Appendix B). Instead, the final report for the benthic survey cites two studies conducted offshore of northern Maryland and southern Delaware (Cutter and Diaz 2000 and Diaz *et al.* 2004) which found that infaunal communities were dominated by annelid worms, followed by mollusks and crustaceans, and that mollusks accounted for over 85 percent of the biomass. Various species of seaducks including white-winged scoters, surf scoters, black scoters and long-tailed ducks forage primarily on mollusks and crustaceans on marine wintering grounds (Bellrose 1978) in water depths ranging from 1 – 60 meters (SDJV 2010). Sea ducks occur in high densities within 12 nautical miles off of Virginia's coastline in areas with sandy shoals during the winter (Forsell 2003). Therefore, it is possible that the two unnamed shoals A and B, proposed for sand mining, are utilized by these birds as forging sites.

The draft PEIS acknowledges that repeated dredging activities at intervals of three years or less may not allow sufficient time for benthic communities to recover between dredging cycles. Studies examining the effects of sand mining on infaunal communities found that levels of abundance and diversity may recover within 1 to 3 years, but recovery of species composition

may take longer (Byrnes *et al.* 2004). While the draft PEIS mentions that reductions in benthic fauna could negatively affect the fish that forage on these organisms, no consideration was given to potential impacts on sea ducks that could result from reductions in the abundance and species composition of infaunal organisms. We strongly recommend that before commencement of any dredging activities, a minimum of three aerial offshore transect surveys be conducted over the course of at least one winter season (one in early November, one in mid-December, and one in late January) along the entire barrier island chain and out to 15 nautical miles to establish relative use of the two unnamed shoals by sea ducks. This information will facilitate assessment of the impact dredging activities will have on these avian species. Please note that based on recent consultation with our waterfowl experts, the recommended timing of the surveys has been changed since we submitted comments to the Virginia Department of Environmental Quality's Office of Environmental Impact Review.

Alternative 2: Full Beach Fill, Groin, Seawall Extension
In addition to the extension of the seawall and beach fill as described in Alternative 1 (and recognizing differences in beach fill amount between Alternatives 1 and 2), Alternative 2 includes the construction of a groin at the south end of the Wallops Island shoreline and perpendicular to the shoreline. We are concerned about the adverse effects placement of a groin at the south end of Wallops may have on islands south of Wallops as it may reduce naturally occurring transport of sands to those areas. Although we recognize NASA's need to protect its assets, we do not support any action to do so that adversely affect other barrier islands that provide important shorebird and sea turtle nesting areas and other wildlife habitats.

Alternative 3: Full Beach Fill, Breakwater, Seawall Extension
In addition to the extension of the seawall and beach fill as described in Alternative 1 (and recognizing differences in beach fill amount between Alternatives 1 and 3), Alternative 3 includes the construction of a nearshore breakwater structure parallel to the south end of the Wallops Island shoreline. We are concerned that the reduction in beach erosion resulting from wave attenuation performed by the breakwaters will be negated by the newly constructed seawall extension. We are also concerned that the combination of the seawall and breakwaters may result in accelerated shoreline erosion to the south of these structures.

Sea Level Rise:
While the draft PEIS acknowledges that the shoreline at Wallops Island will certainly experience the effects of future sea level rise, it was not included as a variable in the models used to design SRIPP. Moreover, the Storm Damage Reduction Project Design for Wallops Island, VA report (Appendix A) offered a very limited discussion on climate change and sea level rise; the only concession it made to address the problem is to follow current US Army Corps of Engineers policy which is to include an additional amount of material during each renourishment event that would raise the entire profile by an amount equal to the projected amount of sea level rise. There was no discussion about what steps would be taken to account for sea level rise within the project's lifetime if renourishment at the required volume and frequency is no longer possible due to lack of funding or availability of beach compatible sand. This omission in the PEIS makes it difficult to fully assess the scope and breadth of the project's risk to the environment over the next 50 years.

Mitigation and Monitoring Plan:

Seawall Extension - According to the draft PEIS, impacts upon wildlife associated with extension of the seawall would be avoided through on site monitoring to ensure that Red Knots and Piping Plovers are not directly affected during the construction of the wall. We contend that avoidance could better be achieved by timing construction activities outside of shorebird nesting season. In addition, we recommend discussion in this section about potential impacts upon sea turtles. Although none are known to nest along this section of beach, it is always possible, especially with the placement of beach fill. In addition, we recommend consideration of cumulative effects upon wildlife resulting from the project, not just direct affects resulting from specific construction activities.

Offshore Dredging Activities - We support the recommendations provided in this section regarding protection of sea turtles, and we recommend continued coordination with the NMFS regarding protection of sea turtles and marine mammals. As stated above, we recommend that studies be performed ahead of dredging to determine how the unnamed shoals are utilized by sea ducks and that those data be used to analyze what, if any, impacts the removal of shoal material will have upon these species. We further recommend that based on the results of these studies, a plan to mitigate any impacts upon sea ducks be developed.

North Wallops Island Sediment Removal - As previously stated, we recommend that all sand removal, if performed, occur outside of the nesting season for Piping Plovers and sea turtles. Statements that indicate that a biologist would be on site during excavation to ensure avoidance of direct impacts upon these species may not be necessary if the work is timed appropriately. We recommend clarification of this point. Adverse impacts upon listed species may occur as a result of habitat impacts in addition to possible direct impacts associated with construction activities. We recommend consideration of indirect and cumulative impacts.

Beach Profile Monitoring Program - The beach profile monitoring program discussed in Appendix A will be conducted throughout the lifetime of the project. Analysis of these data will be used to determine when renourishment should take place and the amount of material needed from all three borrow sites. Moreover, the information collected will be the primary tool used to monitor the success of the project and identify any negative impacts. As this effort is currently proposed, it is confined to Wallops and Assawoman islands. We strongly recommend that beach profile monitoring also be conducted on Metompkin and Cedar islands at a frequency that allows for accurate assessment of project impacts further south along the island chain. We believe this is a necessary component in the beach profile monitoring program given that shoreline movement on Wallops, Metompkin, and Cedar islands is driven by similar geologic processes (Oertel *et al.* 2008) and therefore may act more as a unit than as independent landmasses.

We appreciate the opportunity to provide comments on the draft PEIS for the SRIPP at NASA Wallops Flight Facility. Please contact me or Amy Ewing at 804-367-6913 if we can be of further assistance.

Sincerely,

Raymond Fernald, Manager
Nongame and Environmental Programs

RTF/AME

Encl

Cc: David Whitehurst, VDGIF Wildlife Bureau Director

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COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

Department of Game and Inland Fisheries

Robert W. Duncan
Executive Director

May 7, 2009

Mr. Joshua A. Bundick
Wallops Flight Facility NEPA Program Manager
c/o National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

RE: EIS Scoping – NASA Wallops Flight Facility SRIPP
ESSLog # 23888

Dear Mr. Bundick:

This letter is in response to your notice of scoping for the Environmental Impact Statement (EIS) for the Shoreline Restoration and Infrastructure Protection Program (SRIPP) at NASA Wallops Flight Facility (WFF). The Virginia Department of Game and Inland Fisheries (VDGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises full law enforcement and regulatory jurisdiction over those resources, inclusive of State or Federally *Endangered* or *Threatened* species, but excluding listed insects. We are a consulting agency under the U. S. Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et *seq.*), and we provide environmental analysis of projects or permit applications coordinated through the Virginia Department of Environmental Quality, the Virginia Marine Resources Commission, the Virginia Department of Transportation, the U. S. Army Corps of Engineers, and other state or federal agencies. Our role in these procedures is to determine likely impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce, or compensate for those impacts.

Virginia's Barrier Islands

Virginia's barrier islands represent a critically important breeding area for a number of beach nesting shorebirds and seabirds that are of high conservation concern, including the federally Threatened piping plover *(Charadrius melodus),* the state Endangered Wilson's plover (*C. wilsonia*), the American oystercatcher (*Haematopus palliatus*), which is ranked nationally as a high conservation priority species in the US Shorebird Conservation Plan (Brown *et al.* 2001), the state Threatened gull-billed tern (*Sterna nilotica*), and the least tern (*S. antillarum*), which is

a state species of special concern. The Commonwealth's northern barrier islands that extend from Assateague Island south to Cedar Island typically support over 75% of Virginia's piping plover breeding population and in some years over 90% of the Commonwealth's breeding pairs have occurred on the northern islands (Boettcher *et al.* 2007). Since 2000, Virginia's Wilson's plover breeding population has been confined to Assawoman, Metompkin and Cedar islands with the exception of 2008 when one pair was discovered nesting on Assateague Island (Wilke *et al.* 2009). The barrier islands support over 50% of Virginia's American oystercatcher breeding population with a significant proportion occurring on Metompkin and Cedar islands (Wilke *et al.* 2005; Wilke *et al.* 2009). Moreover, oystercatcher productivity rates along the barrier island chain are some of the highest reported on the US the Atlantic coast, suggesting that the islands may serve as important population sources for the east coast population (Wilke 2008). The barrier islands also provide critical breeding habitat for least terns; since 1975 35% – 67% of the Commonwealth's population has been documented on the barrier island chain (VDGIF, unpubl. data). Virginia's statewide gull-billed tern breeding population has declined from approximately 2,000 pairs in the mid-1970's (Erwin *et al.* 1998) to fewer than 300 pairs in the last three years with the majority of nesting occurring on Virginia's seaside marshes and barrier islands (VDGIF, unpubl. data). While gull-billed terns are able to exploit barrier island and marsh habitats with equal success in response to rapidly changing conditions (Boettcher and Wilke 2009), the barrier islands remain important habitat for the declining species in Virginia. Other barrier island nesting species of greatest conservation need (as defined in Virginia's Wildlife Action Plan, available at www.bewildva.com) include black skimmer (*Rynchops niger*), common tern (*S. hirundo*), royal tern (*S. maxima*) and sandwich tern (*S. sandvicensis*) (VDGIF 2005).

Collectively, the aforementioned avian species' habitat requirements include broad beaches with low discontinuous dunes and expansive sand-shell flats. In addition, piping plover broods require unimpeded access from beach nest sites to the moist-soil ecotones of backside marshes and mudflats for forage and cover (Boettcher *et al.* 2007). These areas are highly susceptible to storm-generated disturbances, which serve to maintain the open active sand zones favored by these species. Any beach restoration activities that attempt to stop the natural movement of an island, counter storm-generated disturbances, or disrupt the longshore transport of sand may result in widespread loss of suitable nesting habitat for avian beach nesting species.

Over the past 20 years, the red knot (*Calidris canutus rufa*) population has declined by over 80% (Morrison *et al.* 2004) and this species is currently a candidate for federal listing under the Endangered Species Act. A significant portion of the population that migrates north along the US Atlantic coast in the spring uses the barrier islands as stopover sites (Smith *et al.* 2008). This includes Wallops Island where more than 1,000 birds have been recorded during a single survey (Center for Conservation Biology, The Nature Conservancy, and VDGIF, unpubl. data). Typical beach renourishment may impact long-distance migrant shorebirds that forage on sand-dwelling invertebrates, such as red knot, by reducing the availability of prey within reach of the birds' bills for a period of time following sand deposition (Bishop *et al.* 2006). Moreover, beach armouring and the installation of groins may result in significant loss of suitable shorebird foraging habitat in the intertidal zone seaward and south of these structures, respectively. These effects are likely to become even more pronounced in the face of sea level rise (Galbraith *et al.* 2002).

Virginia is the northern extreme of the federally Threatened loggerhead sea turtle (*Caretta caretta*) nesting range. While the majority of the Commonwealth's nesting activity has been confined to southern mainland beaches (Fort Story - NC/VA border), nesting activity on the northern barrier islands, including Wallops Island, has increased slightly in recent years (VDGIF, unpubl. data). Nesting sea turtles typically nest on dynamic ocean beaches that have a wide berm and a relatively intact natural dune system. This species typically avoids or has poor nesting success on armoured beaches, which over time, become devoid of dry beaches and natural primary dune systems. Moreover, there is concern that beach renourishment may affect the quality of turtle nesting habitat (Crain *et al.* 1995). For example, the deposition of sand could change beach sand color thereby affecting sand temperature. Because the sex of sea turtles is determined by the temperature of sand surrounding the nest cavity, beach renourishment could alter sex ratios. Beach renourishment also may influence other physical characteristics of beaches such as sand-grain size and shape, silt-clay content, sand compaction, moisture content, porosity, water retention and gas diffusion rates. The altering of one or more of these physical characteristics may not necessarily impact beach selection by nesting females (Crain *et al.* 1995), but may reduce reproductive success of nests laid in these renourished areas (Ackerman 1996).

Alternatives Analysis

- Alternative 1 (the preferred alternative) proposes to extend the existing seawall an additional 4,500 feet south, enlarge the beach with offshore dredged sand, and construct a rock jetty near the southern WFF property line. The proposed groin would allow some fill to pass through and, according to the description of the SRIPP, the net sand transport to Assawoman Island would be equal to or exceed pre-construction conditions. We are concerned that the proposed jetty may impede existing longshore transport of sand to Assawoman, Metompkin and Cedar islands, especially if funding can not be secured for the anticipated 5 – 7 year renourishment cycle. In addition, we are concerned that the extension of the seawall will further accelerate sand loss seaward of the seawall, particularly during periods of frequent storm events. Lastly, regular beach renourishment is very costly and may negatively affect local wildlife habitats in the short term, especially if non-compatible sand is used. This practice also may threaten the biological integrity of the two shoals from where sand will be obtained and may reduce the overall sand budget in the nearshore system, accelerating erosion of nearby beaches.

