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Federal Agencies				
USACE	Robert Cole	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. 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.	Cumulative Impacts	Section 4.7 of the PEIS, Cumulative Impacts, has been updated substantially including addition of a comprehensive past activities discussion and maps showing impacts on various resources since NASA's occupation of Wallops Island in the 1940s. More discussion has been added to the potential impacts under various resources.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Affected Environment	The PEIS text has been revised to state that " Most often, saltwater intrusion is caused by ground-water pumping from coastal wells (Barlow, 2003), or from construction of navigation channels. No such activities are proposed for the SRIPP. Salt water intrusion can also occur as the result of a natural process like a storm surge from a hurricane." The Barlow reference has been included in the reference list.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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	Alternatives	NASA, in conjunction with its cooperating agencies, feels that the alternatives considered in the PEIS best meet the purpose and need while balancing impacts, costs, and schedule. NASA consulted with NMFS and USFWS and the mitigation measures from the consultation have been incorporated into Chapter 5 of the PEIS. Additionally, NASA would implement a monitoring program and use an adaptive management approach (described

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		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.		in Section 1.4 of the Final PEIS). Future NEPA documentation for renourishment would describe potential environmental impacts, and NASA would consult again with agencies as appropriate.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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. In contrast, the sand retention structures described in alternative 2 and 3 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.	Alternatives	The intent of the PEIS is to be programmatic but to also allow for a sufficient level of detail for implementation of the Proposed Action Alternatives. Section 1.5 (Scope of the PEIS) of the Final PEIS has been updated to provide a more detailed description of how NASA plans to use this document to aid in planning for the SRIPP. Appendix A provides additional detail on the design of the Preferred Alternative. The USACE has also advanced the engineering design details of the beachfill since publication of the Draft PEIS and these are reflected in the Final PEIS. Regarding screening of the Alternatives, additional information has been added to Sections 2.3 and 2.4 of the Final PEIS to explain how various project configurations were considered but ultimately dismissed from detailed study.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	We recommend revising the alternatives discussed to be more consistent with the implementation and intent of a programmatic EIS.	Alternatives	Due to the immediate need for storm damage reduction measures on Wallops Island, the PEIS has been prepared to analyze programmatic impacts while also providing a sufficient level of detailed analysis to support the project's initial construction phase. Using the best available data and understanding of the sediment transport system at the time the Draft PEIS was developed, all alternatives were modeled very specifically to reflect actual impacts from initial construction. Longer term project options, such as sources and frequency of renourishment fill, were given a more programmatic treatment as details regarding those components are not fully defined. Section 2.1 of the Final PEIS has been revised to clarify NASA's strategy for the SRIPP. As part of NASA's Adaptive Management and Design approach (Section 1.4 of Final PEIS) and based on the results of future monitoring efforts, additional alternatives may be considered. Supplemental NEPA documentation would be prepared at that time.
U.S. Department	Willie Taylor	The migratory birds identified and considered in the	Birds	The Affected Environment (3.2.2.3) and Environmental

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of the Interior, Office of Environmental Policy and Compliance		DPEIS do not sufficiently address or represent the species that may occur in the area or the potential effects on them. … As we recommend 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.		Consequences (4.3.2.2) sections of the Final PEIS have been updated to include more information regarding birds including migratory birds and sea ducks. NASA would conduct bathymetric monitoring of the shoals that would provide information on the geomorphic changes to the shoals which could provide insight into the effects of dredging on EFH, fish species, and the birds that feed at the shoals.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Cumulative Impacts	Minimization and mitigation measures proposed for the SRIPP would reduce potential local and regional impacts to fish, wildlife, and conservation lands. Under the No Action Alternative, vegetation associated with the dune and swale zones and the shrub, thicket, and maritime forest areas located at the southern end of the island would continue to be at-risk as the shoreline continues to retreat. Increased overwash events would also impact coastal vegetation on Wallops Island. Over time, because this alternative would not prevent shoreline retreat, vegetation in the dune and shore environments may be adversely affected, thereby also adversely affecting fish and wildlife resources.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Cumulative Impacts	The text in Section 4.7.2.2 of the Final PEIS has been updated to reflect the complexity and level of detail needed to determine impacts from the SRIPP.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	We recommend providing a more detailed and comprehensive analysis of cumulative effects on all resources beyond stating that cumulative effects will occur.	Cumulative Impacts	NASA has updated the cumulative effects section (4.7) of the Final PEIS to include a more comprehensive list of past actions at Wallops Island, has added new resource sections, and updated existing sections to more fully explain cumulative impacts on specific resources.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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 of the two targeted shoals to maximize the shoals' wave attenuation function; to maintain the shallowest water wave-action processes,	Dredging	The dredging plan in Section 2.5.5.2 of the Final PEIS has been developed following the two most recent BOEMRE sponsored studies. Chapters 2 and 5 of the Final PEIS include updated dredging plans based on consultation with NMFS regarding EFH. Appendix J provides additional details regarding NASA's proposed dredging plan.

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		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 the wave focusing processes [vii].		
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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].	Dredging	Comment noted.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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].	Dredging	The dredging plan in Section 2.5.5.2 of the Final PEIS has been revised based on EFH recommendations from NMFS.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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].	Dredging	Comment noted. The dredging plan in Section 2.5.5.2 of the Final PEIS has been developed consistent with the two most recent BOEMRE sponsored studies.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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 the removal of such a large volume of either shoal may impact the regional sediment budget and sediment	Dredging	Consistent with the two recently BOEMRE sponsored studies; NASA would employ dredging techniques (avoiding erosional areas, not dredging to excessive depth, etc.) to minimize long-term effects on the offshore sand shoals. As a result, the shoals would continue to dissipate incoming wave energy. In addition, the dredged areas would fill gradually over time from local

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		transport pathways, specifically the sentiment 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.		sediment transport. The deep troughs landward of these two shoals would, in effect "isolate" the shoreline and its immediate profile off Assateague Island from the dredging effects. The shoals are detached shoreface ridges are isolated on the inner shelf. As such, these sand bodies have a high preservation potential and consequently, a low cross-shore sediment transport potential. Section 4.2.3.5 of the Final PEIS has been revised to provide additional information that supports this conclusion.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Editorial	The range of the Piping Plover habitat has been extended to the south to include the area where the 2010 nests were found. Text was added to Section 3.2.10.4 of the Final PEIS to clarify this point.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	In Table 22, we recommend clarifying VDGIF's joint jurisdiction concerning federally listed species that they also identify as threatened or endangered.	Editorial	The table has been clarified to state VDGIF as having joint jurisdiction for the species that have both a state and federal threatened or endangered status.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	The net sand transport direction shown in Figure 7 appears incorrect and inconsistent with discussion and photographs and groins and their function.	Editorial	Figure 7 is correct. The commenter may be misinterpreting the portions of figure depicted as beach versus ocean.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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. … In consideration of the largely unknown consequences of dredging the shoals, and with the	GENESIS model	It is understandable that while the modeling effort has shown that dredging either shoal A or shoal B would produce shoreline impacts that are below the MMS threshold, this does not completely satisfy reviewer concerns. The MMS threshold (Equation 8-1, pg 140 in USACE report attached as Appendix A to the PEIS) is a factor that is not easily interpreted. For example, some value of the factor cannot be interpreted as producing the same shoreline impact as a certain number of additional moderate storms per year. What can be said is that the threshold value of 1 is conservative. That is, given the dynamic nature of beaches, any impacts due to dredging can be expected to not be discernable within the natural variability of

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		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.		the shoreline. The modeling indicates that the largest shoreline impacts from mining either Shoal A or B would be less than the MMS threshold and are therefore marginal. The impacts from dredging either of these shoals is mitigated by the presence of Blackfish Bank and Chincoteague Shoal. In addition, the largest of Shoal A impacts would be south of the vulnerable Tom's Cove area. They will be in the vicinity of Fishing Point, an area which is rapidly accreting.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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. ... We believe that providing this type of context is necessary to adequately understand and consider the potential environmental effects of the project.	Habitat	Sections 3.2.2 (Wildlife), 3.2.7 (Finfish) and 3.3.1 (Land Use) of the Final PEIS have been updated to reflect the importance of the adjacent conservation lands and the fish and wildlife populations they support.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Habitat	The PEIS has been revised and now states that Assateague Island National Seashore extends into Virginia.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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 crest 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 deeps such as those above shoal crests.	Habitat	The dredging plan in Section 2.5.5.2 of the Final PEIS has been revised based on EFH recommendations from NMFS, which includes site specific dredging methods. NASA would target Shoal A for the initial fill and dredging would occur in areas that are accreting to the extent practicable. Erosional areas of the shoal would be avoided to the extent practicable. There is no plan to avoid shoal crests as recent studies have indicated that there is potential for recovery of shoal crest height provided the dredging cut depth is not excessive (MMS, 2010; Dibajnia and Nairn, *in press*). In addition, the crests have lower benthic abundance and diversity than the flanks and adjacent troughs (e.g., Cutter and Diaz, 2000; Diaz et al., 2006; Slacum et al., *in press*). Per Dibajnia and Nairn (*in press*) recommendations, NASA would not dredge along the entire length of the shoal.
U.S. Department	Willie Taylor	While the proposed project is expected to result in a	Habitat	Additional analysis has been incorporated into Chapter 4.7 of

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of the Interior, Office of Environmental Policy and Compliance		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.		the Final PEIS. NASA in consultation with USFWS recognizes that there is uncertainty of how the beach habitat would be used.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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 the use of the northern borrow area would help to reduce the 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 is needed.	Habitat	Additional information has been added to Chapter 4 resource sections of the Final PEIS to more clearly describe the potential environmental effects of excavating sand from north Wallops Island. As this component of the SRIPP is only a concept at this point, supplemental NEPA documentation, consultation with appropriate agencies (NMFS, USFWS, VMRC, etc.), and appropriate surveys and mitigation would occur prior to use of this area.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Invertebrates	The Final PEIS has been revised to incorporate the recommended statement.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	…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.	Mitigation and Monitoring - General	As described in Section 5.2.2.5, NASA will prepare a semi-annual report that summarizes the data collection and analyses and provides recommendations for future work. It is anticipated that future specific actions will require NEPA documentation that can be tiered from this Programmatic EIS to address potential project-specific environmental impacts.
U.S. Department of the Interior, Office of	Willie Taylor	We also recommend that the Preferred Alternative consider the possibility that future research may identify increased impacts to the Assateague Island	Mitigation and Monitoring - Shoreline	Comment noted. This recommendation is addressed with the Adaptive Management strategy that would be implemented with the SRIPP and is the purpose of monitoring program.