- We have similar concerns with Alternative 4 as we do with Alternative 1 because it involves the same actions, only less beach fill will be used. The reduced beach fill will likely require more frequent beach renourishment; therefore Alternative 4 does not appear to offer any cost benefits or reduce barrier island ecosystem impacts over the long term.

- We have concerns with Alternatives 2 and 5, which involve beach fill, detached breakwaters, and seawall extension mainly due to issues surrounding the seawall extension as discussed above. While the breakwaters may attenuate wave action and thereby reduce beach erosion to some degree, the stable seawall, which will inhibit the natural movement of sand and water, will likely negate any benefits the breakwaters may provide.

- We do not consider Alternatives 3 and 6, which are limited to beach fill, to be viable options since both will likely result in the rapid loss of sand placed on the beach.

- We recommend a thorough analysis and discussion of a seventh alternative that involves the installation of detached breakwaters to attenuate wave action, but excludes the seawall extension and beach fill options, and considers limited retreat or removal of infrastructure that does not require a beachfront location.

Recommended items for discussion in the EIS:

- The impacts of sand mining at Blackfish Bank Shoal and unnamed shoal on erosion rates at Assateague Island and islands to the south including results from studies on this topic.

- All potential sand mining impacts on the aforementioned shoals' avifauna and to fishes and other wildlife species that forage on the shoals' benthos.

- Results from a compatibility analysis that examine how well the sand on the two offshore shoals matches the existing sand on the barrier islands (i.e., grain size, color, etc.).

- What level of protection each alternative will realistically offer and a full presentation of the analyses conducted to determine these protection levels. We recommend the analyses take into account sea level rise and the potential for future increases in storm activity and intensity.

- A detailed description of the beach fill design (i.e., targeted beach slope, elevation and width to be maintained over the long term).

- A thorough analysis and discussion of potential impacts each alternative poses on the islands to the south of the project area, with a special focus on Assawoman, Metompkin and Cedar islands.

- A detailed description of a post-construction beach monitoring plan. This plan should present methods for measuring changes to island shorelines over time. We strongly recommend that the monitoring plan not be confined to Assawoman Island, but that it also include, at a minimum, Metompkin and Cedar islands.

- A threshold at which NASA considers the cost of the project to outweigh the benefits to NASA's mission and goals. The cost/benefit analysis should not only examine monetary costs, but should also take into account costs to fish and wildlife resources, the physical integrity of the barrier island chain, and other stakeholder interests.

- The availability of funding for typical renourishment in the long term since, according to the SRIPP scoping document, beach renourishment is key to the project's success.

- Consultations with National Marine Fisheries Service regarding potential impacts of hopper dredging on sea turtles.

We appreciate the opportunity to provide comments regarding the development of the EIS for the SRPP at NASA Wallops Flight Facility. Please contact me or Amy Ewing at 804-367-6913 if we can be of further assistance.

Sincerely,

Raymond Fernald, Manager
Nongame and Environmental Programs

Encl: Literature Cited

Cc: David Whitehurst, VDGIF Wildlife Bureau Director

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From: Forsgren, Diedre (VDH) [Diedre.Forsgren@vdh.virginia.gov]
Sent: Friday, March 19, 2010 10:50 AM
To: Pinion, Anne (DEQ); Bundick, Joshua A. (WFF-2500)
Cc: Matthews, Barry (VDH)
Subject: (10-019F) EIS/CD: Shoreline Restoration and Infrastructure Protection Program, NASA

DEQ Project #: 10-019F
Name: Shoreline Restoration and Infrastructure Protection Program
Sponsor: National Aeronautics and Space Administration
Location: Accomack County

VDH – Office of Drinking Water has reviewed DEQ Project Number 10-019F. Below are our comments as they relate to proximity to public drinking water sources (groundwater wells, springs and surface water intakes).

Potential impacts to public water distribution systems or
sanitary sewage collection systems must be verified by the local utility.

No groundwater wells are within 1 mile radius of the project site.

No surface water intakes are located within 5 miles radius of the project site.

Project does not fall within Zone 1 or Zone 2 of any public surface water sources.

There are no apparent impacts to public drinking water sources due to this project.

Diedre Forsgren
Office Services Specialist
VIRGINIA DEPARTMENT OF HEALTH
Office of Drinking Water, Room 622-A
109 Governor Street
Richmond, VA 23219
Phone: (804) 864-7241
email: diedre.forsgren@vdh.virginia.gov

COMMONWEALTH of VIRGINIA

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

Douglas W. Domenech
Secretary of Natural Resources

Steven G. Bowman
Commissioner

February 19, 2010

Mr. Joshua A. Bundick
Wallops Flight Facility NEPA Program Manager
c/o National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility (250.W)
Wallops Island, Virginia 23337

Re: Shoreline Restoration Wallops Island

Dear Mr. Bundick:

You have inquired regarding the permitting requirements for Shoreline Restoration on Wallops Island. The Marine Resources Commission requires a permit for any activities that encroach upon or over, or take use of materials from the beds of the bays, ocean, rivers and streams, or creeks, which are the property of the Commonwealth.

In addition, since Accomack County has not yet adopted the model Coastal Primary Sand Dune Zoning Ordinance, the Commission is charged with reviewing the impacts associated with any project that may fall within the Coastal Primary Sand Dunes/Beaches of Accomack County.

Based upon my review of the reference maps and drawings, it appears that alternatives 1 through 3 will require authorization from the Marine Resources Commission. (The proposed dredged sits appear to be greater than 3 miles offshore, therefore, that portion of the project will not require a permit from our agency.)

Alternative 1. (NASA's Preferred Alternative) Proposes to extend the existing stone riprap an additional 4,600 feet south and place 3,199,000 cubic yard of sandy dredged material along the Wallops Island shoreline. **This alternative would help alleviate some of our concerns with the anticipated 5 year nourishment cycles long term funding. If funding was not secured the existing longshore transport of sand to Assawoman Island would have less impact than in the proposed Alternative 2 (jetty).**

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

Sincerely,

George H. Badger, III
Environmental Engineer

Comments Received from Local Government

COUNTY OF ACCOMACK
DEPARTMENT OF BUILDING AND ZONING

23296 COURTHOUSE AVENUE, ROOM 105
Post Office Box 93
Accomac, Virginia 23301-0093
(757) 787-5721 (757) 824-5223
FAX (757) 787-8948
building@co.accomack.va.us

David A. Fluhart
Director

Building/Fire Inspections
Zoning and Wetlands

March 5, 2010

Goddard Space Flight Center
Wallops Flight Facility
Attn: 250.W
Josh Bundick, WFF NEPA Manager
Wallops Island, Virginia 23337

In Re: Draft PEIS

Dear Mr. Bundick: Josh

This will acknowledge receipt of the Draft Programmatic Environmental Impact Statement (PEIS) for the proposed Shoreline Restoration and Infrastructure Protection Program on Wallops Island, Accomack County, Virginia. The CD and cover letter was received in this office on behalf of the Accomack County Wetlands Board on February 17, 2010.

I reviewed the Draft PEIS and at the Accomack County Wetlands Board meeting on Thursday, February 25, 2010 advised the Board of the project and explained the project would not impact wetlands within their jurisdiction (local Wetlands Board).

As there was no local Wetlands Board jurisdiction, the Accomack County Wetlands Board took no action on the project and offered no comments regarding the Draft PEIS. It was noted that parts of this project will require approval from the Virginia Marine Resources Commission.

Thank you for the opportunity to review this Statement while in its draft form. Please feel free to contact this office if you have any questions.

Sincerely,

David A. Fluhart, Secretary
Accomack County Wetlands Board

A-NPDC
ACCOMACK-NORTHAMPTON PLANNING DISTRICT COMMISSION
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(757) 787-2936 • TOLL FREE (866) 787-3001 • FAX: (757) 787-4221
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April 6, 2010

Mr. Josh Bundick
NASA Wallops Flight Facility NEPA Manager
Code 250.W
Wallops Island, VA 23337

Dear Mr. Bundick,

The Eastern Shore of Virginia Ground Water Committee is a bi-county commission consisting of local Supervisors and members of the public with experience in ground water issues and science. The Committee works with farmers, local and state officials, and the interested public on various types of ground water preservation and protection measures.

The Ground Water Committee would like to voice its support for the Shoreline Restoration and Infrastructure Protection Program (SRIPP) at the Wallops Flight Facility on Wallops Island, Virginia. The Committee found your summary of the Draft Programmatic Environmental Impact Statement at its last meeting to be very informative. The Ground Water Committee greatly supports the SRIPP.

Thank you for your consideration.

Sincerely,

Larry Trala
Chairman
Eastern Shore of Virginia Ground Water Committee

cc: Elaine K.N. Meil
Executive Director
Accomack-Northampton Planning District Commission

Comments Received from Other Organizations and Individuals

ACT TO PRESERVE OUR COASTAL BAYS
Assateague Coastal Trust
PO Box 731, Berlin, MD 21842
410-629-1538

April 19, 2010

Mr. Josh Bundick
250/NEPA Manager
WFF Shoreline Restoration and Infrastructure Protection Program
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, Virginia 23337
wff_shoreline_eis@majordomo.gsfc.nasa.gov

Dear Mr. Bundick:

Assateague Coastal Trust (ACT) has reviewed the NASA-WFF Shoreline Restoration and Infrastructure Protection Project Draft Programmatic EIS and would like to provide the following comments for consideration.

ACT, the oldest non-profit grassroots environmental advocacy organization in the Atlantic coastal bays watershed, works to protect and enhance the natural resources of the watershed through advocacy, conservation, and education. ACT has a long history of environmental advocacy in the Maryland and Virginia coastal bays region, beginning with its landmark efforts in the early 1970s to preserve the unspoiled character of Assateague Island, which is now protected as a National Seashore.

We support NASA's Wallops Flight Facility as part of our community and hope to work both towards the success of the Facility and the protection of our region's coastal ecosystem. However, as expressed in our letter during the Scoping Process, ACT remains concerned that the Shoreline Restoration and Infrastructure Protection Project will impact many of the natural resources that our organization works hard to protect, including barrier island habitats, coastal waters, shorebirds, sea birds, fish, and marine mammals.

Potential Impacts of Dredging on Wave Climate and Cross-Shore Sediment Transport

Barrier island morphology supports a variety of fragile and dynamic habitats, including the intertidal, beach, and dune habitats. Those habitats would potentially be impacted by accelerated shoreline erosion, addition of incompatible non-native sediments, and other changes in natural coastal processes.

Offshore shoals are known to dissipate incoming wave energy, diminishing the wave energy that reaches the shoreline, and thereby sheltering the coastline from wave-driven erosion. ACT is concerned that dredging either of the proposed shoals, located 7 and 11 miles offshore of Assateague Island, will reduce the shoal's ability to shelter Assateague Island from large waves and resulting shoreline erosion. As stated in the modeling results included in Volume II of the Draft PEIS, the Impact Factor of dredging is more than 0.75 along parts of the Assateague Island shoreline, and "it is not clear [that these values]

equate to a negligible long term shoreline impact." Any dredging with the potential to increase erosion or wave energy impact on the barrier islands should follow a detailed dredging plan that is included in the EIS. That plan should describe site-specific dredging methods that minimize impacts on island shorelines, such as maintaining the existing shoal crest height (to maintain shallow water processes and crest stability) and avoiding longitudinal (along-axis) dredging (to minimize wave focusing), as per new draft dredging guidelines currently in review by Minerals Management Service[1]. We agree with NASA's decision to dredge no deeper than the seafloor or base of the shoals; dredging pits could alter physical processes.

ACT is also concerned that removal of a significant volume of either shoal will reduce the volume of sediment currently being transported to the barrier islands, thereby accelerating erosion and impacting the islands' natural coastal processes and resilience to the ongoing effects of climate change including sea level rise and storm intensity. As noted in our comments during the Scoping Process, multiple mid-Atlantic coast studies indicate that offshore shoals are an important component of the regional sediment budget and sediment transport pathways. We are disappointed that the Draft EIS did not address potential impacts of sediment removal on cross-shore sediment transport, and we recommend that the Preferred Alternative include new studies to map and quantify cross-shore sediment transport in the area, including geophysical and hydrodynamic data collection in the nearshore and offshore regions of Assateague and Wallops Islands. In the meantime, to minimize potential impacts of dredging on the poorly-understood sediment transport processes in this region, we also recommend that sediment be dredged from as far offshore as possible, where it is less likely to contribute to onshore sediment transport; that it be dredged from the downdrift accreting side of each shoal, to minimize interruption to sediment transport pathways; and that it be dredged in a thin uniform layer from non-crest areas, to minimize disturbance to shoal topography and geometry and associated shoal-maintenance processes.