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Environmental Policy and Compliance		shoreline, so subsequent dredging for beach renourishment may need to include mitigation of shoreline impacts on Assateague Island and consideration of alternative dredging locations.		
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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.	Mitigation and Monitoring - Shoreline	NASA is committed to conducting the vegetation planting on the created dune. It would be included as part of the initial beach fill construction contract specifications.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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. … We recognize the reasons why it might 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).	North Wallops Island Borrow Site	The initial fill phase of the Preferred Alternative does not include use of the north Wallops Island borrow site. If north Wallops Island is selected as a renourishment borrow site, NASA would conduct new analysis including more detailed surveys of habitats in the potentially affected area, would re-initiate consultation with NMFS, USFWS, and DGIF regarding potential impacts and mitigation measures for protected species, and would prepare new NEPA documentation. Chapter 4 of the PEIS has been updated to include more information on impacts from excavation of north Wallops Island.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	The project, as proposed, is not being designed or implemented to prevent loss or damage to 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.	Project Effectiveness	NASA assumes the comment is referring to the 100-year design storm return interval which means there is a one percent chance each year for a storm of the 100-year magnitude to occur. As such, there is not a 50 percent chance that the project would fail. However, NASA realizes that the magnitude of the 100-year storm may increase over time therefore NASA has committed to an adaptive management strategy.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	ASIS (*Assateague Island National Seashore*) 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.	Project Impacts - Shoreline	Results of the USACE modeling to evaluate potential impacts from dredging on ASIS indicate that no measurable impacts would occur to the ASIS shoreline. In addition, NASA would follow guidelines recommended in the two most recent BOEMRE sponsored studies. As a result, the shoals would continue to dissipate incoming waves. Also, the dredged areas would fill in gradually over time from local sediment transport. The deep troughs landward of these two shoals would, in effect "isolate" the shoreline and its immediate profile off Assateague

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				Island from the dredging effects. The shoals are detached shoreface ridges are isolated on the inner shelf. As such, these sand bodies have a high preservation potential and consequently, a low cross-shore sediment transport potential. Section 4.2.3.5 of the Final PEIS has been revised to provide additional information that supports this conclusion.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	Recognizing that offshore shoals dissipate incoming wave energy, and thereby help to shelter shorelines from the erosive effects of large waves, ASIS (*Assateague Island National Seashore*) is concerned that the proposed dredging will significantly reduce the volume, height, and associated sheltering effect of the targeted shoals and will ultimately impact the shoreline conditions on Assateague Island.	Project Impacts - Shoreline	Results of the USACE modeling to evaluate potential impacts from dredging on ASIS indicate that no measurable impacts would occur to the ASIS shoreline. In addition, NASA would follow guidelines recommended in the two most recent BOEMRE sponsored studies. As a result, the shoals would continue to dissipate incoming waves. Also, the dredged areas would fill in gradually over time from local sediment transport. The deep troughs landward of these two shoals would, in effect "isolate" the shoreline and its immediate profile off Assateague Island from the dredging effects. The shoals are detached shoreface ridges are isolated on the inner shelf. As such, these sand bodies have a high preservation potential and consequently, a low cross-shore sediment transport potential. Section 4.2.3.5 of the Final PEIS has been revised to provide additional information that supports this conclusion.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	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 assumed renourishment of 616,000 m3 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.	Renourishment	The beach response to the initial fill was modeled using not only average wave conditions, but also the entire hindcasted wave dataset, broken into 20 different 4-year blocks, as described in Appendix A, pgs 95-96. This range of beach responses allowed 95% confidence intervals to be calculated for the initial beach response. This level of modeling effort was not performed for the renourishment fills. Instead, only average wave conditions were modeled which only allowed for an average renourishment volume (616,000 m3) to be calculated. This savings in modeling effort and expense is justified on several grounds. First, the actual renourishment volumes would not based upon this modeled value, but rather upon a value calculated from the monitoring data at the time each renourishment is to occur. This is different than the initial fill, which would not be based upon the monitoring effort. Secondly, the primary use of this modeled renourishment volume value is to estimate the total renourishment volume (616,000 * 9) needed during the 50-year life of the project. The variation in this total renourishment number is much less than 9

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				times the individual variations. That is, some renourishment volumes are expected to be greater than this modeled value, while others are expected to be less and these variations in renourishment volumes are statistically expected to largely cancel each other out. In addition, the monitoring of many past beach fill projects has shown that renourishment volumes have a tendency to decrease over time. The explanation is that early in the project lifecycle, it is relatively easy for waves to carry sand to adjacent beaches, because of the shoreline offsets at the ends of the project. However, as material which is eroded from the project site accumulates on adjacent beaches, there is less shoreline offset at the time of renourishment and the erosion rate at the project site decreases. The modeled renourishment volume is calculated as the first renourishment volume, and as such, is considered conservatively large. Therefore calculations of confidence intervals on the renourishment volume were not deemed to add sufficient value to the modeling effort.
U.S. Department of the Interior, Office of Environmental Policy and Compliance	Willie Taylor	ASIS (*Assateague Island National Seashore*) 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.	Wildlife	Comment noted. NASA recognizes that there would be unavoidable localized adverse impacts to fish and wildlife resources from implementation of the SRIPP, however these impacts would not be significant within a regional context. The Final PEIS addresses the following impacts on shoal habitats from dredging: Dredging sand from either offshore shoal would have a significant and immediate adverse impact on the local benthic community of the shoal. The primary direct effect would be the removal of sand and entrainment of the infauna and epifauna that reside within and on the sediment. However, it is expected that there would be a negligible impact on the regional benthic ecosystem because: (1) the benthic assemblages on the sand shoals are not unique and similar to assemblages in adjacent areas and (2) the spatial extent of the dredged area is small compared to the broad area of the nearshore continental shelf. The loss of benthic organisms would create a loss of prey for local wildlife, including some managed fish species, but the effect would be localized and temporary. The hopper dredge would also cause an increase in turbidity which could temporarily disturb the ability of fish, surf clams, and other mollusks to feed; however, this effect would be temporary.
US EPA Region	Jeffrey D. Lapp	Other: Existing underwater noise conditions have not	Affected	As stated in the PEIS, existing underwater noise levels are

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III		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.	Environment	unknown. Baseline noise conditions have not changed at Wallops Island with the exception of additional large- and medium-class rocket launches, which result in short-duration high-intensity noise that does not contribute to on-going baseline conditions.
US EPA Region III	Jeffrey D. Lapp	Other: 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.	Air Quality	Sections 4.2.7 and 4.7.2.1 of the Final PEIS describe the effects of the project on climate change and greenhouse gas emissions, as well as how climate change considerations were included in project design.
US EPA Region III	Jeffrey D. Lapp	Purpose and Need and 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?	Alternatives	As described in Section 1.2.4.2 of the Final PEIS, the facilities on Wallops Island are not only located to ensure public and employee safety, but are also sited based on interrelationship with other facilities including those at the WFF Main Base and Mainland. The existing configuration would need to be maintained to adequately support the various mission activities and maintain safety buffers. Additional information has been added to Section 2.2.1.1 of the Final PEIS to illustrate the hazards inherent with WFF's launch range operations. Because of the unacceptable impacts on local landowners if facilities are moved, purchasing land and relocating infrastructure inland is not feasible.
US EPA Region III	Jeffrey D. Lapp	Purpose and Need and Alternatives: 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.	Alternatives	Comment noted. NASA has considered the fact that Wallops Island is a dynamic environment and therefore only locates critical facilities there that are absolutely necessary for launch operations. Refer to Section 2.2.1 of the Final PEIS for additional information.
US EPA Region III	Jeffrey D. Lapp	Purpose and Need and Alternatives: Clarify what level of storm protection has been determined and why this specific level is necessary.	Alternatives	The SRIPP has been designed to provide storm damage reduction from a 100-year storm. Ideally, NASA would provide protection against a much larger storm event; however, in consultation with the USACE, the 100-year storm was used in design based on an optimized approach in which a balance is obtained between initial construction costs and the maintenance costs associated with storm-induced damages.
US EPA Region	Jeffrey D. Lapp	Purpose and Need and Alternatives: Please provide	Alternatives	Section 2.4.2 of the Final PEIS has been updated to include a

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III		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.		more detailed explanation on the screening of alternatives. Regarding the reduced fill options, there are two basic reasons for their elimination. The first is straightforward – the short fill (between the south camera stand and Building W-65) does not satisfy the project requirements of providing storm damage reduction to the at-risk assets on Wallops Island. The portion of the facility north of Building W-65 would remain mostly unprotected as it is today. The second reason is regarding project costs. Shorter fills cost more to maintain on a per foot of beach basis than longer fills. The theoretical arguments for this are presented in Dean (2002). The following quote is from Dean (2002): In fact, the longevity of a project varies as the square of its length, thus if Project A with a longshore length of one mile “loses” 50% of its material in a period of two years, Project B subjected to the same wave climate and constructed of with sand of the same characteristics but with a length of 4 miles would be expected to lose 50% of its material from the region where it was placed in a period of 32 years! Thus project length is very significant to performance.
US EPA Region III	Jeffrey D. Lapp	Purpose and Need and Alternatives: 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.	Alternatives	Due to the availability of funding for the initial phases of the SRIPP, individual elements (seawall, beach fill) are separated. Therefore, they are presented in the PEIS as individual packages based on funding and procurement. However, each individual project element would only partially fulfill the purpose and need and therefore would not be constructed by itself as a long-term solution. Sections 2.1 and 2.6 of the Final PEIS has been revised to clarify this point.
US EPA Region III	Jeffrey D. Lapp	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.	Cultural Resources	Potential impact footprints of the pump-out buoys would be minor and consist of anchor footprints and anchor sweeps. Specific locations and anchoring methods for the pump-out locations have not been determined but would be located approximately at the 9 m (30 ft) depth contour which is about 3 km (2 mi) offshore. NASA consulted with VDHR on this issue in July 2010; additional Section 106 consultation would be required for the areas around the pump-out stations once the

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				locations have been identified.
US EPA Region III	Jeffrey D. Lapp	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.	Cultural Resources	NASA strives to maintain brevity in its NEPA documents. As such, it is not practical for NASA to provide all background reports and consultation letters not directly related to the SRIPP PEIS such as the Cultural Resources Assessment for WFF. Any reports prepared specifically for the PEIS (such as the two cultural resources reports, biological and essential fish habitat assessments) that support the statements made, conclusions in the document have been included as appendices. Although not included as an Appendix of the Final PEIS, the Cultural Resources Assessment is available for review at http://sites.wff.nasa.gov/code250/cultural_resources_assessment.html. Other documents referenced in the PEIS are available from NASA WFF upon request. Please contact Randall Stanley, WFF Historic Preservation Officer, at 757-824-1309, to obtain these documents.
US EPA Region III	Jeffrey D. Lapp	Cultural Resources: 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.	Cultural Resources	NASA consulted with VDHR for potential impacts on cultural resources from the SRIPP Proposed Action Alternatives; the SHPO concurred with NASA's determination that no historic properties would be affected by the SRIPP. Potential impact footprints of the pump-out buoys would be minor and consist of anchor footprints and anchor sweeps. Specific locations and anchoring methods for the pump-out locations have not been determined but would be located approximately at the 9 m (30 ft) depth contour which is about 3 km (2 mi) offshore. NASA consulted with VDHR on this issue in July 2010; additional Section 106 consultation would be required for the areas around the pump-out stations once the locations have been identified.
US EPA Region III	Jeffrey D. Lapp	Cultural Resources: 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-	Cultural Resources	Following BOEMRE archaeological standards, NASA surveyed the potential borrow sites and the nearshore zone where sand retention structures could be located and did not identify any significant resources. Only debris typically associated with commercial and/or recreational fishing activities were identified. This debris included anchor chains, wire rope, trawls, and other flotsam. Please see Appendices F and G for additional details regarding the surveys. Potential impact footprints of the pump-out buoys would be minor and consist of anchor footprints and anchor sweeps. Specific locations and anchoring methods for the pump-out locations

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		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.		have not been determined but would be located approximately at the 9 m (30 ft) depth contour which is about 3 km (2 mi) offshore. NASA consulted with VDHR on this issue in July 2010; additional Section 106 consultation would be required for the areas around the pump-out stations once the locations have been identified.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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.	Cumulative Impacts	The cumulative effects section (4.7) of the Final PEIS has been updated to include study limits for each resource area. Two new figures have been added to the cumulative impacts section to visually display the geographic area of extent for existing and future projects that are described in the PEIS; one showing land-based projects and the other figure showing ocean-based projects. The past actions that have occurred on Wallops Island (starting in the 1930s) have been summarized in a new subsection of cumulative impacts.
US EPA Region III	Jeffrey D. Lapp	Environmental 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.	Cumulative Impacts	Comment noted. NASA has consulted with NMFS regarding effects on EFH as well as listed species under the agency's jurisdiction. Additionally, NASA consulted with USFWS regarding impacts to listed species and migratory birds. The outcomes of these consultations and supporting information have been included in Sections 4.3.11.1 and 4.7.2.2 of the Final PEIS.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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	Cumulative Impacts	The cumulative effects section has been revised and includes a comprehensive analysis of environmental impacts from past, current and foreseeable future activities within the project area.

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		proposed turbines has not been completed.		
US EPA Region III	Jeffrey D. Lapp	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.	Dredging	The plane and contour methods of dredging were use in modeling of wave climate by the USACE; however, actual dredging would be completed by the contour method which would result in the least impacts on shoal recovery. Another method investigated was striping but it was eliminated based on increased area of dredging which would result in more impacts on sea turtles and excessive costs. The dredging plan has been revised based on coordination with NMFS. Specific areas of the shoal would be avoided to maintain its geomorphic integrity and allow the greatest recovery. Benthic recolonization of the area should begin soon after dredging operations end. However, It is anticipated that full benthic community recovery will take several years.
US EPA Region III	Jeffrey D. Lapp	Other: A 25% loss rate of material during sand dredge and placement operations is predicted for this project, which results in. 2-3 million yd3 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.	Dredging	Based on empirically-derived information provided by BOEMRE, sediment losses from offshore dredging operations due to overflow and placement operations may be up to 25%. NASA used this as a conservative value when estimating actual dredging volumes for the SRIPP. Losses are likely to be less than 25% because of the relatively coarse grain size of the sand and low silt/clay composition at Shoals A and B. A portion of the sand lost during dredging operations is expected to fall back into the dredging footprint. Impacts to the benthic community and fish from sediment falling back through the water column and accumulating on the seafloor are expected to be minimal. The trailer suction hopper dredger(s) would be moving while excavating sand and therefore sand losses from overflow will be distributed throughout the dredged area and nearby adjacent areas. Section 4.2.3 of the Final PEIS describes these impacts.
US EPA Region III	Jeffrey D. Lapp	Purpose and Need and Alternatives: 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?	Dredging	NASA considered the most recent and appropriate scientific literature in developing the dredging methodology at the offshore shoals. See Section 2.5.5.2 of the Final PEIS for the results of these analyses and more information on NASA's dredging plan and EFH considerations. Environmental effects of both Shoals A and B are considered and presented in the Final PEIS. NASA studied how to minimize impacts from dredging and determined that erosional areas of the shoal would be avoided to the greatest extent practicable to maintain its geomorphic integrity and thereby allow the greatest recovery. Because of their similarity between the two shoals (orientation,

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				depth, benthic habitat, sediment characteristics, etc. - see Chapter 4), the environmental impacts to each shoal would be similar; therefore, NASA does not consider one shoal to be environmentally preferable.
US EPA Region III	Jeffrey D. Lapp	Cultural Resources: 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.	Editorial	The reference to Appendix C was removed from the sentence about the pedestrian survey.
US EPA Region III	Jeffrey D. Lapp	Cultural Resources: 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.	Editorial	It is not practical for NASA to provide all background reports and consultation letters not directly related to the SRIPP PEIS such as the Cultural Resources Assessment for WFF. Any reports done specifically for the PEIS (such as the two cultural resources reports, biological and essential fish habitat assessments) that support the statements made, conclusions in the document have been included as appendices. The discrepancy noted in the date of the VDHR letter (December 3 versus 4) has been corrected in the Final PEIS. The Cultural Resources Assessment is available for review at http://sites.wff.nasa.gov/code250/cultural_resources_assessment.html. Other documents referenced in the PEIS are available from NASA WFF upon request. Please contact Randall Stanley, WFF Historic Preservation Officer, at 757-824-1309, to obtain these documents.
US EPA Region III	Jeffrey D. Lapp	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).	Environmental Impacts - Miscellaneous	Comment noted.
US EPA Region III	Jeffrey D. Lapp	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.	Environmental Impacts - Miscellaneous	Comment noted.
US EPA Region III	Jeffrey D. Lapp	Additional details on adverse impacts to aquatic resources, cultural resources, threatened and endangered species are needed to determine the full	Environmental Impacts - Miscellaneous	Comment noted. NASA added additional details on potential environmental impacts to the PEIS in Chapter 4.

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		scale of potential impact.		
US EPA Region III	Jeffrey D. Lapp	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.	Environmental Impacts - Miscellaneous	As described in Section 5.2.2.5, NASA would conduct semi-annual monitoring and prepare a semi-annual report that summarizes the data collection and analyses. The report would provide recommendations for future actions such as potential construction of a sand retention structure. It is anticipated that future specific actions would require NEPA documentation that can be tiered from this PEIS to address potential project-specific environmental impacts.
US EPA Region III	Jeffrey D. Lapp	Environmental Justice: 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.	Environmental Justice	The reference statement on page 186 of the Draft PEIS that the minority definition came from EPA has been revised to remove reference to EPA. Section 3.3.8 of the PEIS includes identification of income and poverty statistics as they relate to EJ for the populations relevant to the area surrounding WFF - the residents of Accomack County and the Town of Chincoteague. Additionally, Table 27 of the Draft PEIS shows the census tract information for communities surrounding WFF. Because the Proposed Action would not result in disproportionate impacts on low income or minority populations, NASA did not provide additional detailed background information on all the population areas surrounding WFF.
US EPA Region III	Jeffrey D. Lapp	Environmental Justice: 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.	Environmental Justice	NASA does not expect low income and minority populations to be disproportionately affected by the Proposed Action. Additional information has been provided in Chapter 4.4.7 of the Final PEIS regarding NASA's public outreach.
US EPA Region III	Jeffrey D. Lapp	Environmental Justice: 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.	Environmental Justice	The statement about displacement of residences (Draft PEIS stated that displacements would not occur) was removed from this section. Although there are low income and minority populations within Accomack County, the Proposed Action would involve activities similar to those currently conducted at WFF, and the current WFF EJIP found that WFF activities do not disproportionately affect low-income or minority populations (NASA, 1996). Additional information has been provided in Chapter 4.4.7 of the Final PEIS regarding potential

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				impacts on EJ populations.
US EPA Region III	Jeffrey D. Lapp	Environmental Justice: 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.	Environmental Justice	Section 3.3.8 of the PEIS includes identification of income and poverty statistics as they relate to EJ for the populations relevant to the area surrounding WFF - the residents of Accomack County and the Town of Chincoteague. Additionally, Table 27 of the Draft PEIS shows the census tract information for communities surrounding WFF. A new figure (Figure 41) showing the census tracts examined for EJ has been added to the Final PEIS. Because the Proposed Action would not result in disproportionate impacts on low income or minority populations, NASA did not provide additional detailed background information on all the population areas surrounding WFF.
US EPA Region III	Jeffrey D. Lapp	Offshore Shoals: Provide a map showing proposed mined areas. Proposed borrow areas within the shoals should be delineated.	Figures	Figure 18 has been added to the Final PEIS showing specific areas within the 2-square-mile survey blocks that would be targeted for dredging.
US EPA Region III	Jeffrey D. Lapp	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.	Future NEPA Documentation and Agency Coordination	Comment noted. NASA looks forward to working with the EPA and other federal agencies on future NEPA documentation for proposed actions at WFF.
US EPA Region III	Jeffrey D. Lapp	Offshore Shoals: 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?	Grain Size	Please refer to Section 2.4.5 of the PEIS for information on sediment grain size. A grain size of 0.29 mm was used in the modeling for the alternatives. Please refer to Appendix A for further details on sediment grain size.
US EPA Region III	Jeffrey D. Lapp	Other: 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?	Groin or Breakwater	Please refer to modeling information presented in Sections 4.2.2 and 4.2.3 of the Final PEIS and Appendix A for a detailed description of potential impacts from construction of a groin or breakwater.
US EPA Region III	Jeffrey D. Lapp	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.	Habitat	The cumulative effects section (4.7) of the Final PEIS has been revised and includes a comprehensive analysis of environmental impacts from past, current and foreseeable future activities within the project area.