Potential Impacts to Terrestrial Wildlife

South of Wallops Island, Assawoman and Metompkin Islands provide important habitat for a variety of shorebirds, migratory birds including the declining Red Knot, and the Federally-listed Piping Plover. The importance of these habitats have been recognized by the Audubon Society, which designated this area as an Important Bird Area, and by the United Nations, which designated the chain of undeveloped Virginia barrier islands as an International Man and the Biosphere Reserve. The habitat value of the birds' nesting and foraging areas depend on natural barrier island conditions, which are in turn controlled by natural coastal processes including sediment supply and type.

Because these islands are geologically fragile and biologically important, we strongly support NASA's decision not to build shore-perpendicular sand retention structures. Groins are well known to cause erosion on their downdrift side and the impacts to alongshore sediment transport would be unacceptable.

ACT remains concerned that dredged sediments placed on Wallops Island, and from there transported to Assawoman and Metompkin Islands, will be incompatible with native sediments, which would in turn alter the terrestrial surface texture, the shoreface slope, and the sediment transport processes driven both

[1] Dibajnia, M. and R.B. Nairn, in prep. Investigation of Dredging Guidelines to Maintain and Protect the Integrity of Offshore Ridge and Shoal Regimes. U.S. Department of the Interior, Minerals Management Service, XXX OCS Region, 2010. OCS Study MMS 2010-XXX. 150 pp. and appendices.

by wind and by overwash. Such changes in sediments would affect the nesting and foraging behavior of shorebirds on those islands. In consideration of these potential impacts, the Preferred Alternative should include guidance on ensuring the compatibility of shoal sediments with the native sediments of Wallops Island and downdrift nearshore and beach areas.

Potential Impacts to Marine Life

ACT's mission includes protection of marine and estuarine life and the habitats on which it depends. The marine waters along the Virginia barrier islands hosts a rich diversity of marine life, including benthic communities around the shoals that support pelagic fish, which feed on the shoals and live parts of their lives in the estuarine waters behind the barrier islands, and which also create feeding grounds for sea turtles, marine mammals, and sea birds. ACT is concerned that destruction of shoal habitat will impact the complex food web of these shoals, and the marine communities that depend on it. Therefore, we support NASA's decision not to dredge Blackfish Bank, which is known to support a rich biological community. Additionally, we request that the Preferred Alternative include site-specific dredging methods that protect habitat value for finfish and pelagic seabirds by avoiding the shoal crests.

Thank you for considering ACT's concerns about this proposed project. We look forward to working with NASA to evaluate alternatives for protecting both NASA infrastructure and our region's important coastal resources.

Sincerely,

Kathy Phillips
Assateague COASTKEEPER
Executive Director, Assateague Coastal Trust

HAMPTON ROADS MILITARY AND FEDERAL FACILITIES ALLIANCE
EDUCATE ★ SUSTAIN ★ GROW
WILLIAM D. SESSOMS, JR., MOLLY JOSEPH WARD, CO-CHAIRMEN • E. DANA DICKENS III, TREASURER • DWIGHT L. FARMER, SECRETARY
FRANK ROBERTS, EXECUTIVE DIRECTOR

March 11, 2010

Joshua A. Bundick
250/NEPA Manager
WFF Shoreline Restoration and Infrastructure Protection Program
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337

RE: DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (PEIS); WALLOPS FLIGHT FACILITY SHORELINE RESTORATION AND INFRASTRUCTURE PROTECTION (SRIPP) PROGRAM

Dear Mr. Bundick:

On behalf of the Board of Directors of the Hampton Roads Military and Federal Facilities Alliance (HRMFFA), we offer the comments below regarding the Draft Programmatic Environmental Impact Statement (PEIS) for the proposed Shoreline Restoration and Infrastructure Protection Program (SRIPP) along the beaches of the Wallops Flight Facility on Virginia's Eastern Shore.

HRMFFA is a not-for-profit corporation that represents the collective interests of 13 Hampton Roads communities in matters relating to retention, sustainment and growth of military and federal capabilities in the region.

Hampton Roads has a long and proud association with the National Aeronautics and Space Administration (NASA), chiefly through the NASA Langley Research Center located in the City of Hampton. NASA Langley is intrinsically tied to the Wallops Flight Facility through research activity in aeronautics, unmanned vehicles and climate change study. HRMFFA maintains close ties with military and federal activities at the Wallops Island complex and is a member of the Eastern Shore Defense Alliance (ESDA). Thus the interest of the entire Hampton Roads region in preserving the infrastructure and continuing uninterrupted operations associated with NASA programs at Wallops Island. We fully support the planned SRIPP proposal as economically, environmentally and operationally sound.

We find the PEIS to be exhaustive in its research and in its attention to preserving the rich environment unique to the Eastern Shore. We believe NASA has done a superb job of balancing the concerns of preserving both the environment and the NASA, U.S. Navy and Mid-Atlantic Regional Spaceport assets which would be enormously expensive to replicate should they be damaged or destroyed from wave impacts associated with storm events.

HRMFFA
REGIONAL ADVOCACY FOR ★ FEDERAL INVESTMENT ★
430A World Trade Center . Norfolk, Virginia 23510 . (757) 644-6324

We fully support NASA and the Goddard Space Flight Center's Wallops Flight Facility in the planned Shoreline Restoration and Infrastructure Protection Program. Please don't hesitate to contact us should you desire additional input. The HRMFFA Executive Director, Frank Roberts, can be reached at (757) 644-6324 or by e-mail at froberts@hrmffa.org.

Sincerely,

William D. Sessoms, Jr.
Mayor, City of Virginia Beach
Co-Chair
Hampton Roads Military &
Federal Facilities Alliance

Molly Joseph Ward
Mayor, City of Hampton
Co-Chair
Hampton Roads Military &
Federal Facilities Alliance

FAR/daa

Copy to: Steven R. Haberger, Eastern Shore Defense Alliance

The Nature Conservancy
Protecting nature. Preserving life.™

The Nature Conservancy in Virginia
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nature.org

Via email; hardcopy to follow

April 19, 2010

Mr. Josh Bundick, NEPA Manager
WFF Shoreline Restoration and Infrastructure Protection Program
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, Virginia 23337

Re: Comments on the Draft Programmatic Environmental Impact Statement for Wallops Flight Facility Shoreline Restoration and Infrastructure Protection Program

Dear Mr. Bundick:

On behalf of The Nature Conservancy in Virginia, I am writing to submit our official response to the National Aeronautics and Space Administration's (NASA) Draft Programmatic Environmental Impact Statement (PEIS) for the proposed Wallops Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP). We appreciate the opportunity to comment on the Draft PEIS for this important project.

First and foremost, The Nature Conservancy applauds NASA for its selection of Alternative One (seawall extension and beach re-nourishment) as the Preferred Alternative in the SRIPP PEIS. The Nature Conservancy believes that the Preferred Alternative will provide short-term protection benefits to the WFF without creating significant deleterious impacts to the barrier islands owned by the Conservancy and other conservation partners to the north and south of Wallops Island. As you know, the Conservancy and a number of other conservation organizations and agencies voiced serious concerns during earlier comment periods and in direct meetings with NASA staff that the construction of sand retention features such as breakwaters or a groin would very likely create significant impacts to our land holdings and our years of conservation investments in this landscape. We are very appreciative of NASA for listening to those concerns, re-examining some of its earlier conclusions, and ultimately selecting a much more ecologically sensitive approach. NASA's responsiveness and willingness to make substantial modifications to its initial plan reflect well on staff and the

agency as a whole. From our perspective, one of the important side benefits of our engagement on this issue has been the opportunity to develop a much closer relationship with NASA. Both our organizations clearly have a shared interest in enhancing the economic and ecological health of the Eastern Shore of Virginia and the larger Delmarva Peninsula, and we welcome working more closely with you on a number of related fronts.

This praise notwithstanding, there are a few areas of the PEIS that do raise some concerns for The Nature Conservancy, concerns that we outline in this letter and that we hope to continue to discuss and address with NASA in the future. We have organized the remainder of our comments as follows:

- A brief overview of The Nature Conservancy's ownership, investment and interest in the barrier island system south of Wallops Island
- Review of the PEIS modeling and analysis of sediment dynamics
- Recommendation for landscape-scale monitoring
- Sea level rise and the need for long-term adaptation strategies

The Nature Conservancy's Ownership, Investment and Interest in Virginia's Barrier Islands

The Nature Conservancy has been working to protect barrier islands and coastal habitats off the coast of Virginia for nearly four decades. Since its inception in 1969, the Conservancy's ownership on the Eastern Shore has grown to encompass 14 barrier and marsh islands along with multiple preserves and easements on the mainland. Collectively this network of protected lands is known as the Virginia Coast Reserve. The Conservancy and partners have protected more than 114,000 acres of land on the Eastern Shore, including 40,000 acres where we hold a direct legal interest. The 65-mile long Virginia barrier island chain is considered to be the best example of a naturally functioning barrier island system on the Atlantic coast and the last remaining Atlantic coast wilderness. The entire Eastern Shore, and especially the barrier islands, host globally-significant concentrations of breeding and migratory waterfowl, shorebirds, raptors and neotropical landbirds every year. Simply put, these lands are ecologically irreplaceable and represent one of the Conservancy's most significant holdings in all of North America. Our ownership and the incredible ecological importance of these wild barrier islands mean that protecting the islands and abating anthropogenic threats to their health, integrity, and the ecological processes that maintain them are our very highest priorities. We continue to work collaboratively with many federal, state and local partners to protect, enhance, and restore the unique and productive habitats and wildlife of the Virginia Coast Reserve, and now also the offshore areas of the Mid-Atlantic Continental Shelf.

Review of PEIS Modeling and Analysis of Sediment Dynamics

To assist in our evaluation of the more technical aspects of the Draft PEIS, the Conservancy again retained the services of Dr. Robert S. Young, and we requested that he focus his review in part on the science and engineering behind the assessment of Alternative Two. While we were pleased to see that the construction of a groin or a breakwater was no longer included in the Preferred Alternative, we have some concerns that the PEIS overestimated the benefits these structures might provide and underestimated their likely environmental impacts. While any

flawed analysis of the benefits and costs of sand retention structures may not impact the actionable outcomes of this PEIS, we believe it is important that the PEIS acknowledge these limitations so as to provide the most accurate background information in the event this issue is re-examined in the future.

As Dr. Young states very clearly in his report (enclosed), "the modeling used to examine the benefits and impacts of the proposed groin is critically flawed. All references in the PEIS to any increased durability of the re-nourishment project, cost savings, or potential downdrift impacts resulting from the construction of the proposed groin are therefore flawed and should not be used for consideration of Alternative Two." Ultimately, Dr. Young calls into question the use of the Generalized Model for Simulating Shoreline Change (GENESIS), stating that it results in "incorrect representation of shoreline change and sedimentary processes" since the calibrated model was not successfully verified and does not account for the influence of antecedent geology on the sediment budget at Wallops.

In addition, Dr. Young raises serious concerns regarding the U.S. Army Corps of Engineers' selection of a four-meter closure depth. Dr. Young submits that this depth is too shallow, and its selection yields incorrect conclusions on the project's durability, impacts from storm events, and the overall movement of sand within the project area.

If obtaining more accurate and actionable information for the PEIS were simply a matter of correcting a few parameters on the GENESIS model run or using a different model, the Conservancy would certainly make that request for the Final PEIS. Unfortunately, we believe that the flaws in the GENESIS model are instead symptomatic of the underlying limitations of sediment transport models on complex and dynamic real-world environments. Especially when the stakes are so high (both the protection of WFF and the preservation of the larger barrier islands system) we submit that the construction of large scale structures or new engineered approaches is simply not appropriate without robust, long-term, and large-scale real world monitoring results to guide and direct future management actions. With the selection of Alternative One, NASA has taken steps that generally align with this precautionary approach, and again, we commend this decision.

Recommendation for Future Monitoring Efforts

We also commend NASA's commitment in the PEIS to monitoring changes in shoreline and beach volume, as we believe that a comprehensive monitoring program for the SRIPP provides an excellent opportunity to gain an empirically-based understanding of the sediment dynamics at Wallops and the surrounding environments currently lacking in the PEIS. We do, however, urge NASA to consider an even larger monitoring effort.

Determining the precise fate of sand as it erodes from the re-nourished beach will be critical for evaluating the viability of proposed SRIPP actions and the desirability of other efforts with much higher degrees of certainty and reliability than the PEIS currently provides. To produce credible results and conclusions about onshore-offshore sediment transport, the geographic extent of the shoreline and beach volume monitoring must extend well beyond the four-meter

closure depth and include a significant buffer to the north and south of Wallops—essentially a landscape-scale monitoring effort. We strongly recommend that the monitoring project area should be clearly delineated in the final PEIS and consistent with this recommendation.

Sea Level Rise and Long-term Adaptation Strategies

As stated in our previous scoping comments, the Conservancy has real concerns that the PEIS does not adequately address the myriad of ways rising sea levels will both complicate and magnify the threats the ocean and the dynamic nature of a barrier island pose to the viability of WFF infrastructure. Dr. Young echoes many of these same concerns in his analysis, stating that "Sea level rise does not just impact the oceanfront. It will change the shoreline on all sides of the island. It will increase the frequency and magnitude of flooding from the backside as well as the front. [Sea level rise] will threaten infrastructure and access regardless of the size of the beach." Indeed, the harsh reality is that Wallops Island will remain extremely vulnerable to sea level rise and storm surges. We agree with Dr. Young's assessment that NASA must, "entertain the very real possibility that the WFF will not be maintainable as is, in situ, over the next 50 years," even if the Preferred Alternative performs as designed. The Conservancy submits that in order for the PEIS to evaluate accurately any one Alternative's likely success in protecting the infrastructure and operations of WFF over the 50-year lifespan of the SRIPP, it must more comprehensively consider the implications of rising sea levels within the PEIS.