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US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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.	Habitat	Comment noted. NASA has added additional information regarding potential effects from renourishment on piping plovers in Section 4.3.10 of the Final PEIS. NASA would conduct monitoring of the future beach as agreed upon with NMFS and USFWS through the Section 7 consultation process for the SRIPP PEIS. Prior to renourishment activities, NASA would consult with USFWS and NMFS regarding potential effects on Threatened and Endangered species including the Piping Plover.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: The proposed activity may also result in the development of SAV beds in the project area. These resources should be monitored for and protected.	Habitat	The proposed action would not create conditions for SAV development at the sand placement site. SAV does not exist along the Atlantic-facing beaches due to the wave energy, sediment movement, and low water clarity, among other conditions. Shallow excavation on north Wallops Island for beach renourishment material may have the potential to create conditions suitable for SAV development if the excavated area would be protected from breaking waves. Potential SAV development would be considered as part of a mitigation approach to offset any habitat impacts from excavation.
US EPA Region III	Jeffrey D. Lapp	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.	Mitigation and Monitoring - General	Comment noted. NASA recognizes that there would be unavoidable adverse impacts on environmental resources from implementing the SRIPP. However, NASA is committed to minimizing those impacts. Chapters 2 and 5 of the Final PEIS have been updated to include more information about mitigation and monitoring.
US EPA Region III	Jeffrey D. Lapp	Offshore Shoals: 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?	Mitigation and Monitoring - Shoals	The tools for monitoring and managing the sand resources along the Wallops Island beach are contained within the SRIPP monitoring program, explained in detail in Section 5.2 of the Final PEIS. NASA would conduct pre- and post-dredge bathymetric surveys of the proposed dredge area. Erosional hotspots along the shoreline would be identified during the beach profile monitoring proposed to be conducted twice a year.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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.	Mitigation and Monitoring - Wildlife	Additional information has been added to Section 5.1.2.2 of the Final PEIS to clarify the role of the observer. In summary, the shipboard endangered species observer would advise the dredge operator to slow the vessel or maneuver safely when sea turtles or marine mammals are spotted. Additionally, the observer would monitor the intake of dredged material for the presence

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				of sea turtles such that any interactions or take is properly documented and reported to NMFS.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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.	Mitigation and Monitoring - Wildlife	Comment noted. Chapters 2 and 5 of the Final PEIS have been updated to include more information about mitigation and monitoring.
US EPA Region III	Jeffrey D. Lapp	Other: 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, CERCLA 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.	Munitions	To minimize the risk of adverse impacts from UXO in from the North Wallops Island borrow site, an MEC Avoidance Plan that addresses the potential hazards would be prepared. A visual and magnetic survey of the area to locate MEC would be completed and potential hazards removed prior to excavation. According to a report prepared by the USACE in 2007 and referenced in the Final PEIS, there is no historical evidence of MEC in the vicinity of the offshore shoals considered for the Proposed Action. Regarding other hazardous materials, the WFF Integrated Contingency Plan, developed to meet the requirements of 40 CFR Part 112 (Oil Pollution Prevention and Response), 40 CFR Part 265 Subparts C and D (Hazardous Waste Contingency Plan), and 9 VAC 25-91-10 (Oil Discharge Contingency Plan), serves as WFF's primary guidance document for the prevention and management of oil, hazardous material, and hazardous waste releases.
US EPA Region III	Jeffrey D. Lapp	Environmental Impacts: 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.	North Wallops Island Borrow Site	Additional information regarding effects of backpassing sand on piping plovers has been added to Section 43.10. To mitigate potential effects, excavation work on north Wallops Island would be limited to the non-nesting season for the piping plover. If, in the future, NASA identifies the need to use this area, and when potential plans are more defined, NASA would consult with USFWS to ensure adequate protection and monitoring of any protected species observed in the area.

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US EPA Region III	Jeffrey D. Lapp	Purpose and Need and Alternatives: 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.'	Project Design	The seawall extension is needed to protect existing infrastructure (see Figures 3 and 4) such as launch pads, UAS runway and the south camera stand. Critical infrastructure refers to infrastructure that NASA needs to complete its mission.
State Agencies				
Virginia Institute of Marine Science	Ellie L. Irons	Monitoring project activities will be essential to validate project performance assumptions and to adapt the management strategies as needed over the life of the project.	Adaptive Management	Agreed. The Final PEIS describes the adaptive management strategy for the SRIPP based on periodic monitoring and results.
Virginia Institute of Marine Science	Ellie L. Irons	Reviewers also indicated that there are information gaps and deficiencies in the draft PEIS, which should be remedied in the final PEIS.	Editorial	NASA has addressed comments, data gaps and deficiencies in the Final PEIS that have been identified in the Draft PEIS as necessary.
Virginia Institute of Marine Science	Ellie L. Irons	…VIMS recommends that NASA provide a better explanation as to why multiple containment structures with less frequent and intensive beach nourishment cycles are not acceptable and why alternatives with only one structure at the southern end are acceptable.	Groin or Breakwater	Section 2.4.2 of the Final PEIS has been revised to include a more detailed description of the alternatives selection process, which included analysis of multiple sand retention structures that were eliminated due to high potential cost. NASA is proposing an adaptive management strategy whereby the initial beach fill would be monitored. Based on erosional hot spots, etc., structures may be evaluated to determine, with more certainty, where along the shoreline they should be placed.
Virginia Institute of Marine Science	Ellie L. Irons	The draft PEIS (Section 2.3.3.4) is unclear why multiple off-shore breakwaters with beach fill is not an acceptable alternative at the southern end of the project area. During the planning stages of the proposed project, NASA and the Corps considered offshore containment structures and although not clearly explained in the draft PEIS, this alternative was discounted. VIMS wonders if the alternative was discounted due to excessive initial cost, the level of protection needed, a preference for the on-shore seawall extension, the expected downdrift impacts, a combination of these factors or other reasons.	Groin or Breakwater	Section 2.4.2 of the Final PEIS has been updated to include a more detailed discussion regarding alternatives selection. NASA initially dismissed the construction of multiple offshore breakwaters due to cost considerations and because breakwaters could not be easily relocated if monitoring results indicated a more optimal location(s). However, in the future, NASA may consider additional sand retention structures based on beach monitoring results and an adaptive management approach.

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Virginia Institute of Marine Science	Ellie L. Irons	Monitoring programs will be essential to validate project performance assumptions and to adapt the management strategies as needed over the life of the project. Beach profiles and biological surveys at the Wallops Island borrow area will be particularly important to support using this sand source.	Mitigation and Monitoring - Shoreline	Agreed. The Final PEIS describes the adaptive management strategy for the SRIPP based on periodic monitoring and results.
Virginia Institute of Marine Science	Ellie L. Irons	… it is VIMS' opinion that mining sand from the Wallops Island borrow site could adversely impact beach and dune processes in this natural area. However, VIMS' concerned have been somewhat alleviated by the following: -the sand from the Wallops Island borrow site would not be used for the initial beach fill; -any material excavated from the borrow site would likely originate from the initial beach fill due to the predicted sand transport pattern; -no temporary construction access roads or other improvements will be needed to transfer the material; -sand from the northern end of the Island would only be used as source material for a portion of renourishment events; and –sand from the northern end of the Island would only be used if threatened and endangered species will not be adversely impacted.	North Wallops Island Borrow Site	As noted in the comment, the removal of sediments from north Wallops Island would be mitigated by the re-deposition of sediment that would come from the addition of new sand on the beach. Work on north Wallops Island would be limited to the non-nesting season for the piping plover and other beach nesting shorebirds. NASA would work with USFWS to ensure adequate protection and monitoring of any protected species observed in the area.
Virginia Institute of Marine Science	Ellie L. Irons	Several mitigation measures are included to minimize adverse environmental effects during the dredging and transport process. However, regardless of which alternative is selected, the proposed activities will have reasonably foreseeable effects on coastal resources.	Project Impacts	As disclosed in the PEIS and noted in the comment, all alternatives would result in unavoidable impacts on coastal resources. As noted in the PEIS Chapter 4, NASA prepared a Federal Consistency Determination stating how NASA would comply with the enforceable policies of the Virginia Coastal Resources Management Program and stating how the SRIPP would affect coastal resources. The Federal Consistency Determination and VDEQ's response has been included as an appendix to the Final PEIS.
Virginia Institute of Marine Science	Ellie L. Irons	The main findings of the draft PEIS are well supported with various models, current scientific reference data and professional expert advice. The future effects of sea level rise were accounted for within the 50-year project life. Also, proposed offshore sand mining was thoroughly evaluated and appears to be consistent with the current scientific understanding of potential impacts.	Project Support	Comment noted.

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Virginia Institute of Marine Science	Ellie L. Irons	Given that some type of action is necessary, VIMS generally agrees that the three shoreline restoration alternatives are appropriate and consistent with current guidelines for projects on ocean coasts, even though the proposed project will have significant impacts to the environment. However, each proposed alternative includes multiple mitigation measures to minimize these impacts.	Project Support	Comment noted. In implementing this project, NASA would strive to mitigate potential environmental impacts to the extent practicable.
Virginia Institute of Marine Science	Karen A. Duhring	If relocation of vulnerable infrastructure to the mainland is not a viable option, then we agree that the No Action Alternative is not acceptable. Irregular and unscheduled emergency protection actions are not effective. Some type of additional action is necessary to provide erosion and storm protection for the valuable infrastructure at this facility.	Project Support	Comment noted. As described in Section 2.3.3.1 of the Final PEIS, relocation of the infrastructure on Wallops Island is not feasible, and as such, NASA is proposing the SRIPP.
Virginia Institute of Marine Science	Karen A. Duhring	It is our opinion that the proposed SRIPP activities are consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Resources Management Program, as stated in Section 4.2.6, CZM Federal Consistency Determination.	Project Support	Comment noted.
Virginia Department of Conservation and Recreation	Alli Baird, Coastal Zone Locality Liason	DCR continues to recommend exploring the feasibility of inland relocation of existing facilities.	Alternatives	As described in Section 2.3.3.1 the Final PEIS, relocation of the infrastructure on Wallops Island is not feasible.
Virginia Department of Conservation and Recreation	Alli Baird, Coastal Zone Locality Liason	Alternative One 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.	Alternatives	Comment noted.
Virginia Department of Conservation and Recreation	Ellie L. Irons	Coordinate with DGIF and the FWS to ensure compliance with protected species legislation due to the legal status of the Piping and Wilson's Plovers.	Birds	NASA is coordinating with both DGIF and the USFWS regarding listed species, as described in the Final PEIS Sections 3.2.10 and 4.3.11.
Virginia	Ellie L. Irons	Coordinate with DCR's Division of Natural Heritage	Future NEPA	Comment noted. If a significant amount of time passes,

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Department of Conservation and Recreation		(telephone, (804)371-2708)) if a significant amount of time passes before the project is implemented, since new and updated information is continually added to Biotics Data System.	Documentation and Agency Coordination	additional NEPA documentation would be prepared as appropriate.
Virginia Department of Conservation and Recreation	Alli Baird, Coastal Zone Locality Liason	DCR also recommends the protection of rare bird habitat (Least tern, Wilson's plover, and Piping Plover) during the nesting season from April 15 to August 15.	Mitigation and Monitoring - Nesting season	Comment noted. North Wallops Island would not be excavated during the shorebird nesting season. Chapter 4 of the PEIS summarizes ESA consultation with NMFS and USFWS and Chapter 5 summarizes the mitigation measures NASA would implement as determined by NMFS and USFWS to protect listed species and their habitats.
Virginia Department of Conservation and Recreation	Ellie L. Irons	Limit the source for beach nourishment to the sand shoals (Unnamed Shoal A or Unnamed Shoal B) located offshore in Federal waters and not from the Piping Plover habitat at the Wallops Island borrow site.	North Wallops Island Borrow Site	As specific details regarding backpassing of sand from north Wallops Island are not currently available, it is difficult to accurately characterize the effects the work would have on shorebird nesting. For example, the north end could potentially be used only for a small volume of sand needed to fix an erosional "hot spot," and therefore impacts would likely be minimal. Conversely, if the entire area were used as a borrow site, impacts would likely be much greater. If and when NASA determines that this area is needed as a source of fill material, additional NEPA documentation would be prepared to consider the effects of the specific action. As resource agencies have expressed concern regarding this aspect of the SRIPP, work on north Wallops Island would be limited to the non-nesting season for shorebirds and sea turtles. Additionally, NASA would work closely with resource agencies to ensure adequate protection and monitoring of any protected species known to inhabit the area.
Virginia Department of Conservation and Recreation	Ellie L. Irons	NASA must prepare and implement erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The ESC plan is submitted to DCR’s Suffolk Regional Office for review for compliance.	Permitting	Comment noted.
Virginia Department of Conservation and Recreation	Ellie L. Irons	The operator or owner of construction activities involving land disturbing activities equal or greater that 1 acre are required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project specific stormwater pollution prevention plan (SWPPP).	Permitting	Comment noted.