In addition, we believe it is imperative that NASA begin to take steps to evaluate rigorously the costs and benefits of various adaptation strategies, including phased relocation to the mainland and corresponding efforts to promote the resiliency of the barrier island system. From our conversations with NASA, we understand that those evaluations are beyond the scope of this PEIS. We also appreciate that any relocation effort would pose enormous operational, engineering and financial challenges. While not at all disregarding those challenges, we do respectfully submit that those challenges are likely to increase over time, as are the impacts from rising sea levels and more intense storm events. Given the billions of dollars invested in WFF and its laudable plans to expand operations and its role in the nation's public and private spaceflight programs, starting these planning and analysis efforts earlier rather than later seems to be the most prudent course.

We suggest that one place to start would be for NASA to form an advisory team to assist with monitoring, long-term planning, and adaptive management of WFF protection strategies. Under NASA-WFF's leadership, this team could evaluate costs, benefits, feasibility and impacts associated with phased and limited relocation of infrastructure from Wallops Island to other sites within WFF, and ways to utilize the natural resiliency and migration of barrier islands as a first line of defense for NASA operations and assets. Such an advisory team could draw upon the extensive theoretical, modeling and research expertise of many academics and agency staff who have a great interest in the Virginia barrier islands and the viability of Wallops Flight Facility. The working results of this advisory team's efforts could become a national model and demonstrate how to best adapt to a dynamic coastal system in the face of global climate change. It is worth noting that a variety of federal initiatives could provide both higher level support and funding for this sort of effort.

To summarize our comments on the Draft PEIS, the Nature Conservancy:

1. Commends NASA for selecting Alternative One as the Preferred Alternative for meeting the short-term goals of the SRIPP for WFF without causing adverse impacts to downdrift barrier islands;
2. Requests that any future actions considered by NASA for short-term protection of WFF should be based on robust landscape-scale monitoring of the sediment dynamics and shoreline change at Wallops;
3. Given the reality of rising sea levels and stronger storms, strongly recommends that NASA form an advisory team of partners and experts to help develop an adaptation strategy that ensures the long-term protection of NASA's operations at Wallops and the conservation of the larger barrier island system.

Again, the Conservancy appreciates the opportunity to provide these comments to the Draft PEIS. We appreciate the very real challenges NASA faces as it seeks to protect the sizable investments and important operations at the Wallops Flight Facility. We look forward to working with NASA as this EIS process continues. Please contact Steve Parker at 757-442-3049 or sparker@tnc.org with any questions or requests for additional information.

Most sincerely,

Michael Lipford
Vice President and Virginia Director

Enclosure: Dr. Young's Evaluation

cc (via email):

Tylan Dean, Assistant Supervisor, Ecological Services, Virginia Field Office, USFWS
Lou Hinds, Superintendent, Chincoteague National Wildlife Refuge, USFWS
Trish Kicklighter, Superintendent, Assateague Island National Seashore, NPS
Laura McKay, Director, Virginia Coastal Zone Management Program, DEQ
Karen McGlathery, Director, Virginia Coast Reserve Long-Term Ecological Research, UVA
Tom Smith, Director, Division of Natural Heritage, DCR
Tony Watkinson, Deputy Chief, Habitat Management Division, VMRC
David Whitehurst, Director, Wildlife Diversity Division, DGIF

An evaluation of the proposed Shoreline Restoration and Infrastructure Protection Program at Wallops Island Flight Facility, Wallops Island, Virginia

Addendum to the April 20, 2009 Report

Robert S. Young. PhD, PG
Submitted to the Virginia Nature Conservancy
April 13, 2010

Introduction:

In April of 2009, the author prepared a report evaluating the March 2009 Description of the Proposed Action and Alternatives (DOPAA) for the proposed Shoreline Restoration and Infrastructure Protection Program (SRIPP) at NASA Wallops Flight Facility (WFF). In February 2010, NASA released the Draft Programmatic Environmental Impact Statement for the SRIPP. The author was retained by The Nature Conservancy (TNC) to evaluate a fairly narrow aspect of the recently released draft PEIS, the science and engineering behind the assessment of the proposed Alternative Two. This alternative would combine beach renourishment and seawall extension with the construction of a 130m-long groin at the southern end of the project. This report also evaluates the long-term strategy of protecting the WFF infrastructure in situ given the reality of rising sea level and storm impacts over the estimates 50 yr life of the SRIPP.

Summary of Opinion:

1) The modeling used to examine the benefits and impacts of a proposed groin is critically flawed. All references in the PEIS to any increased durability of the renourishment project, cost savings, or potential downdrift impacts resulting from the construction of the proposed groin are therefore flawed and should not be used for consideration of Alternative Two.
2) USACE (2010) seriously underestimates the closure depth along this shoreline leading to a significant underestimation of the amount of nourishment sand required, the storm benefits of the project, and project durability.

3) The impacts of rising sea level along Wallops Island over the next 50 years are also greatly underestimated.

Point #1:

The primary tool used to examine the efficacy and impacts of the groin proposed in Alternative Two is the GENESIS model. The Generalized Model for Simulating Shoreline Change (GENESIS) (HANSON and KRAUS, 1989) is used by coastal engineers to predict shoreline change resulting from spatial and temporal gradients in longshore sediment transport associated with coastal engineering projects. Shoreline change produced by cross-shore sediment transport such as that associated with storm events is not considered and cannot be simulated by GENESIS. Cross-shore transport is assumed by the model developers to average out over the long term (sand moved offshore during a storm always returns during fair weather).

The GENESIS model requires detailed calibration and verification and has a number of underlying assumptions that are often unmet in practical application (Young et al, 1995). In the case of the GENESIS model run reported by USACE (2010), the model run fails in two primary ways: the verification run can not be judged as successful, and the use of GENESIS ignores the strong underlying geological control that is an important driver of shoreline change in the vicinity of Wallops Island.

Calibration and verification of GENESIS is seemingly straightforward. One attempts to use the model to reproduce measured shoreline change for a given period in the past (in this case from 1996-2005). During this "calibration" run, model parameters can be tweaked to provide the best fit to the final shoreline. One then attempts to verify the calibrated model by reproducing shoreline change for another period of time for which adequate historical data is available. In this case, USACE (2010) used the period of 2005-2007. This is a very short period of time for a verification run; yet, they still found that "the 2007 measured shoreline does not agree well with the 2007 GENESIS verification shoreline…". It is clear that the model, as calibrated, was not successfully verified, although the modelers

rationalize the failure by suggesting that the modeled shoreline fits within an envelope of shorelines generated by different wave climates. Despite the problems with verifying GENESIS over a mere two-year period, USACE (2010) elect to use the calibrated model for their analysis of beachfill performance and for evaluating the impacts of the proposed groin. One has to wonder how far off the predicted shoreline would be over a five or ten year period.

Given the poor model verification run, GENESIS should not have been used to produce detailed volume data for beach renourishment. In particular, GENESIS, as calibrated, should not have been used to examine the suggested increased durability of beachfill with the addition of a groin. In light of this, one must conclude that the USACE (2010) study and the PEIS do not, and cannot, scientifically demonstrate any clear benefit to the project from groin construction.

It is likely that one reason that GENESIS cannot be calibrated and verified successfully along this shoreline is due to the very strong underlying geological control exhibited by the nearshore, outcropping geological units. GENESIS, as run here, assumes a uniform, sandy bottom with waves moving sand as the primary control on shoreline dynamics. Oertel et al (2008) conclude that the barrier islands within the Chincoteague Bight (CB) are strongly impacted by large- and small-scale geological control. When this is the case, utilizing a model like GENESIS that accounts only for waves moving sand will result in an incorrect representation of shoreline change and sedimentary processes (Young et al, 2005). One needs only walk the beach along Assawoman Island to see that the berm is covered with shell material that is not modern, having been cast up onto the beach from nearshore, older geologic units. The modern sediment cover is thin. This is a classic example of the type of coastal setting where GENESIS should not, and cannot be used. It is no surprise then, that verification of the model was not successful. It should be noticed that this conclusion is supported by an independent technical review provided by Dean et al (2009) where they request specific criteria that were used to determine that the GENESIS verification run was “acceptable”.

In summary, the data presented in the PEIS purporting to show a small benefit to the durability of the beachfill following placement of a groin at the south

end of Wallops Island cannot be used to evaluate Alternative Two. Thus, the PEIS does not provide any justification for the inclusion of a groin at any stage of the SRIPP. This conclusion is also supported by Dean et al (2009) where they " strongly recommend that the issue of initial construction of a south terminal structure be abandoned. While they leave the door open for the later inclusion of some kind of structure based on some proposed adaptive monitoring program, this program is not elucidated in the PEIS, and thus, cannot be evaluated.

Point #2:

Closure depth is assumed to be the depth beyond which no sediment is transported offshore during storms. USACE (2010) uses a surprisingly shallow depth of closure (4 m). They need to do a better job of justifying such a shallow depth of closure, particularly in light of the 8 m depth reported by Morang et al (2006). Selecting a shallow closure depth gives an optimistic view of beach width following placement of renourishment sand and suggests that large storm will not remove beachfill from the immediate nearshore. In fact, the PEIS shows pictures of oscillatory ripples at depths of 14 m and 17 m on "unnamed" shoal. Clearly, sand along this shoreline is moving at depths greater than 4 m.

It should be noted that numerous geological studies have documented transport of beach renourishment sand well offshore of any proposed closure depth (Thieler et al, 1995, for example). The PEIS assumes that all sand lost to Wallops Island will be lost alongshore. This is not a safe assumption. Any monitoring program needs to account for the precise fate of the sand as the renourished beach shrinks. If sand is lost offshore during storms, the addition of any structure designed to trap sand moving alongshore will not help increase project durability. In addition, any post-project monitoring needs to include shoreface profiles that extend well beyond 4 m in depth. The choice of a 4 m closure depth improves the project beach width and storm protection numbers, but it is not a scientifically realistic number. In order to give the public a more reasonable perspective on the benefits/costs of the project, the PEIS should use a more reasonable design closure depth.

Point #3:

The PEIS does an inadequate job of addressing sea level rise (SLR). Protecting the infrastructure at the WFF will involve more than adding a little bit to each renourishment interval to raise the elevation of the beach in order to keep up with rising sea level. Sea level rise does not just impact the oceanfront. It will change the shoreline on all sides of the island. It will increase the frequency and magnitude of flooding from the backside of the island as well as the front. SLR will threaten infrastructure and access regardless of the size of the beach. It will narrow the island. True protection of all WFF infrastructure during the 50-yr lifecycle of this proposed project will require massive re-engineering of the entire island (elevating facilities, major dikes and walls, elevating roads).

The PEIS should do much better job of examining the long-term threat of rising sea level to WFF. It should be made very clear that this project will be just one facet of the engineering that will be required to keep the WFF facilities in place over the next 50 years. No one should think that even if the project performs as designed, there would be no other expenditures needed to maintain the infrastructure. In fact, one must entertain the very real possibility that the WFF will not be maintainable as is, in situ, over the next 50 years. In addition to the monitoring proposed, it is highly recommended that an additional study be implemented, in conjunction with the initial renourishment, examining the feasibility of moving some infrastructure off the island over the next 50 years. This gradual relocation could begin with facilities that do not require close proximity to the coast, and develop contingencies for moving damaged structures following large storms. Although the timing and magnitude of future SLR is still uncertain, it is virtually guaranteed that these moves will be required at some point. Initiating this planning makes scientific and fiscal sense.

Conclusions:

Alternative Two, beach nourishment along with the construction of a groin is unsupported in the Draft PEIS from a scientific standpoint or from a benefit cost

standpoint. The inclusion of a structure should be dropped from any future planning without significant additional study. The PEIS should include a more realistic depth of closure and a significantly more robust examination of the ability of the proposed project to protect against future sea level rise.

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Minutes from the March 16, 2010 Public Comment Meeting

NASA WALLOPS FLIGHT FACILITY

SHORELINE RESTORATION AND

INFRASTRUCTURE PROTECTION PROGRAM

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

PUBLIC COMMENT MEETING

March 16, 2010

Wallops Island, Virginia

TAYLOE ASSOCIATES, INC.

Registered Professional Reporters

Telephone: (757) 461-1984

Norfolk, Virginia

Appearances:

Keith Koehler, Public Affairs Office

Paul Bull, Shoreline Restoration Project Manager

Josh Bundick, NASA Wallops Environmental Office

Dr. David King, U.S. Army Corps of Engineers

Shari Silbert, WICC Team Member

Also present:

Tracy Hand, RPR, Meeting Reporter

(The hearing commenced at 6:07 p.m.)

MR. KOEHLER: We will get started. The idea tonight is kind of give everybody on update where we are on the Shoreline Restoration Project and the EIS program.

So the process tonight, we'll have a few comments, we'll have an overview of where we're at on the project. After that you'll be allowed to ask some questions and answers to make sure everybody's clear on what's going on, and then after that we have a public comment period if anybody has any comments after that point.

When we get to the questions and answer session and the comments, raise your hands and I can give you the mike so we can get everything recorded, make sure she hears everything that everybody is saying.

So we're going to get started and we'll start out with Craig Purdy, who is the deputy director here at Wallops. He will make a short statement.

MR. PURDY: Okay. I happen to be acting facility director until my new boss gets here, so that's the capacity I'm here. These guys have done a real good job over the past year putting together a plan for the restoration and the protection of our

infrastructure over on the island.

They got the input from the world's experts in this area and they got the input from the local experts in this area, and that's a lot of you sitting out there that helped us put this plan together. And they put out the EIS or the environmental Impact Statement, and this is our time to listen to your comments on it and take your comments and see if we need to do another thing to make this plan more palatable to everybody involved.

We are your neighbors, we want to do what you think is right, but we have to protect Wallops, and this plan is extremely important to the longevity of Wallops and what we are doing here. These two guys up here have put in a lot of work, a lot of good work, and I'm sure they will be able to answer all your questions. So thanks again for coming.

MR. KOEHLER: Thanks, Craig.

Okay. We're getting started with Paul Bull, who's the project manager for the station program, so, Paul.

MR. BULL: How is everybody doing this evening? I'm the project manager for the -- this project to hopefully protect or loss range. Josh is the EIS manager; he will be right after me.

And we'll tell you things that you have heard before. I think all the faces I see in the crowd for the most part are familiar, but we'll go ahead and shoot the same script we did last time. Actually, I'll get to say it this time versus the person in front of me. Kind of an inside joke.

Here is our agenda. We will talk about the nor'easter damage. This is actually the nor'easter damage from the November storm. Probably should turn this the right way. We've had several nor'easters after that storm and have done more damage, not -- it's not sustained damage, as sustained; it's just kind of chronic damage to our seawall primarily and sand on some of our infrastructure.

We will talk about the alternatives. We have three project stats where we are today, new technical information that I discussed last time and we will go over it one more time, EIS update, Josh will jump in there, and then we'll have the Q and A for anybody who has any questions for us, and then we'll open it up for public comments as well for the record.

All right. Here is the slide that basically shows why we're doing what we're doing. We

have about a billion dollars worth of federal assets on Wallops Island and we have about a hundred million of annual programs that activate on Wallops all year, yearly, every year.

And this is the information we had when we actually started this project. I think Craig says we have been working the least year. Actually, 2006 is when we had the first Corps study, so it's been at least four years we've been actively working on this project.

Since that time I guess -- I'm going to get the date wrong, but I remember sitting in a conference room, Jay Pittman, our launch manager, looked at his BlackBerry, whatever, and said, we've got Taurus II. So that's after this -- this is above and beyond what's here, a hundred -- a billion dollars worth of federal assets, a hundred million dollars of annual activity on the island, and now Taurus II is coming with a $2 billion program and at least a hundred million dollars worth of assets being constructed today that's not on this slide right now.

Here is a picture of UAV runway to the south, pad 0A -- 0B, I'm sorry, 0B here. Basically, Assawoman Island is about 2000 feet off the V100 camera stand. This is a picture probably in 2008,

early 2008 time frame.

Flipping to November of 2009, and you can see all the geo tubes are mostly gone, the beach is kind of gone, UAV runway is inundated with sand and debris. This is just a nor'easter. Of course, nor'easters tend to do the most damage here.

Okay. This is the alternative portion of our discussion. Ongoing seawall maintenance. As I mentioned before, these storms that we've had have been kind of chronic in nature; they have just been eating at our seawalls. They've sat here -- I think the November storm sat here for seven high tides; it just ate -- chewed up on the seawall and the sand in front of it, and we've lost some elevation because of it.

But we're going to do some ongoing seawall maintenance as part of this project. We just had funding to do that. We have three alternatives to consider. I think some of you were here when we considered the beach fill groin as our primary alternative, but we will talk about that in a little bit more detail.

So we have three alternatives: Beach fill only, which also extends the seawall. All of them have the extension of the seawall in this project

embedded. Beach fill only, beach fill and groin perpendicular to our property line, and beach fill with detached breakwaters.

We have had ongoing meetings and discussions with our folks that are helping us from the Corps. The URS is doing the EIS, and we also have the ITR Team, Independent Technical Review Team. I think the next slide speaks to who those individuals are and what they are doing for us.

Through those meetings and constant dialogue and research and design, we've kind of determined that when we first met you, we were thinking that our groin project would be our primary alternative, but we got public comment against that, we got -- and then we met with our ITR team and our design team, and they basically have -- we figured out that all three of these projects have similar technical merits, and what's important for us is the cost of all three projects is similar.

So we -- knowing all that, we decided to make beach fill the preferred alternative. One other issue we discussed when we first met you-all was Blackfish Bank. The idea is taking sand off Blackfish Bank. Blackfish Bank is the closest structure out in the ocean we can pull sand from. But we had a lot of

comments, we did a fish -- a survey of all the fishermen and all the charter boat captains, and they wanted us to stay away from Blackfish Bank. And then we had some further modeling by folks in the Corps, and they determined that if we mined Blackfish Bank long term, there would be some negative effects to Assateague. So we backed away from that, and I will have a slide show on that shortly.

Our implementation schedule for this project, we hope sometime later this summer to begin a seawall repair in targeted areas, about 2500 feet or so of seawall we need to repair. We need more, but that's what we have budgeted. And we hope to start extending our seawall south up to 4600 feet. Right now the project is probably in the 1500-foot range this fall as well, probably extending into 2011 calendar year.

Then in 2011, probably springtime, we hope to begin our first phase of a two-phase project to put 3 million cubic yards of beach on Wallops Island that is not there today. That will end up being somewhere between 70 feet and 110 feet of dry beach at high tide, depending on how we get bids in and what gets funded.

Project status. I won't dwell on the

draft PEIS's while you-all are here. Josh will talk a little bit about that, so I'm going to jump down and talk about design. 30 percent design we've already marched through up in October, February, Josh and I traveled to Norfolk and reviewed the 60 percent, 90 percent should be here in May, and then July timeframe to coincide with our EIS project completion will be in July, a hundred percent.

Okay. I spoke briefly about the ITR, Independent Technical Review Team, and I know a lot of you were here last time and you know who they are, but we will speak a little bit about it.

The idea about the ITR Team actually was brought up way earlier in our project, and I kind of didn't think it was a good idea, then I slowly warmed up to the idea. But, basically, it's to provide independent technical review of all documentation related to this project, to evaluate the scientific and engineering studies relative to the stakeholder comments, all the comments we received from the public, we allow them to look at that and the response on that, and they've commented on that.

They identified strengths and weaknesses for our project. They made -- or part of the deciding voice to push us away from the groin. They consist of

four university professors with 125 years experience doing this kind of work, and they have -- most of them have done work in this area.

Technical information that was new to us last time, but I will repeat this time in case anybody didn't hear. We've done additional modeling. We remodeled the model again, and we've determined the net sediment transport along Wallops Island is to the north.

Any given day, any given year it could be to the south, net, but the net, sediment transport, is to the north. Primary reason of that is the groin -- fishing point groin to the south. So our predominant wave action that comes from the northeast is sheltered basically by that piece of land growing south, and we believe it's going to continue to go south.

Blackfish Bank, here's the issue of Blackfish Bank: Blackfish Bank is obviously the closest structure to us to grab sand from; however, it's also the closest to Assateague, and it costs money to steam out here.

This costs less money than going to here and there, and there is even more, so... But we got comments from the public that Blackfish Bank was a bad idea. We got the modeling results that also said it

could potentially be a negative impact to Assateague, so we have now decided to go to Site A and take Blackfish totally out of the running for getting sand.

One other small thing, we have a large build-up to our north. Our north is kind of secreting sand, and we are investigating the idea anyway in the EIS to potentially take some of this sand off our own beach and use it for some of our renourishment efforts.

The problem with that is not enough sand, Number 1, but it may not be cost effective to do it as well. It might be cost effective to just bring a dredge in and do the whole shooting match.

With that, I'll turn it over to Josh, and then when Josh finishes, we will sit here and take any questions you might have.

MR. BUNDICK: Thank you, Paul. Again, Josh Bundick, and I am the project manager for the environmental impact statement. I work in the environmental office, and our job is to make sure all Wallops projects follow the NEPA process.

And I will give you the quick 15-, 20-second debrief on NEPA. NEPA is a federal requirement that the government assess the environmental impacts of its proposals prior to

implementing those proposals, and that's, of course, why we're here tonight. We assess the impacts, disclose those impacts to the public and to the regulatory community, and then incorporate those comments into our final decision document, and then, in effect, make an informed decision based on the best technical and scientific information available. So that's kind of why we are here tonight, and I'm to talk more about the EIS process.

Back in April of 2009 we all were in this room listening to this initial proposal, and the purpose of that meeting was to conduct scoping, and the purpose of scoping is to get feedback on the proposal prior to beginning the EIS process.

And the concerns that were raised during that 45-day window and the meeting that we had here in April was that the preferred alternative at that time was an alternative that included a terminal groin at the south end of the project, and that was the lion's share of the comments that were received during that time.

And, of course, in the EIS we do disclose the uncertainties inherent in the modeling that we predicted and that although the modeling may have shown that the groin would not have an adverse effect

on sediment transport to the south, we couldn't say that for sure.

But there is some uncertainty out there with having a rock structure in the ocean, and, therefore, it was changed that the project's preferred alternative would not include that terminal structure.

A second comment that was received was regarding the relocation of our launch range infrastructure, perhaps moving it westward from Wallops Island where it's been since the '40s to perhaps the mainland or to the main base.

And in the EIS we considered those concerns and actually worked with our range safety office in developing an analysis of what type of effects that might have on landowners in Assawoman, in Atlantic near Chincoteague if we were to do such a thing. And, again, we explained why the risks -- the safety risks are inherently unacceptable to NASA and why that's not an acceptable alternative for us to consider in the EIS.

And regarding biological impacts at the bar sites, as Paul mentioned, we did remove Blackfish Bank as a shoal under consideration due to the potential effects to commercial and recreational fishing in the area.

Also, we are consulting very heavily and closely with the National Marine Fishery Service in determining the best way to dredge the shoal, whether it be Shoal A or B, 10 or 15 miles off of Assateague to minimize the environmental impacts on those shoals throughout the life of the 50-year project.

And, of course, there was some concern regarding the ability of NASA to maintain and/or fund the project. And, of course, as being a federal agency, we are subject to the appropriations from Congress, and in the EIS we do acknowledge the fact that there is some uncertainty in the out years, say 45 years down the road, whether or not we can guarantee funding or not.

And, of course, having a rock structure in the open ocean is inherently risky given those considerations. So, again, we acknowledge that in the EIS, and our preferred alternative certainly contains the least damaging -- environmentally damaging alternative if funding in the out years was unable to be secured.

Just a brief rundown on the studies and the analyses that have been conducted to support the EIS: First, Dr. Dave King with the ERDC, down in Vicksburg with the Army Corps of Engineers, performed

a very thorough sediment transport analysis, both the effects of the dredging on the offshore shoals and Assateague Island, but, also, the near shore sediment transport on Wallops Island and Assawoman Island.

And we found through that modeling, there should be no measurable impacts to either Assawoman Island or Assateague Island from the project.

Regarding the biological resources, Jeff Ridenhour and his team from URS spent a couple of the best weeks of his life out in the boat in the Atlantic Ocean this past summer, not only performing underwater archeology but actually out there with a drop camera taking video footage of those shoals at I believe it was 40 different stations at each shoal to better characterize the bottom dwelling habitat, do we have any hard substrate out there that fish might find to be preferable or is it all consistently sand.

And what we found is that both Shoals A and B are consistently the same. We are also consulting with the National Marine Fishery Service and the Fish and Wildlife Service right now to determine the level of effects we might expect to threaten an endangered species, namely sea turtles, protected whales, protected mammals, seals and porpoises and whatnot, as well as piping plovers, red

knots, and the nesting birds on the beach.

And regarding the cultural resources, I mentioned before, we've been consulting with the Virginia Department of Historic Resources since the beginning of the project, and just today we received their concurrence that the project should have no effect whatsoever on historic or prehistoric archeological resources for either alternative.

And as the programatic environmental impact statement continues to develop from draft to final, we will keep our website continually updated with its status. I recall at the December 8th meeting that we had here there was some interest in our sharing the video footage from the shoals on the website. We have updated the website to include that information. Of course, it includes all of the EIS and its supporting documents.

And there's, of course, the web link. The document in its hard copy format is available at all the local libraries from Chincoteague south to Nassawadox. We also have hard copies and CD's available for those of you who might want your own personal copy, and, of course, if there is anyone that is not on our existing project distribution list for both e-mail and hard copy information, you can

certainly sign up in the back tonight and we will be glad to add you to that.

And the comments on the project at this point are due April 19th. Our previous announcement that we may have sent out noted April 15th, but we have extended it out an additional four days to incorporate some processing time that was needed prior to our Federal Register announcement back in March. So, again, the comments are requested by April the 19th.

And with that, just I would like to open it up for any questions that you might have on the project. And as Keith mentioned before, this is not necessarily the time to speak for the record as, you know, this is more of an informal session where, you know, anybody has any questions regarding both the project or the environmental effects.