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Virginia Department of Conservation and Recreation	Ellie L. Irons	According to the draft PEIS (page 220) the proposed project does not include any land development within the Chesapeake Bay or its tributaries. Therefore the proposed project is consistent with the coastal lands management enforceable policy of the VCP.	Permitting	Comment noted.
Virginia Department of Conservation and Recreation	Alli Baird, Coastal Zone Locality Liason	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.	Project Impacts	Comment noted. Currently, waves hit the seawall directly for the majority of its length. The intent of the seawall is to be a secondary line of defense in conjunction with beachfill placed along its entire length. In addition, sand would be placed over the seawall to form a dune line inland of the placed beach fill. As a result, the shoreline would not be “hardened," as it is in its current condition, but restored to a sand beach, with the rock seawall only serving as an "insurance policy" during larger storm events.
Virginia Department of Conservation and Recreation	Ellie L. Irons	DCR supports Alternative One as the Preferred Alternative, provided that sand is not taken from the Wallops Island borrow site and the proposed seawall extension is limited to the minimum length absolutely necessary for the protection of facilities. DCR’s selection of Alternative One as the best alternative is based on the belief that sand transport to the south of the project area will be less likely to be disrupted without the construction of a groin or breakwater. However, DCR continues to recommend exploring the feasibility of inland relocation of existing facilities.	Project Support	Comment noted. Section 2.3.3.1 of the Final PEIS explains why relocation of infrastructure is not feasible.
Virginia Department of Conservation and Recreation	Alli Baird, Coastal Zone Locality Liason	[DCR]'s files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity. The current activity will not affect any documented state-listed plants or insects.	Wildlife	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	Several agencies indicate that the relocation of vulnerable infrastructure to the mainland would be the best long-term solution to protect the infrastructure on Wallops Island.	Alternatives	Public safety is NASA’s highest priority when conducting its missions. As described in Section 2.3.3.1 of the Final PEIS, the missions that NASA undertakes are sited on Wallops Island to maintain the strictest possible safety measures. The existing configuration would need to be maintained to adequately support the various mission activities and maintain safety buffers. Therefore, purchasing land and relocating infrastructure inland is not feasible.
Virginia	Ellie L. Irons	Some agencies also agree that irregular and	Alternatives	As disclosed in the Final PEIS and noted in your comment, all

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Department of Environmental Quality		unscheduled emergency protective actions have not been (and would continue to not be) and effective shoreline management strategy. However, since all of the action alternatives propose some type of permanent erosion and storm protection along the Wallops Island shoreline, adverse impacts on coastal resources, including protected species and wildlife and the resources upon which they depend, will occur.		alternatives would result in unavoidable impacts on coastal resources. NASA would comply with the enforceable policies of the Virginia Coastal Resources Management Program and mitigate adverse impacts to the greatest extent practicable.
Virginia Department of Environmental Quality	Ellie L. Irons	In general, the reviewing agencies agree that Alternative One, the preferred alternative, would have the least impacts of all the action alternatives since it no longer includes the installation of a permeable groin, and provided that sand is not taken from the Wallops Island borrow site for beach replenishment and the proposed seawall extension is limited to the minimum length absolutely necessary for the protection of the facilities.	Alternatives	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	The draft PEIS is unclear as to why the selected alternatives with only one containment structure at the south end (either groin or breakwater) qualified for the secondary screening of alternatives.	Groin or Breakwater	Using the best available data and understanding of the sediment transport system at the time the DPEIS was developed, Alternative 2 (beach fill + groin) and Alternative 3 (beach fill + breakwater) modeled specific sand retention structures at the southern end of the project area. The structures were considered to retain sand within the project area and were recommended by USACE as providing the most effective solution within the project budget. Initial project costs for multiple structure alternatives were simply too costly. The Final PEIS has been revised to clarify the alternatives selection process and to state that sand retention structures could be considered elsewhere along the Wallops shoreline as part of NASA's adaptive management approach and based on the results of future monitoring efforts. Consideration of any structures not specifically analyzed in this Final PEIS would be subject to additional NEPA documentation.
Virginia Department of Environmental Quality	Ellie L. Irons	The agencies believe that the construction of a groin would disrupt the southerly longshore transport of sand thereby adversely affecting the islands south of Wallops.	Groin or Breakwater	Comment noted. NASA's Preferred Alternative does not include initial construction of a groin or breakwater.
Virginia Department of	Ellie L. Irons	DEQ advocates that principles of pollution prevention be used in all construction projects as well as in facility	Mitigation and Monitoring -	NASA already has an effective and current EMS in place for WFF which includes the recommendations you have provided.

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Environmental Quality		operations. … We have several pollution prevention recommendations that may be helpful in constructing or operating this project. – Consider development of an effective Environmental Management System (EMS). – Consider environmental attributes when purchasing materials. –Consider contractors' commitment to the environment (such as an EMS) when choosing contractors. –Choose sustainable materials and practices for infrastructure and building construction and design. –Integrate pollution prevention techniques into the facility maintenance and operation.	General	Chapter 1 of the Final PEIS has been updated to include reference to WFF's EMS.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ's FFR Program staff recommends that during removal, all borrow and dredge material should be thoroughly screened for munitions. … All munitions encountered should be managed in accordance with NASA's established munitions avoidance and disposal procedures.	Munitions	As stated in the PEIS, a MEC Avoidance Plan that addresses the potential hazards would be prepared to minimize the risk of adverse impacts from MEC during excavation of north Wallops Island. Any munitions encountered would be managed in accordance with NASA's established munitions avoidance and disposal procedures.
Virginia Department of Environmental Quality	Ellie L. Irons	Prior to initiating any project activities on Wallops Island or offshore, DEQ's FFR Program recommends that the SRIPP Project Manager contact NASA's WFF Manager of Environmental Restoration for information concerning any CERCLA obligations and the Corps Remediation Project Manager for Wallops FUDS areas for information concerning CERCLA obligations at or near Wallops FUDS sites.	Munitions	Comment noted. NASA's WFF manager of Environmental Restoration as well as the USACE Wallops FUDS Project Manager have been consulted during the preparation of the PEIS.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ's Federal Facilities Restoration (FFR) Program staff states that the proposed project is the latest in may beach replenishment projects that have occurred on Wallops Island. The history of beach replenishment at Wallops Island was provided in the draft PEIS. One potential consequence of relocating sand from borrow areas on Wallops Island or offshore dredge areas became evident during the winter storms of 2009. Wave action during those storms created breaches in the seawall. Within some of the breaches old munitions were found intermixed with seawall boulders. … However, the draft PEIS does not address the potential for munitions to be encountered during offshore dredging activities at the Unnamed Shoal.	Munitions	To minimize the risk of adverse impacts from MEC in this area, an MEC Avoidance Plan that addresses the potential hazards would be prepared. A visual and magnetic survey of the area to locate MEC would be completed and potential hazards removed prior to excavation. According to a report prepared by the USACE in 2007 and referenced in the Final PEIS, there is no historical evidence of MEC in the vicinity of the offshore shoals considered for the proposed action.

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Virginia Department of Environmental Quality	Ellie L. Irons	DEQ's FFR Program staff states that the Preferred Alternative may impact several Federal Facilities Restoration Program FUDS currently under investigation by the Corps.	Munitions	There is a potential that MEC would be encountered during excavation of the north Wallops Island borrow site. As described in Chapter 3 of the PEIS, historic military activities in that area have resulted in a high probability of encountering MEC in the nearshore environment and on the northern end of Wallops Island. As seen on Figure 34, the sea target impact and the small arms range safety fan overlap the accreting shoreline of north Wallops Island. To minimize the risk of adverse impacts from MEC in this area, an MEC Avoidance Plan that addresses the potential hazards would be prepared. A visual and magnetic survey of the area to locate MEC would be completed and potential hazards removed prior to excavation.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ recommends that the final PEIS address the potential for munitions to be encountered during offshore dredging activities at the Unnamed Shoals as all potential sources for sand identified in the draft PEIS could contain MECs.	Munitions	According to a report prepared by the USACE in 2007 and referenced in the PEIS, there is no historical evidence of MEC in the vicinity of the offshore shoals considered for the proposed action.
Virginia Department of Environmental Quality	Ellie L. Irons	There are several Federal Facilities Restoration Program formerly used defense sites (FUDS) located along or immediately adjacent to the shoreline and/or the Wallops Island borrow site. Therefore, use of sand from the Wallops Island borrow site could adversely affect the FUDS sites, which are currently under investigation by the Corps.	North Wallops Island Borrow Site	Comment noted. Prior to implementing any activity NASA would coordinate with the FUDS project manager as well as the NASA restoration manager for any survey or removal efforts as necessary.
Virginia Department of Environmental Quality	Cindy Keltner	This project will require a permit from the VWPP program (Virginia Water Protection Permit Program).	Permitting	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ's Tidewater Regional Office (TRO) states that the proposed project will require a VWP (*VA water protection*) permit from DEQ.	Permitting	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	Provided that all applicable VWP permits are obtained and complied with, the project will be consistent with the wetlands management and point source pollution control enforceable policies of the Virginia Coastal Zone Management Program (VCP) (previously called the Virginia Coastal Resources Management Program).	Permitting	Comment noted.