We will be glad to answer those, or if Paul or I can't answer them, we will certainly defer to our technical team sitting here in the audience. So thank you.

MR. KOEHLER: If anybody has any questions at this point about the project itself, just raise your hand and I will bring the mike to you.

Yes, state your name and ask away.

MR. SEYBOLT: My name is Ace Seybolt. I have a comment, which I will do later, but I have one question. Should eventually NASA have to switch to Alternative 2 or 3, would you do this whole, I guess you call it NEPA or EIS process all over?

MR. BUNDICK: Yes. The purpose of -- what -- the document that we prepared was the programatic document, meaning that there are elements within the program that are, you know, of course, unknown at this point. We can't say with absolute certainty between now and fiscal year 2017 how exactly -- are we going to have to put 2.3 million cubic yards or 2.4 million yards back on the beach.

So we recognize that uncertainty and prepared this document knowing that for future renourishment actions or changes to the program that are outside of what we select as our preferred alternative would be subject to additional NEPA review, focusing on that specific action. So the answer is yes.

MS. SCHUPP: This question, I think really is for Dr. David King. In the engineering report on the impact for the Assateague shoreline, Dr. King suggested that perhaps dredging Shoal A, which is a little further south but closer to Assateague

Island, that that might have fewer impacts on that narrow part of Assateague that's retreating a lot faster than the part just south of Tom's Cove.

I was wondering if you could shed a little more insight on the resolution of that, if that's a plus or minus ten miles shoreline impact or if it's on a smaller scale than that.

DR. KING: Can you guys hear me? I don't have the figures in front of me, but in Chapter 8 there are those three figures that show the impacts to Blackfish Bank, to Shoal A, and to Shoal B.

This isn't a real scientific study, but if you just look at where the largest impacts are relative to where Tom's Cove is, relative to where Fishing Point is on those figures, you will see that for Shoal A they're shifted to the fishing point area, whereas in the impacts to Shoal B are a little more focused on the Tom's Cove area.

I didn't do any kind of statistical analysis up and down the beach saying where the biggest impacts were. I was -- the origin of that comment was just from looking at those figures, basically, okay?

MR. BUNDICK: And here they are, Dave.

DR. KING: I can hold them up, but

that's -- yeah, just the squiggly lines that are adjacent to the pictures on the left-hand side of those three pictures.

MS. SCHUPP: Right. And conceptually that makes sense, but I was wondering for -- you know, from a land management perspective if that -- you know, how big a grain of salt to take it with, you know, if I should really be concerned about a 20-mile stretch or if it's really safer say to Dredge A versus B.

DR. KING: There is probably not going to be a lot of impact. The guidelines that Mineral Management Services provided that they give us that coefficient, that was the basis for that line that I present in the report. It's a fairly conservative number, result to get.

They could have given other guidelines that would have allowed more leeway, I think. I'm not sure it's necessarily in the guideline I would have chosen if I were -- if I were presenting that, but that's not me.

But your question is a good one, and I think that you're probably getting to the limits of the modeling capability. I don't want to speak in very dogmatic terms about the details of that. You're

at about the limit of what the models are capable of telling us. I shouldn't be leaning back here.

Yeah, to get to a more detailed understanding, you're going to very rapidly get to the point of saying that we just don't know, don't have the capability of saying where the zero impact is, where the real minimal impact is, and where you draw the line between what is an acceptable impact and an unacceptable impact.

The -- what the -- this figure -- and I'm sure that most of you are thoroughly lost on this subject -- shows is -- compares the changes in the transport rate that you get on the beach from modeling -- from dredging each of these different shoals compared with what the normal year-to-year variability in the wave climate is.

It's not reasonable to say that if there's one more grain of sand or less, more or less transported because of the offshore dredging, that that's an unacceptable site.

But, okay, well, if one grain is more or less than -- then will get moved is okay, is two grains okay? Is five or ten grains? Well, all of those, sure. But a hundred gazillion grains where you have huge cutbacks in the beach is not.

And there is no obvious line that you can draw and say that this is a significant impact and something a little bit less is an insignificant impact. And, frankly, you're also at about the limit of how much you want to trust the modeling effort.

I'm not sure that's the best answer or the answer that you would like to hear, but that's pretty much the state of modeling of where we are.

Now, did that go into it enough?

MS. SCHUPP: Yes, thank you.

DR. KING: More than enough?

MR. BUNDICK: Now, just to add one thing to Dr. Dave's response was that -- just for everybody else: The modeling, the analysis that he did assumed that all the sediment required for the 50-year life of the project was all removed in one fell swoop, which, of course, would not be the case in reality; it was just, again, designed that way so that we could provide a conservative analysis to make up for some of the uncertainties.

MR. WOLFF: Ron Wolff. The question that I would have, this year being a very different year as far as storms that have affected the island, with this 50-year project in mind, is this year and the number of northeast storms that have affected the island, is

this something that is unique or is this something that is usual in your 50-year analysis?

Do you plan for these type of storms on a more frequent basis or less frequent basis? I know, you know, this one is kind of unusual, but --

MR. BULL: That's why I asked Shari to put us on this slide. This is the data set that Dr. King worked from. Nor'easters, we had 39 between '54 and 2003. Of course, what we're having this year is not modeled, but I can't say, and maybe -- we don't have a meteorologist here, but I can't say any years within that time period had the same kind of veracity of storms that we had this year.

I don't know if you want to add a little bit to that.

DR. KING: Yeah, just a little bit.

MR. BULL: Just a little bit.

DR. KING: I will try not to be too windy.

Yeah, the modeling is based on historical data sets. And this is the storm data set that was used. There is also a 20-year wave climate that was used between -- the years for that were from 1980 to 1999.

Yeah, this has been a bad winter. How

bad it is is not clear since I know there were big waves out there, but I don't have the actual data on them.

So to really answer your question, we needed to do the modeling work before we got to this winter, so this stuff has not been incorporated into the modeling effort to date.

MR. BULL: I guess to follow up on that, Dave, if this project was already done, we wouldn't have experienced any of the effects to the extent we've experienced this winter. That's pretty much an easy thing to say. If you had 70-foot or a hundred-foot of beach at mean high water out there when we had these storms, the impact would have been minimal.

MR. BUNDICK: The fact that the crashing waves would not have been on our seawall, it would have been a hundred, a hundred five feet seaward would be the benefit of having the beach out in front.

MR. KOEHLER: Any more questions? Any more comments from you guys?

MR. BULL: I don't think so.

MR. KOEHLER: At this point then, we will go into the official comment period. If anybody would like to make an official comment, just raise your

hand, I will come by with the mike.

MR. SEYBOLT: Someone has to speak. Again, my name -- for the recorder, my name is Ace Seybolt. I spoke last, I guess that was April or whenever. As I said before, I own the farms behind Assawoman Island and I used to own Assawoman Island.

As a taxpayer and a citizen of the county, I appreciate all the work you have done, especially since this winter you were probably looking over your shoulder holding a life jacket some of the time.

As before, my comment deals with the groin and the detached breakwater. They do not seem to have been foreclosed as an option in the report, and to a layman nothing in the report seemed to incorporate all the negative impacts or studies concerning groins.

And, actually, you seem to be saying there would be no impact on Assawoman. So that is my comment. Thank you.

MR. CHESSER: I'm Grayson Chesser, and I'm the supervisor for Accomack County representing District 3. And before I spoke and I spoke against the seawall. Now -- not the seawall but the groin.

And I'm really happy to see that -- I'm

kind of unhappy to see it's still on the list, but I'm very happy to see that it's dropped down to Number 2. And because I think it would be disastrous for you if you go to that option.

And, you know, Wallops is very important to us. Some people I think think because I express my concerns about Wallops that I am somehow opposed to it. But a large part of my closest family members work at Wallops. An awful lot of my friends, former classmates work at Wallops.

It's absolutely, you know, vital to the county that you succeed, and I wish you-all the best. The reason I spoke against the groin is because I think it would be detrimental not only to you but to all of us who depend on you.

You know, we have a lot riding on you and your success, and we want you to be successful, and I hope that -- hope that you are, and I think you have made the right choice.

Like I said, I would rather see the groin completely eliminated because I've spent an awful lot of time out there in the winter. Almost all these slides you can see show places that I hunt, and so I see a lot of what's going on. And I think I started going out there in the '50s and, you know, seeing all

the changes, and it's very dynamic, and I think the choice that you have made is the only logical one to make. Thank you.

MR. PARKER: For the lady with the flying fingers, I have this in writing again. My name is Steve Parker. I'm director of The Nature Conservancy's Virginia Coast Reserve.

This globally important natural area consists of 14 barrier islands and several mainland properties owned and managed for conservation purposes south of Wallops Island. The Nature Conservancy is a nonprofit organization with operations in 50 states and 35 foreign countries. Our mission is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

We help with the protection of over 100 million acres globally. The Virginia Coast Reserve is one of our most important preserves.

I wish to thank NASA for conducting an open, participatory NEPA process and for listening carefully to the comments of scientists, stakeholders, and this community.

And in completion of our internal review of the PEIS, the Conservancy is in agreement with the

preferred alternative. Our concurrence, as well as our concerns with Alternative 2 and other comments and suggestions will be stated in writing during the present public comment period.

NASA Wallops has a mission that's very important to this country and to our community. The Nature Conservancy looks forward to continuing to work with NASA in the future, and thank you again for the opportunity to participate in this very important process.

MR. KOEHLER: Any further comments? Okay. Seeing no further comments, we thank everybody for coming out tonight, and, again, any written comments you need to provide, do so by April the 19th. Okay. Thank you.

(The hearing was concluded at 6:44 p.m.)

Independent Technical Review Team Comments

Please note that Independent Technical Review Team Memoranda 1 and 2, dated August 31, 2009 and December 21, 2009, respectively, are not included in this Appendix as they were based upon reviews of preliminary working drafts of the SRIPP DPEIS. The focus of Technical Memorandum 3, included in this Appendix, is the DPEIS that was available for public review and comment.

Technical Memorandum #3

Independent Technical Review of the Draft Programmatic Environmental Impact Statement: Wallops Flight Facility Shoreline Restoration and Infrastructure Protection Program

Michael S. Fenster, Laura J. Moore, Robert G. Dean, Robert Dolan

April 5, 2010

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Minor technical comments contained in a previous version of TM #3.

Introduction

This review represents the third Technical Memorandum (TM) developed by an Independent Technical Review (ITR) Panel tasked to review and evaluate the Shoreline Restoration and Infrastructure Protection Program (SRIPP) Draft Programmatic Environmental Impact Statement (EIS). The specific tasks for this TM include:

- outline the findings from a review of the Draft Programmatic EIS;
- identify strengths and weaknesses of the document, with comments focusing primarily on the status/resolution of previously identified issues from past reviews; and
- provide recommendations to any deficiencies identified.

Below, we provide our review in sections:

- Resolution of Previously Identified Issues
- Level I Technical Comments and Recommendations: Highest Priority
- Level II Technical Comments and Recommendations: High Priority

We ranked our technical comments and recommendations into two priority categories based on the ITR team's professional judgment as to their importance in addressing deficiencies or improving the overall quality of the SRIPP and the PEIS. Level I technical comments and recommendations are of greatest concern and should be addressed with the highest priority during the editing period. Level II technical comments and recommendations are also of concern and we strongly recommend addressing these comments as well.

Although not included in the comments below, the ITR Panel remains concerned about the southern groin option in Alternative Two and the southern breakwater option in Alternative Three. While the ITR recognizes that the initial plans (Alternative One) will not include construction of the southern groin or breakwater, we strongly recommended in TM #1 (Section 2.4.1) and the ITR Panel continues to recommend that Alternative Two, which calls for a south terminal structure as an adaptive design option, be removed from the PEIS. Similar consideration should be given to abandoning Alternative Three (with a single south nearshore breakwater) given that the impacts can be expected to be similar to those of the south groin.

As discussed in more detail later, we strongly recommend an "adaptive design" approach to addressing the uncertainties attending the complex sediment transport system in the vicinity of Wallops Island. This would both recognize the real uncertainties and pave the way for valuable flexibility in future actions where needed. Additionally, the Corps of Engineers has recommended adaptive design approaches where warranted.

Assuming that NASA will integrate an adaptive design approach, the ITR Team advocates the following reprioritizing of Alternatives:

Alternative One: Seawall and beach nourishment (current Alternative One)
Alternative Two: Seawall, beach nourishment, and north groin
Alternative Three: Seawall, beach nourishment, and a north breakwater

Current Alternative Two: Seawall, beach nourishment, and south groin - ELIMINATE
Current Alternative Three: Seawall, beach nourishment, and south breakwater - ELIMINATE

Finally, the ITR encourages statements in the EIS as to the options available after this project has fulfilled its life. For example, if the site is abandoned, will the structures be removed? Might the Project be extended beyond the 50-years currently planned? Answers to these questions will provide valuable information to the public as they contemplate the next generation charged with managing infrastructure protection projects and natural environments.

Resolution of Previously Identified Issues

Many of the issues identified previously by the ITR and described in Technical Memoranda #1 and #2 have been completely or partially addressed thereby strengthening the current version of the document. We note that improvements include:

- Increased emphasis on possibility of recycling sand from the north.
- More complete analysis and discussion of a relocation alternative.
- More complete geologic and geomorphic background provided along with more appropriate citations of original work.
- Enhanced discussion of sea-level rise within Chapter 3.
- More transparent presentation of uncertainty in the position of the nodal point via identification of 95% confidence limits in net transport rates and notation of a "nodal zone."

Level I Technical Comments and Recommendations

Level I Comment #1: Adaptive Design

It would seem appropriate to introduce the concept of "Adaptive Design" more explicitly in regard to the determination of whether or not a structure is needed, and if so, the location of the structure. The Adaptive Design concept acknowledges that uncertainty exists in the magnitudes and directions of net transport and, in particular, in the location of the nodal point. Under Adaptive Design, design alterations or a decision to implement an alternative design in the future would be based on the understanding gained from the monitoring results. At this stage, defining the groin location to within a 5 m longshore location conveys an unwarranted understanding of the sediment transport system. We suggest adding text to section 2.5 along the lines of that which appears at the beginning of Chapter 5. The text currently at the beginning of Chapter 5 discusses an adaptive management strategy whereby mitigation measures are optimized. Our suggestion is to apply the same principles to project *design* in Chapter 2, by explicitly discussing the intention to adapt any future project design modifications/additions based on results of monitoring efforts. A logical order in which to frame this discussion could include: (1) Adaptive Management and Design; (2) Uncertainty; (3) Alternatives; and (4) the need for a supplemental EA or EIS after a monitoring period.

Level I Comment #2: Most Effective Location of a Structural Alternative

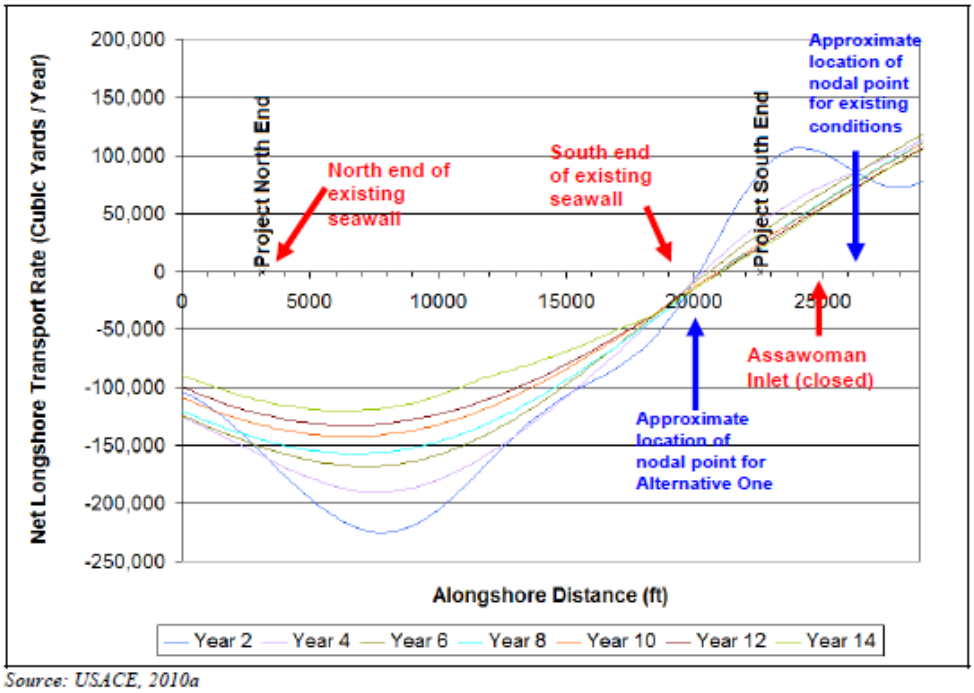
With the present design, there is confusion associated with the groin and offshore breakwater alternatives. Page ES-2 states:

> "Construction of the groin would result in more sand being retained along the Wallops Island beach, so less fill would be required for both the initial nourishment and renourishment volumes compared to Alternative One."

Figure 42 (reproduced below as Figure 1) which applies for the case of no structures (Alternative One), shows that the groin would be installed at about the location[1] of the nodal zone. According to this figure, during a five-year period, the north end of the project would lose more sand (by a factor of approximately 1.8) than the south end. The ITR Team questions the amount of total sand loss (north loss + south loss) used in determining anticipated 5-year fill volumes. We note a potentially greater total loss of approximately 1.5 times over the first 5 years than reported in the PEIS on p. ES-2, p. 57, p. 61 (Table 6), and p. 223 (by our calculations, approximately 1,165,000 cy compared to 806,000 cy). It appears that the last two present alternatives are, to some degree, an artifact of the original design when the net transport was believed to be strongly

[1] The groin would be installed 445 m north of the boundary between Wallops Island and Assawoman Island.

south at the south end of Wallops Island. Though the ITR continues to endorse the preferred alternative (no structure), substantial advantages may exist in changing Alternatives Two and Three to include a structure at the **north end** of the project, rather than at the south end, as discussed below.



Source: USACE, 2010a

Figure 42: Net Sediment Transport Rates over Time for Alternative One

Figure 1. Net Longshore Transport Estimates for Alternative One (No Structures).

A structure at the south end has the potential of either causing erosion or being perceived as causing erosion on Assawoman Island whereas a structure at the north end of the project would retain any impact on Wallops Island. The lack of a structure at the south end would benefit Assawoman Island.

A structure at the north end of the project would maintain the area north of the north structure as an "environmental preserve" which would not be disturbed by back passing and would guarantee that backpassed material from south of the north structure would be the same quality as placed in the initial nourishment. The material collected by the structure could be backpassed on a more-or-less continuous basis "in the dry" by earth moving equipment operating on the beach. This would have several advantages including at least doubling or tripling the renourishment intervals from offshore sources and the ability to address localized "erosional hot spots" without the need for dredge mobilization, thereby reducing project costs and environmental impacts due to large emplacements and removals from the offshore shoal(s). Also, prevention of the transport of the material placed to the extreme north end of Wallops Island would have advantage of not

increasing shoaling pressure on Chincoteague Inlet. This Alternative would provide a "conservation of sand approach" without impacting the existing ecology farther north on Wallops Island.

In summary, the benefits of a northern groin - in lieu of the southern groin for Alternative Two - include:

- Reducing the perceived or real adverse impact on downdrift islands;
- Recapturing sand of same quality as initial nourishment;
- Reducing shoaling pressure on Chincoteague Inlet;
- Retaining all potential adverse impacts within Wallops Island;
- Extending renourishment intervals from offshore sources by factor of 2-3;
- Lowering costs;
- Providing a capability to address erosional hot spots as they occur;
- Recycling sediment on a more continuous basis thereby reducing adverse impacts due to large volume placements; and
- Creating an "environmental preserve" north of the groin.

Also, on Figures 42 and 43, why not include a corresponding plot of shoreline change rate? These rates can be calculated from these figures by a specialist, but not the layperson.

Level I Comment #3: Dredging Plan

It seems that the plan is, for each nourishment or renourishment, to dredge uniformly the designated areas in Shoal A and/or Shoal B. To minimize disturbance, wouldn't it be better to dredge a smaller area deeper each time, thereby disturbing less biota since the majority of the biota live in the upper 15 cm or so? We recommend examining several candidate dredging scenarios, determining which is most advantageous to the biological system and detailing to a greater degree, this preferred dredging scenario.

Additionally, in discussing the disruption to the sea bottom due to dredging, if trawling for shrimp and/or clams occurs on these sand ridges, it would be appropriate to discuss this trawling to put the disruption due to dredging in perspective.

Level I Comment #4: Mean Grain Sizes

It is still not possible, from the information provided, to ascertain how the mean grain sizes reported from Unnamed Shoals A and B were derived. This issue is of importance in substantiating claims of sand compatibility and renourishment volumes. Why not clarify sample

analysis and calculations of mean grain sizes? For example, p. 43 states, "The mean grain size in the top layer of Unnamed Shoal A is calculated to be 0.42 mm while the top layer of Unnamed Shoal B has a mean grain size of 0.34 mm." How were these means calculated and what is the standard deviation? Providing some measure of spread in mean grain size would be useful. Appendix A provides insufficient information to assess these questions and no other source of documentation is provided. Are the means calculated from the composite values provided for each core?[2] Are they an average of all grain size measurements taken in each core? Are they volumetric averages? Further, Appendix A appears incomplete without inclusion of information summarizing grain size calculations and sampling procedures associated with the table provided. For example, each upper, mid and lower core position is associated with a single analysis of grain size. Grain size can (and does) vary significantly with depth such that selection of a single sample from a section of core that is several feet long may not be representative of the average grain size across that section. How were the samples within each depth range selected and what criteria were used to determine the depth ranges analyzed? In summary, transparent reporting of procedures is advisable and would improve the reader's confidence in the summary values reported. We also suggest including standard deviations for individual grain size analyses as well as for the mean grain sizes used in modeling and analysis of renourishment volumes. The effect of data spread on model results should also be addressed (see also TM #1, section 2.3 and TM #2, section 2.3).

Level I Comment #5: Use of Historical Aerial Photographs

Use of historical aerial photos as evidence for temporal shifts in longshore transport directions is misleading. For example, p., 99 states, "Northerly sediment transport is evidenced by the accumulation of sediment on the southern side of the previously existing groins (Photo 8, taken in 1994), and evidence of southerly sediment transport in the past is shown in Photo 9 (taken in 1969). As discussed in the ITR TM #1 and TM #2, aerial photos often capture seasonal trends in longshore sediment transport that are not indicative of long-term net transport direction. In TM #1 we suggested that an analysis of historical aerial photographs be carried out. In TM #2 we recommended that the document at least acknowledge the appearance of southerly trends in photographs beyond the one shown in Photo 7 of the previous draft of chapter 3. Currently, a single historical photo showing transport to the south has been added to the document. The implication is now that transport was always to the south historically (e.g., Photo 9) and is now always to the north (e.g., Photo 8). This implication is misleading and has the potential to be interpreted as an attempt to selectively present data that supports a desired conclusion.

[2] Composite values would be most appropriate as the dredge and placement operation will thoroughly mix the sediments removed.

We strongly suggest either:

1. removing the aerial photographs and associated text from the document completely,
2. adding a statement following presentation of the two photographs that clearly acknowledges the possibility for aerial photographs to capture seasonal reversals thereby making it difficult to conclusively determine net long-term transport directions from aerial photographs, or
3. carrying out and presenting an historical photo analysis and adding a statement to the effect of that discussed in 2 above.

Level I Comment #6: Monitoring and Mitigation

Given the importance of mitigation and monitoring in determining project success we suggest a few revisions to this section. Appropriately, the potential for long-term adverse effects on geology (e.g., narrowing and/or lowering of the barrier island landform) due to prevention of overwash has been added to the discussion of impacts earlier in the document. Given the broad scale of such an impact, it seems prudent to address this matter – at least briefly – in section 5.1.1.1. Chapter 5 provides discussion of a shoreline change monitoring program as suggested by earlier ITR TMs, however, we suggest expanding this section to provide additional detail and to address some potential deficiencies in the monitoring plan. Although model results have indicated that there will be little effect of the reduction in shoal volume on Assateague Island, is it worth considering inclusion of Assateague Island in the monitoring program, at least initially, to verify that this determination is likely correct? Additionally, clearer and more complete articulation of the beach monitoring program is necessary to demonstrate that such a program will meet the project needs - especially in light of the adaptive design approach. For example, more detail on data collection and analysis should be provided, along with a few references to existing studies that follow similar established procedures. Examples of areas to be addressed include:

- Will topographic profiles be generated from LiDAR data only or will ground surveys be included? If the latter, how will the two different types of surveys be tied together?
- How will bathymetric profiles be collected?
- How will the gap between topographic and bathymetric surveys be closed? (Actually, some land based survey methods, i.e., rod and level, will be required to establish the profiles in water depths too shallow for fathometer soundings while maintaining adequate “overlap” with the fathometer data for quality control.)

In conjunction with the semi-annual surveys, we recommend collecting sand samples for analysis and comparison through time to aid in tracking beach fill movement. In addition to the semi-annual surveys we suggest that the monitoring plan include a discussion of the desirability of including post-storm surveys following significant events whenever possible. Though we acknowledge that it involves additional expense, we also suggest adding a directional wave gauge and a tide gauge to the monitoring program.[3] Both gauges would provide information that would benefit future modeling efforts greatly. Simple inclusion of statements indicating that monitoring will be carried out by an independent contractor with experience in monitoring, measuring and analyzing patterns of shoreline change would also strengthen this section.