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Virginia Department of Environmental Quality	Ellie L. Irons	Generally, when a locality does not map CBPAs on federal lands, they are still subject to the requirements of the Bay Act Regulations as they contain lands analogous to Resource Protection Areas and/or Resource Management Areas. However, Wallops Island is located in a part of Accomack County outside the Bay watershed and therefore, Wallops Island is not required to be included as part of a Chesapeake Bay Preservation Area and is not subject to the requirements of the regulations.	Permitting	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	The draft PEIS (page 220) states that construction equipment will result in air emissions, but NASA would implement BMPs to minimize impacts. The project would not violate Federal or state air quality standards. Provided that NASA complies with all applicable air regulations, the proposed project would be consistent with the air pollution control enforceable policy of the VCP.	Permitting	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	The draft PEIS includes a federal consistency determination and accompanying analysis of the enforceable policies of the VCP (page 219). The consistency determination states that the proposed project would have no effect on the wetlands management, point source pollution control, coastal lands management and shoreline sanitation management enforceable policies of the VCP. The reviewing agencies generally agree with NASA's determination. However, NASA must ensure that the proposed action is also consistent with the aforementioned policies. Also, DEQ recommends that NASA consider the advisory policies of the VCP.	Permitting	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ concurs that the proposal is consistent to the maximum extent practicable with the VCP provided all applicable permits and approvals are obtained.	Permitting	Comment noted. NASA would obtain all requisite permits and approvals before implementing the SRIPP.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ's Office of Waste Permitting and Compliance in the Tidewater Regional Office states that although the proposed project appears to enhance protection of the hazardous waste open burn/open detonation (OB/OD)	Project Impacts	Groundwater is not discussed in detail in the PEIS because the Proposed Action would not be expected to have measurable effects on groundwater. The SRIPP construction would not

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		Resource Conservation and Recovery Act (RCRA) permitted unit, the draft PEIS does not discuss potential alternation of and/or impacts to the existing groundwater monitoring network and potential changes to groundwater flow.		directly impact the open burning (OB) area and would not be expected to change existing groundwater flow such that it would affect OB monitoring. To put this in perspective, the beach would be restored to approximately the same dimensions as it was when OB monitoring began in 1999 (assuming a shoreline loss of approximately 3 meters [10 feet] per year). Over the past eleven years of monitoring, there have not been measurable differences in OB sample results that would suggest changes in the beach profile measurably affect groundwater flow at the site. As the commenter mentions, the beach fill and sand dune would afford the OB area an additional level of protection from storm damage.
Virginia Department of Environmental Quality	Ellie L. Irons	DEQ recommends that all efforts should be taken to ensure that surface waters, including wetlands, are not adversely affected by the proposed activities.	Project Impacts	Comment noted. NASA would strive to mitigate all impacts on surface waters, including wetlands. Chapter 5 of the Final PEIS describes mitigation measures.
Virginia Department of Environmental Quality	Cindy Keltner	There has been multiple petroleum releases reported at the Wallops Flight Facility. One of the closed cases is adjacent to the proposed shoreline restoration, PC# 1993-0913. This release, associated with regulated USTs and ASTs at Buildings X-5 and X-15, should not impact the proposed restoration project. If evidence of a petroleum release is discovered during construction of this project, it must be reported to DEQ.	Solid and/or Hazardous Materials/Waste	Comment noted.
Virginia Department of Environmental Quality	Ellie L. Irons	The DEQ-Waste Division states that the draft PEIS addresses both solid and hazardous waste issues, but does not include a search of waste-related databases.	Solid and/or Hazardous Materials/Waste	Comment noted. NASA is aware of the history of hazardous materials and hazardous waste sites at WFF through its own recordkeeping; therefore, searching waste databases is not necessary.
Virginia Department of Environmental Quality	Ellie L. Irons	All construction and demolition debris, including excess soil, must be characterized in accordance with the Virginia Hazardous Waste Management Regulations prior to disposal at an appropriate facility.	Solid and/or Hazardous Materials/Waste	Any debris (that would most likely include extracted remnants of previous storm damage reduction measures) would be characterized in accordance with Virginia regulations prior to disposal.
Virginia Department of Environmental Quality	Ellie L. Irons	According to the DEQ-TRO, there have been multiple [petroleum storage tanks] releases reported at the WFF. … Therefore, if evidence of a petroleum release is discovered during project activities, it must be reported to DEQ, as authorized by Virginia Code 62.1-44.34.8	Solid and/or Hazardous Materials/Waste	Comment noted. Section 4.2.9 of the Final PEIS reflects this information.

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		through 9 by the Virginia Administrate Code 9 VAC 25-580/10 et seq. Also, all petroleum contaminated soils and groundwater generated during construction must be characterized and disposed of properly.		
Virginia Department of Environmental Quality	Paul Kohler	Also, all structures being demolished/renovated/removed should be checked for asbestos-containing materials (ACM) and lead-based paint prior to demolition.	Solid and/or Hazardous Materials/Waste	There are no structures being demolished or removed under the SRIPP Proposed Action.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	The draft PEIS does not include a plan of action should the SRIPP fail within the project's life time (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)... The draft PEIS does not explain what actions would be taken….and/or if the availability of beach compatible sane from offshore sources becomes depleted. 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.	Adaptive Management	NASA, as with all Federal agencies, is subject to appropriations from Congress, so there is no guarantee that the project would be continually funded over the 50-year planning horizon. However, for 2012 construction of facilities budget, the SRIPP was NASA's highest priority project. As such, NASA would continue to advocate for continued funding throughout the lifecycle of the project. If funding for future SRIPP actions was not available, NASA would re-evaluate existing conditions and determine appropriate actions at that time.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Develop a contingency plan detailing the steps to be taken if the proposed project is not undertaken.	Alternatives	The equivalent of a contingency plan is the No Action Alternative. Refer to impacts discussed for the No Action Alternative in the PEIS. The past emergency actions undertaken by NASA have not been effective in reducing storm damage on Wallops Island and thereby does not meet the purpose and need of the project.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	Alternatives Two and Five. 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.	Alternatives	After beach fill is completed, the seawall would be located inland of the water line and therefore is not designed to affect sand transport. Additionally, the seawall would be contained within the sand dune system (dune would be constructed over the seawall).
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend a thorough analysis and discussion of a seventh alternative that involved 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	Alternatives	NASA conducted an alternatives screening analysis that originally included alternatives with multiple sand retention structures including breakwaters. Please refer to Section 2.4.2 of the Final PEIS for an explanation of why multiple sand retention structures were eliminated for detailed evaluation.

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		location.		
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: A detailed description of the beach fill design (i.e. targeted beach slope, elevation and width to be maintained over the long term).	Alternatives	Please refer to Section 2.5.1 of the Final PEIS for a detailed description of the beach fill design.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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.	Alternatives	Comment noted. As described in Section 2.4.2 of the Final PEIS, reduced beach fill was dismissed as a project alternative due to the limited benefit that it would provide. The greater frequency of beach renourishment likely needed in the reduced beach fill scenario would result in higher costs compared to other alternatives including the Preferred Alternative (full beach fill). That is one of the reasons this alternative was dismissed and not carried forward in the EIS analysis.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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.	Birds	Natural processes may also result in suitable nesting habitat loss as the shoreline erodes. However, restoring the beach on Wallops Island would provide new shoreline habitat for avian species compared to existing conditions. Because it is not possible to know exactly which protected species would use the newly created beach in the future, NASA would re-initiate consultation with USFWS/NMFS as appropriate prior to renourishment activities
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Conduct a cost/benefit analysis which includes a threshold at which NASA considered the environmental costs of the project to outweigh the benefits to its mission and goals (for more information, see DGIF's attached letter) due to the potential impacts this project may have on wildlife resources beyond the project area. The cost/benefit analysis should not only examine monetary costs, but also take into account costs to fish and wildlife resources, the physical integrity of the barrier island chain, and other stakeholder interests. …the PEIS (*should*) include a discussion on the availability of funding for continuous beach renourishment since it is being presented as a key element to the projects success. DGIF does 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 life time of the project.	Cost/Benefit Analysis	The planning process for USACE Civil Works projects requires that a Cost-Benefit Analysis (CBA) be performed to ensure that the benefits of a proposed project outweigh the costs, thereby providing a justification for implementation. As the SRIPP is not a USACE project but would rather be funded through NASA appropriations, conducting a CBA using a standard USACE methodology was not required prior to project implementation and was therefore not performed. However, in planning the SRIPP, NASA worked closely with USACE to consider the costs of each alternative and whether the benefit realized (storm damage reduction) would outweigh the monetary expenses. Section 1.4 of the Final PEIS includes a discussion of availability of funding and NASA's adaptive management approach. NASA consulted with DGIF to obtain methodology for conducting a cost/benefit analysis that would include wildlife values; however, no example methodology was provided. Due to the extent of the effort and degree of speculation to assign costs associated with all of the various

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				environmental impacts of the SRIPP, this effort was not undertaken. NASA feels that appropriate decisions about implementation of the SRIPP can be made based on the current information provided in the Final PEIS. For more information on project costs see Sections 2.6.2 and 2.6.3 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	Alternative Four. 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.	Cost/Benefit Analysis	The greater frequency of beach renourishment likely needed in the reduced beach fill scenario would result in higher costs compared to other alternatives including the Preferred Alternative (full beach fill). That is one of the reasons this alternative was dismissed and not carried forward in the EIS analysis.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	The draft PEIS should consider cumulative effects upon wildlife, not just direct effects resulting from specific construction activities.	Cumulative Impacts	The cumulative effects section of the Final PEIS (4.7) has been revised.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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). 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. Conduct a minimum of three aerial offshore transect surveys before beginning dredging activities over the course of at least one winter season (one in mid-December, one in mid-January, and one in mid-February) along the entire barrier island chain and out to 15 nautical miles. This would establish the relative use of the two unnamed shoals by sea ducks, which would assist DGIF in assessing the impact of dredging activities on these avian species. We recommend [the survey] data be used to analyze what, if any, impacts	Dredging	The benthic habitat survey consisted of video collected at approximately 40 stations on each shoal. The benthic habitat was determined to be unconsolidated sand. There is a relatively extensive amount of existing information on benthic community composition in this region of the mid-Atlantic which was used to characterize the benthic communities in conjunction with the video results. In performing the impact analysis in this PEIS, NASA used the most current available USFWS data (Forsell et al., 2003) regarding shoal use by sea ducks in and around the project area. NASA acknowledges that sea ducks may utilize these shoals, as well as the other shoals in the region to forage and have addressed potential impacts in the Final PEIS. Impacts to sea ducks are not anticipated to be significant within a regional context. Because impacts would be temporary and benthic habitats are expected to regenerate over the course of several years, NASA does not feel that additional studies are justified. The PEIS text in Section 4.3.3 Birds (Offshore Borrow Sites) has been revised to include more detailed information regarding impacts on seabirds and specifically on seaducks.