Level I Comment #7: Sea-level Rise

The EIS states that **sea-level rise (SLR)** is "a necessary component of the project design" (p. 194) and Chapter 3 (Physical Environment, p. 78-79) highlights SLR as a process that makes Wallops Island particularly vulnerable to infrastructure damage; i.e., "The shoreline at Wallops Island would experience the effects of future sea-level rise, as coasts and barrier islands are particularly vulnerable to the sea-level rise and intensified storm and wave events attributed to climate change (Nicholls et al., 2007)." Moreover, the SRIPP encompasses a 50 year planning horizon – a time span long enough for SLR to impact the SRIPP. However, the first two chapters make little mention of SLR (first mention of SLR on p. 52) to the exclusion of references to storm damage mitigation and reducing "storm-induced" physical damage (numerous statements in Chapters 1 and 2). For example:

- Abstract – no mention of SLR
- Executive Summary – "storm" used 9 times; "sea level" used 0 times
- Chapter 1 - "storm" used 7 times; "sea level" used 0 times
- Chapter 2 - "storm" used 58 times; "sea level" used 1 time (p. 52)

Given the need for developing justification for the SRIPP, setting the context for the SRIPP, and using SLR scenarios in design selection and engineering models we recommend:

- **including SLR discussion earlier in Chapters 1-2 to provide balance between processes that produce changes over various time scales**. Possibilities include:
  Abstract – could mention possibility of climate change and SLR
  page 1: "This Programmatic Environmental Impact Statement (PEIS) has been prepared to evaluate the potential environmental impacts from the proposed Wallops

[3] In discussions with Corps Field Research Facility personnel, subsequent to the March meeting, we were advised that the initial cost of a directional wave gage was $ 120,000 rather than the $ 375,000 reported at the meeting. The annual maintenance costs were stated to be $ 20,000.

Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP). The SRIPP encompasses a 50-year planning horizon and is intended to reduce damage to Federal and State infrastructure on Wallops Island" caused by the combination of sea-level rise (SLR) and coastal storms.
page 2: "Two of these tenants, the U.S. Navy and MARS, have facilities on Wallops Island that are at risk from SLR and storm damages and would be protected by the Proposed Action."

- **improving discussions to include and emphasize the links between SLR and storm activity**; Sea-level rise is an important changing background condition that will make protection of NASA facilities increasingly difficult into the future by increasing the effect of storms, i.e., given the same storm today and in 20 years, the effect will be greater in 20 years due to higher water levels. For example, in Chapter 4: Environmental Consequences, no mention is made of the possibility of more frequent wave overtopping as sea level rises; the three brief paragraphs seem to short shrift the possible impacts (p. 194).

- **clarifying the role of sea level on the sediment transport regime**; for example, "As sea level rises, it is anticipated that the beach on Wallops Island would be exposed to increasing rates of sediment transport, and therefore would erode at increasing rates over time…" (p. 200). In addition, state the basis for this claim.

- Though Figure 15 appropriately shows a blue "sea-level rise fill layer" as included in the design, the approach and significance of this layer is not addressed in the main text, rather one must search for it in the appendix. We suggest adding a brief explanation within the description and comparison of alternatives in Chapter 2.

- It would also be useful to report the historical rates of sea-level rise for the study area, for example, from the Hampton Roads tide gauge.

Level I Comment #8: Downdrift Impacts

The downdrift impacts of Alternatives Two and Three are oversimplified and questionable:

- p. 204 (and elsewhere), is the only effect of the groin alternative a 300 m "shadow" area?
- p. 205 (and elsewhere), is the impact of the breakwater (i.e., erosion and LST) no more than 2.5 km?

- What is the principle whereby the breakwater causes an impact over a shoreline segment that is eight times longer than the groin?

Level II Technical Comments and Recommendations

Level II Comment #1: Improve Consistency and Accuracy of Impact Summary

The table summarizing impacts (Table ES-1: Summary of Impacts from Proposed Action Alternatives) should be edited to more accurately reflect main sections of the text that highlight the most important and most significant impacts. In some cases, the table appears inconsistent with, or to exaggerate impacts as described in the text. For example:

- "Over the lifetime of the SRIPP, the seawall extension and beach fill would have long-term direct beneficial impacts on geology and the Wallops Island shoreline by mitigating the current rate of shoreline retreat." This statement deals only with the impacts to the shoreline without treating the impacts to geology. As stated on p. 195, there will likely be long-term adverse impacts on geology because overwash will be prevented thereby causing island narrowing. This impact should be addressed in the summary table as well.

- "The addition of sediment to the longshore transport system would result in accretion at the southern end of Wallops Island and northern end of Assawoman Island" This appears to be a potentially misleading overstatement of text on p. 199 that reads, "In summary, under Alternative One, the rate of erosion on the southern end of Wallops Island and the northern end of Assawoman Island would be reduced due to additional sand available for transport…"

Level II Comment #2: Provide a More Balanced Presentation of Impacts

In general, this version of the PEIS is improved in terms of recognizing the positive aspects of the Project; however, we believe that the positive aspects merit greater emphasis to achieve a better balance.

Level II Comment #3: Justify 50-year Storm Event

Table 1 on p. 32 and the associated text on p. 31 of the PEIS provide a discussion of the initial screening of project alternatives. This table appears useful but is somewhat misleading in that it pairs each alternative with a specific level of storm damage reduction. If this table is to be used it

should be clearly indicated in the text and in the table that the level of storm damage reduction provided for each alternative is an estimate and therefore representative only of an *anticipated* level of storm damage reduction. For example, changing the text and second to last column heading to "Anticipated Level of Storm Damage Reduction" would provide clarification. Additionally, exclusively listing impacts on adjacent barrier islands as "positive" or "negative" oversimplifies to the point of confusion. Based on the description, this last criterion seems to be an initial assessment of whether or not the project adds sand to the longshore sediment transport system. We recommend providing a text heading (p. 31) and a column heading (p. 32) that is more reflective of this screening criterion (perhaps "Anticipated Change in Sand Availability for Longshore Transport").

Level II Comment #4: Further Clarify Uncertainty in Nodal Zone Position

Further clarify uncertainty in nodal zone position: The presentation and discussion of nodal zone are improved and better reflect uncertainty in position of the nodal point. However, for consistency and to maintain a consistent level of transparency, we suggest annotating Figure 26 in the same manner as Figure 25, showing the position of the nodal zone and reporting the 95% confidence limits on sediment budget numbers as +/- values rather than reporting only the average. Also recommend noting location of the nodal zone on all other similar figures, e.g., Figures 42-44.

Level II Comment #5: Improve Readability

To increase readability of the document by reducing repetition, is it possible to make some general statements that will avoid repetition? For example, could it be said: "In the following paragraphs, unless stated otherwise, all diesel engines will be required to use low sulfur fuel"?

Also, fixing grammar problems will improve both readability and credibility, e.g.,:

- farther vs. further , p. 75, 93, 99 to name a few (do a global search of entire document)
- data = plural, p. 78, 82, 94 "This data…," should read "These data…." "The data is…" should read, "The data are…." (do a global search throughout the document)
- hyphenate sea-level rise throughout the document, but not "the sea level rises" – only when sea level is used as an adjective, e.g., p. 98

Level II Comment # 6: Clarify Predicted Sediment Transport Patterns

Erosion is expected following the beach fill and GENESIS models have estimated the amounts in "Impact on the Shoreline from Seawall Extension," but where will all of this sand go and what will be the impact of the redistribution of this material? The EIS would benefit from more

specific statements than "…once the beach fill is completed, the short-term adverse impacts during Year 1 would be mitigated in the long-term and beneficial impacts on Wallops Island, Assawoman Island, and potentially other islands to the south would occur …."

Level II Comment #7: Address Potential Narrowing of Tom's Cove Isthmus

p. 200, Could changes in wave refraction patterns associated with mining offshore shoals contribute to "Narrowing of Tom's Cove Isthmus?"

Level II Comment #8: Address Impacts on Chincoteague Inlet

p. 203, clarification on the impact of beach fill and mining the north end of Wallops on Chincoteague Inlet is needed. While the EIS mentions eastward migration of Chincoteague Inlet as a function of the accretion at the north end of Wallops, no mention is made in the impacts section on the potential westward migration of the inlet in response to mining the northern end. Major changes to tidal channel bathymetry could be expected.

Level II Comment #9: Discuss Impacts of Historical Large Storms

The discussion of storms skips or omits the Ash Wednesday storm of 1962 and the Halloween Storm of 1989… probably the two key events of the past 60 years in terms of changes to Wallops Island. The EIS may benefit from discussion of specific large storm impacts.

Level II Comment #10: Review Accuracy of Invertebrate Impacts

Some of the information on the impacts on the major invertebrates is questionable. For example, the statement regarding their ability to survive while dredging is underway needs confirmation. Invertebrates cannot dig into or out of dry beach deposits. They require a saturated substrate in order to create a "quick" condition in the upper layers of the beachface. This behavior is discussed extensively in the coastal science literature that we previously submitted (e.g., Peterson *et al*., 2000).

Minor technical comments contained in a previous version of TM #3.

SRIPP ITR Minor Comments and Recommendations (Note: This is only a partial list)

- Edit to remove non-gender neutral language that may be off-putting to some readers (why take the chance of offending readers in this way, when it's so easy to avoid it?). e.g., Man's environment = human environment, man's activities = anthropogenic activities, etc.

- p. 33, second sentence of second paragraph- clarify. Doesn't make sense as written.

- Above Table 35. The ratio above this table should be dimensionless and should be: $0.047/7{,}150 = 6.6 \times 10^{-6}$.

- p. 52, Year 2 nourishment placement activities to "its equilibrium profile." How known?

- p. 52, 54, explanation of "minimum target fill" unclear and not carried out in the discussion

- p. 57, first mention of "monitoring," but unspecified ("on a regular basis")

- p. 57, the term "beach" used incorrectly twice

- p. 73, define acronym "BMP" at first use in each chapter.

- p. 76, "Nor'easters are difficult to predict because their wind speed is not always related to their wave heights."????

- p. 76 Zhang's paper cited as the only one that demonstrates storminess is not linked to global warming… but hurricanes are! (p. 77)

- p. 76, last paragraph, "…which is most damaging along long areas of coastal zones. Nor'easters are difficult to predict because their wind speed is not always related to their wave heights." These two sentences should be clarified and corrected.

- p. 77, second paragraph, "According to a 30-year study by Komar and Allan (2008), the waves off the east coast of the United States are gradually increasing in height, especially those generated by hurricanes." During the study, a net increase in the occurrence of waves…" The study by Komar and Allan was not 30-years long, rather the study investigated a 30-year wave record. The two sentences should be edited accordingly to correctly convey this information.

- p. 78, first sentence: "…how local historical changes and unique circumstances, like rate of subsidence, shoreline retreat, wave and tidal patterns, and presence of manmade structures, affect the sea-level rise within a particular area." Of the items listed, only

subsidence affects relative sea-level rise rate. The other items in the list should be removed.

- p. 81 states: “Bathymetry is the measurement of depth”. Isn’t bathymetry the product of the measurement of depth?

- Why is section 3.1.3 Previous Erosion Prevention and Shoreline Restoration Efforts in
- Chapter 3: Physical Environment section?

- p. 81 ff. Section on “bathymetry” only addresses Assateague and Fishing Point, but not Wallops.

- p. 93, Fishing Point is a “cape?”

- p. 95, section 3.1.5.4 Offshore Sand Shoals is not as detailed as the “Bathymetry” section on p. 81.

- Redundancies: waves, shoals, geographic setting

- p. 96 reads: “…and 11 seconds apart with an 11 second period.” Should read “…with an 11 second period.”

- p. 98, How are LST direction known?

- p. 131, How is the inventory of invertebrates known?

- p. 156 states: “Continental shelf edge sightings were generally associated with the 1,000-m depth contour…”The continental shelf edge is usually taken as 200 m.

- p. 167, Figure 33 – PHOTO MISSING

- Typo on Page 174. Should be “218 people per km^2”.

- p. 193, Cannot erode an inlet (Assawoman)

- NRC (1987) Report referenced for high/low eustatic SLR? Need newer reference.

- p. 195, accuracy of statement on p. 195 – 1st sentence under “*Impacts on the Shoreline from Seawall Extension?”*

- p. 205, strange terms: “benefit to sediments?” “opposite of the breakwater?”

- p. 195 states: “Construction activities would cause erosion in the short-term.”. Please explain the mechanism whereby construction activities cause erosion.

- In Tables 31 through Table 47, why are some of the columns in tons per year and some in metric tons per year?

- Typo on p. 205, Fourth Line: Should read “Three” rather than “Two”.

- pp. 207 and 208. In discussing the effects of the structures, it is stated, for example, that: “…construction of a groin would reduce erosion rates locally.” However, there is the potential that a groin (or breakwater) would either cause or be perceived to cause erosion to occur. Groins can be tricky in their effects and depend on wave characteristics, beach conditions between renourishments, etc.

- p. 209, in discussing infilling of borrow pits. Our understanding is that the infilling of borrow pits is poorly understood and that at least in some cases, borrow areas infill with considerably finer sediments than the native and that this process can take a substantial time.

- p. 209 and elsewhere: “slowing wave energy”. Not standard terminology. “Reduce wave energy”?

- p. 222. In discussing air pollutants emitted it states that “Allowance was made for 10% downtime….” Is the downtime relevant to total emissions released?

- p. 274 states: “Temporary increases in the volume of marine traffic would occur for approximately seven months during initial beach nourishment and approximately six months during each nourishment cycle.” Page 295 states: “In addition, the SRIPP dredging operations would last approximately 7 months during the initial construction phase and approximately 2 months during each renourishment cycle.” Why the disparity?

- Some of the conversions from km to miles are incorrect. For example, p. 274 converts 5 km to 8 mi. Also conversion problems are present elsewhere in the report.

- Table 33 and others. The releases are in terms of annual quantities. Are these averages and thus amortized over the 50 year period. Perhaps we missed this explanation.

- p. 257, wording. “driving the suction through the pipe”.

- p. 267. Should “induced” be “multiplier”?