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		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.		
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: 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.).	Grain Size	Section 2.4.4, 2.4.5, and 2.4.6 of the Final PEIS describe the sediment sampling conducted by USACE to determine grain size suitability of the potential borrow areas. Only compatible sand (that which is adequately similar in grain size to that currently on Wallops Island beach) would be used for beach nourishment. The potential borrow sites were chosen based on the grain size evaluation. Several borrow sites were dismissed because they did not meet the criteria listed below for a useable source of sand.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative One. Moreover, it will reduce the island's value to beach and marsh-dependent wildlife through the loss of beach seaward of the seawall if renourishment efforts are not able to keep up with erosion rates, and the loss of marshes behind the island should significant island narrowing occur.	Habitat	It is NASA's intent to ensure that renourishment efforts would keep up with erosion rates. The goal of Alternative One is to create and maintain beach seaward of the seawall. The topography and bathymetry of the beach would be monitored on a regular basis to determine sand movement patterns and plan when renourishment is needed. The absence of sand retention structures would result in a larger amount of sand being available for erosion and longshore transport. Over the 50-year project life, the exact frequency of beach nourishment would be determined by the amount of fill placed each time, amount of sea-level rise, and by the number and severity of storm events.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Benthic communities. The draft PEIS acknowledges that repeated dredging activities at intervals of three years of less, may not allow sufficient time for benthic communities to recover between dredging cycles.	Invertebrates	Comment noted. The current SRIPP beach fill design contains a 5 year renourishment interval, which would better allow for benthic community recovery. Additional information has been added to Section 2.5.1.3 of the Final PEIS to explain that an additional margin of safety (the overfill volume) is included in the beach fill design to reduce the likelihood of having to renourish at more frequent intervals.
Virginia Department of Game and Inland Fisheries	Amy Ewing	We contend that avoidance could better be achieved by timing construction activities outside of shorebird nesting season. In addition, we recommend some mention in this section about mitigation for possible impacts upon sea turtles.	Mitigation and Monitoring - Nesting season	Due to the length of time required to complete the initial fill (approximately 7 months), it is not feasible to completely avoid work during shorebird and sea turtle nesting season. NASA consulted with NMFS and USFWS and received terms and conditions for SRIPP initial fill activities. During sand placement operations and work on the seawall, NASA would conduct regular monitoring of the beach for potential sea turtle

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				and shorebird nesting activity using a qualified biologist during construction activities if these activities take place during nesting season. If a nest is detected within the proposed work area, that area would be avoided until NMFS/USFWS are notified and site-specific measures developed. To mitigate impacts during renourishment cycles, NASA would avoid excavation on north Wallops Island during sea turtle or shorebird nesting season. NASA would conduct surveys for the presence of sea turtle and shorebird nests along the newly created beach and in consultation with resource agencies would determine timing of renourishment cycles. Additional details regarding mitigation and monitoring are located within Section 5 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Amy Ewing	..we recommend that all sand removal, if performed, occur outside of the nesting season for Piping Plover and sea turtles. … Adverse impacts upon the 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.	Mitigation and Monitoring - Nesting season	The Final PEIS has been revised as follows: To avoid impacts to nesting Piping Plovers and sea turtles, work in the proposed north Wallops Island borrow site area would be limited to the non-nesting season. (March 15 through November 30 or the last date of potential sea turtle hatchling emergence based on when the last eggs were laid).
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	The proposed mitigation measures for sand removal at the Wallops Island borrow site listed in Table 11 (PEIS, pages 73-74) state that a qualified biologist would closely monitor excavation activities to ensure that impacts to any listed species and their nests would be avoided or minimized. This statement appears to imply that the work would be conducted during the breeding season. However, the draft PEIS also states (page 302) that work in the proposed Wallops Island borrow site would be limited to the non-nesting season for the Piping Plover (September-March). This contradiction in the draft PEIS needs to be addressed. Also, DGIF notes that if the work is timed to be completed outside of the nesting season, then an on-site biologist would not be necessary.	Mitigation and Monitoring - Nesting season	This contradiction has been corrected in the Final PEIS. No excavation of north Wallops Island would occur during sea turtle or shorebird nesting season.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF has the following recommendations to ensure protection of Bald Eagles under its jurisdiction: No large machinery should be used within 660 feet of any bald eagle nest from December 15 through July 15 of any year to ensure protection of bald eagles during	Mitigation and Monitoring - Nesting season	As stated in the Final PEIS, no impacts on the bald eagle are anticipated primarily because their habitats would not be disrupted by SRIPP activities. However, as a safeguard, prior to removing sand from north Wallops Island, NASA would conduct a nest survey to determine if any new nests are present

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		excavation activities. Also DGIF recommends that prior to each excavation cycle, the Wallops Island borrow site should be surveyed to determine if any new nests are build within 660 feet of the excavation area and that the same excavation time-of-year restriction should be applied to any new or alternate nest sites.		and would establish buffers as needed. If any nests are identified, NASA would consult with USFWS and VDGIF regarding potential mitigation measures.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF has the following recommendations to ensure protection of shorebirds under its jurisdiction: The removal of any sand from the Wallops Island borrow site should occur outside of the breeding and nesting seasons for shorebirds (work should occur from November-March of any year), to prevent potential adverse impacts upon these species as a result of habitat impacts and possible direct impacts associated with construction activities.	Mitigation and Monitoring - Nesting season	The EIS states that a trained observer would closely monitor the beach during sand placement activities to ensure that impacts to any listed species and their nests would be avoided or minimized. If a nest is detected within the proposed work area, that area would be avoided until USFWS is notified and site-specific mitigation measures developed.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF has the following recommendations to ensure protection of sea turtles under its jurisdiction: The removal of any sand from the Wallops Island borrow site should occur outside of the sea turtle (work should occur from November-March of any year).	Mitigation and Monitoring - Nesting season	North Wallops Island would not be excavated during sea turtle nesting season (November to March). Chapter 4 of the Final PEIS summarizes ESA consultation with NMFS and USFWS and Chapter 5 summarizes the mitigation measures NASA would implement as determined by NMFS and USFWS to protect listed species and their habitats. If north Wallops Island is selected as a renourishment borrow site, NASA would conduct new analysis including more detailed surveys of habitats in the potentially affected area, would re-initiate consultation with NMFS, USFWS, and DGIF regarding potential impacts and mitigation measures for protected species, and would prepare new NEPA documentation.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	We recommend discussion in the EIS on: A detailed description of post-construction beach monitoring plan. This plan should present methods for measuring changes to island shorelines over time. Conduct beach profile monitoring on Metompkin and Cedar islands at a frequency that allows for an accurate assessment to be made regarding project impacts further south along the barrier island chain.	Mitigation and Monitoring - Shoreline	As described in the Final PEIS, the greatest physical effects from the project would be closest to the site. Based on USACE modeling in Section 4.2.2.1 and the extent of project effects, monitoring on islands south of Assawoman (Metompkin and Cedar Islands) is not warranted. Given that the net sediment transport is generally toward the north along the Wallops Island shoreline, effects would be expected to be minimal immediately south of the project site, and they would continually decrease with distance from the Wallops Island project site. As such, NASA does not expect that monitoring such a large geographic distance from the project site would provide meaningful data that would allow project-related changes to be discerned from

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				natural variability in the wave climate. NASA's monitoring plan could be modified based on the adaptive management strategy and monitoring results. The monitoring survey of the shoreline in the vicinity of Wallops Island would be conducted twice a year. The first monitoring event would be conducted along the entire lengths of Wallops and Assawoman Islands, from Chincoteague Inlet in the north to Gargathy Inlet in the south, a distance of approximately 13.7 km (8.5 mi). The second of the two annual survey events would be limited to the length of shoreline from Chincoteague Inlet on the north to 0.8 km (0.5 mi) south of the former Assawoman Inlet which defines the south end of Wallops Island. NASA, USACE and BOEMRE agree that this proposed area of shoreline monitoring is appropriate to determine effects from the SRIPP and the data used in the adaptive management decisions. A detailed description of the beach profile monitoring has been added in Section 5.2.2 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Amy Ewing	Offshore Dredging Activities. We support the recommendations provided in this section regarding the protection of sea turtles and recommend continued coordination with the NMFS regarding their protection and the protection of sea mammals.	Mitigation and Monitoring - Wildlife	NASA has coordinated with NMFS and the USFWS regarding the protection of sea turtles and mammals under Section 7 of the Endangered Species Act; a summary of the consultation is provided in Section 4.3.11 of the Final PEIS. Both NMFS and USFWS Biological Opinions are includes as appendices to the Final PEIS.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF recommends that the 'Mitigation and Monitoring' section of the draft PEIS address mitigation measures for potential impacts to sea turtles.	Mitigation and Monitoring - Wildlife	Section 5.1.2 in the Final PEIS describes the mitigation measures that have been agreed upon through Section 7 consultation with NMFS and USFWS regarding protection of sea turtles.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Provide a more detailed explanation of the types of wildlife habitats at the northern end of the island that would be avoided during excavation activities.	North Wallops Island Borrow Site	If north Wallops Island is selected as a renourishment borrow site, NASA would conduct new analysis including more detailed surveys of habitats in the potentially affected area, would re-initiate consultation with NMFS, USFWS, and DGIF regarding potential impacts and mitigation measures for protected species, and would prepare site-specific NEPA documentation. To avoid impacts to nesting Piping Plovers and sea turtles, excavation of sand for future renourishment would be conducted outside of plover and sea turtle nesting season (March 15 through November 30 or the last date of potential sea turtle hatchling emergence based on when the last eggs were laid). The wildlife habitat constraints referred to in the Draft PEIS are regarding the identification and avoidance of the

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				most active areas of piping plover and sea turtle nesting. Over the past several years, these areas have generally been south of the Wallops beach off road vehicle access road and therefore Figure 13 in the Final PEIS presents the potential area for sand removal as such. However, it should be noted that these areas are subject to change upon placement of the new beach and would be better defined at the time this option is considered in more detail. The Final PEIS has been revised to clarify this point.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Consider conducting an analysis of the actual recovery time and the sustainability of beaches at the northern end of Wallops Island.	North Wallops Island Borrow Site	NASA would create and implement a monitoring plan that would be modified based on the adaptive management strategy and monitoring results. Chapter 5 of the Final PEIS has been updated to provide additional details that are known at this time.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	The draft PEIS states that the Wallops Island borrow area was developed in consideration of "wildlife habitat constraints," but this statement is not further explained. DGIF states that 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 that sand removal to a depth of 1 meter will have on the benthic community and the species that forage on these organisms. DGIF believes that the omission in analysis of environmental consequences represents a serious oversight and a discussion of such analysis should be included in future iterations of the document. DGIF believes that the combination of sand excavation in the northern end of the island and beach renourishment activities to the south may substantially reduce the benthic invertebrate prey base at Wallops Island for unknown periods of time, which will diminish the quality of the island's shorebird foraging (and breeding) habitat.	North Wallops Island Borrow Site	Given the current level of uncertainty regarding the extent and magnitude of how north Wallops Island would be excavated, NASA assessed impacts from this option in a more programmatic manner, relying on the best available data from studies within the region. Additional information regarding potential impacts has been added to Chapter 4 of the Final PEIS. As north Wallops Island would not be used for the initial fill cycle, and as the newly placed fill material would likely be transported onto north Wallops Island, the physical parameters of the beach (namely grain size and beach geometry) would change accordingly. These parameters would likely have a direct effect on the infauna that would inhabit the area. As such, it would be more appropriate to conduct sampling of infaunal densities of the proposed excavation area when preparing a site-specific analysis. If north Wallops Island is selected as a borrow site, NASA would conduct new NEPA analysis including more detailed surveys of habitats in the potentially affected area, would prepare the appropriate level of NEPA documentation, and would re-initiate consultation with NMFS, USFWS, and DGIF regarding potential impacts and mitigation measures for protected species.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative One. DGIF states that the sacrifice of important and unique wildlife habitat along the only section of undeveloped beach on Wallops Island to acquire fill material at the lowest cost possible is not	North Wallops Island Borrow Site	As described in the Draft PEIS, the northern part of Wallops Island may be considered for potential beach renourishment material. However, sand would not be excavated from unique wildlife habitats. NASA would conduct further detailed

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		appropriate. Moreover, the use of sand which is not the optimal grain size is in opposition to the mitigation criteria developed by NASA for sand placement activities (page 300).		coordination with the USFWS on potential areas for excavation as well as to prepare appropriate NEPA documentation to evaluate potential impacts from use of north Wallops Island as a sand source. The mean grain size of samples of native sand on Wallops Island was found to be between 0.20 and 0.21 mm. The mean composite grain size of sand from north Wallops Island was found to be 0.20 mm. Although the grain size of sand from Shoals A and B is preferable as material for nourishment due to its larger grain size (0.42 and 0.34 respectively), the sand from north Wallops Island is still appropriate to supplement renourishment needs, especially once it mixes with the coarser offshore sand.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF is strongly opposed to NASA's using the Wallops Island borrow site for beach fill during renourishment cycles due to the presence of the federally-listed threatened Piping Plover and sea turtle nesting sites.	North Wallops Island Borrow Site	To avoid impacts to nesting Piping Plovers and sea turtles, excavation of sand for future renourishment would be conducted outside of plover and sea turtle nesting season (March 15 through November 30 or the last date of potential sea turtle hatchling emergence based on when the last eggs were laid). Additionally, prior to using this site as a sand source, NASA would conduct additional NEPA analysis and consult with the appropriate federal and state wildlife management agencies to better assess the potential for implementation prior to making a final decision. NASA would work closely with NMFS and USFWS for avoidance and mitigation of protected species and to avoid any nesting sites.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative One. 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.	North Wallops Island Borrow Site	Comment noted. Section 4.2.2.1 of the Final PEIS provides additional detail regarding potential indirect effects of the SRIPP, including island narrowing. The goal of Alternative One is to create and maintain beach seaward of the seawall, which would increase the land mass of Wallops Island compared to existing conditions. The topography and bathymetry of the beach would be monitored on a regular basis to determine sand movement patterns and plan when renourishment is needed. The absence of sand retention structures would result in a larger amount of sand being available for erosion and longshore transport.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF believes that, even with intervention, the Wallops Island shoreline is likely to continue to retreat landward and any attempts to delay or alter the shoreline retreat may be futile over the long term. … This sand capture (*referring to the growing caps of	Project Effectiveness	Comment noted. NASA has been located on Wallops Island since the 1940s and its mission requirements have grown since then. There are over $1 billion of public assets on the island. Chapter 1 provides details on the purpose and need for the program. The SRIPP is designed to provide infrastructure

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		Fishing Point*) is a further indication that Wallops Island will continue to retreat, thereby necessitating continual and costly efforts to slow the 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.		protection for a term of 50 years. At that point, NASA would re-evaluate appropriate protection measures.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: 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.	Project Effectiveness	According to current USACE design methodology, all alternatives of the SRIPP have been designed to provide storm damage reduction from a 100-year storm. Additionally, the USACE beach fill and seawall design did take into account sea-level rise, as explained in Section 2.5.1.3 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Discuss in the final PEIS the assertion that any negative impacts from the seawall would be mitigated following beach fill placement.	Project Impacts	As described in further detail in the USACE's modeling and design report in Appendix A, the modeling of the seawall extension showed that the seawall would have only minor impacts on the adjacent shoreline, particularly if the seawall is set back at least 10 yards from the shoreline. The average shoreline change rate at Assawoman Inlet attributed to seawall construction would be less that the variability in the change rate caused by yearly changes in the wave climate. Any negative impacts (e.g., change in shoreline position) from the seawall extension would be negated following the placement of additional sand to the beach and the nearshore sediment transport system. he new sand would effectively replace any sediments lost as a result of fixing the shoreline position with the seawall.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative One. DGIF is concerned that the 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	Project Impacts	The potential impacts to overwash processes have been addressed in Sections 4.2.1.1 and 4.7.2 of the Final PEIS. The seawall is one component of the SRIPP. Beach fill is the other major component. The addition of beach fill (both initially and during renourishment cycles) will, at least temporarily, reduce the narrowing of Wallops Island during the 50-year project lifetime. Predictions of changes extending past the 50-year horizon are not addressed in the PEIS. As part of its Adaptive Management and Design strategy, NASA would continually monitor and manage for changes throughout the program

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		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.		lifetime.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative Three. DGIF is concerned that the reduction in beach erosion resulting from wave attenuation performed by the breakwaters will be negated by the newly constructed seawall extension and that this structure may also result in shoreline erosion to the south.	Project Impacts	Sand would be placed in front and on top of the seawall extension under all three alternatives. Therefore, waves would break on the constructed sand beach and would only interact with the seawall in the most extreme storm events. The rock seawall can be thought of as an insurance policy that would only be needed during rare occasions. Section 4.2.2.1 of the Final PEIS and Section 10 of Appendix A describe the minor impacts on the shoreline from construction of the seawall extension prior to placing the beach fill in front of it. It is expected that this condition would only exist for a short period of time (less than one year) and that any resulting shoreline changes would be mitigated by the beach fill.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Alternative One. Lastly, the results from the models presented in Appendix A of the draft PEIS suggest that the 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.	Project Impacts	Your comment is correct. As presented in the Final PEIS and USACE modeling report (Appendix A of the Final PEIS), the seawall extension would have less of an impact on Assawoman Island compared to storms and the existing variability in wave climate.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	Alternative One. ..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.	Project Impacts	Although the seawall extension would cause a temporary reduction of sand available to the longshore transport system during the year between completion of seawall construction and completion of initial beach nourishment, there would be an overall net gain of sand introduced to the system by the beach fill.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: 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.	Project Impacts - Shoreline	Because of the potentially adverse impacts on the Assateague Island shoreline and the public perception of negative impacts on commercial and recreational fishing communities, Blackfish Bank Shoal was removed from consideration as a borrow site option. See Sections 2.4.5.3 and 2.4.7 for details. Potential impacts to the Virginia Barrier Island system including modeling results are discussed in Section 4.2.2.1 of the Final PEIS.
Virginia Department of	Raymond Fernald	We recommend discussion in the EIS on: A thorough analysis and discussion of potential impacts each	Project Impacts - Shoreline	Potential impacts to the Virginia Barrier Island system, including modeling results, are discussed in Section 4.2.2.1 of

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Game and Inland Fisheries		alternative poses on the islands to the south of the project area, with a special focus on Assawoman, Metompkin and Cedar islands.		the Final PEIS.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF is concerned about the adverse effects of Alternative Two on islands located south of Wallops Island as it may reduce the naturally occurring transport of sands to those areas. … Although DGIF understands NASA's need to protect its assets, DGIF does not support any action that could adversely affect other barrier islands, which provide important habitat for shorebirds, sea turtle nesting areas and other wildlife.	Project Impacts - Shoreline	As discussed in detail in Appendix A, the nodal zone of sediment transport is located at approximately the Wallops and Assawoman boundary. Under current conditions, Alternative Two proposes a groin approximately at the location of the nodal zone. The sediment transport diverges at this location. As a result, a groin placed at the southern portion of the project area would not result in erosion to the south.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	Alternative One. We are concerned that the proposed jetty may impede existing longshore transport of sand to Assawoman, Metompkin and Cedar Islands, especially if funding cannot be secured for the anticipated 5-7 year renourishment cycle.	Project Impacts - Shoreline	The following text has been added to Section 4.2.2.1 of the Final PEIS: The groin would be specifically designed to let some sand pass through the structure and was modeled as such. If there were no beach fill, the groin would exacerbate the downdrift erosion on Assawoman Island; however, because the SRIPP includes a beach fill component, overall, more sand would be moving onto the north end of Assawoman Island than is occurring at present. According to the modeling results, the combination of the groin with beach fill would result in accretion of sand on the north end of Assawoman Island. The greatest amount of erosion and accretion would occur immediately adjacent to the groin and would exponentially decrease with distance from the groin. However, it should be noted that NASA share's DGIF's concern regarding the effects of the groin if renourishment funding cannot be secured, and as such, the Beach Fill Only alternative is NASA's preferred alternative for the SRIPP.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	DGIF does not fully support any of the alternatives presented in the draft PEIS. DGIF believe that all of the alternatives are likely to result in adverse impacts upon wildlife and/or the resources upon which they depend. However, DGIF agrees with the selection of Alternative One as the Preferred Alternative, since it no longer includes the installation of a permeable groin. The groin would reduce the southerly longshore transport of sand thereby adversely affecting the islands south of Wallops.	Project Support	Comment noted.

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Virginia Department of Game and Inland Fisheries	Raymond Fernald	Alternative One. 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 may also 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.	Renourishment	Section 2.4.4, 2.4.5, and 2.4.6 of the Final PEIS describes the nearshore, offshore, and north Wallops Island sediment sampling conducted by USACE to determine grain size suitability of the potential borrow areas. Only compatible sand (that which is adequately similar in grain size to that currently on Wallops Island beach) would be used for beach nourishment. The potential borrow sites were chosen based on the grain size evaluation. Several borrow sites were dismissed because they did not meet the criteria listed below for a useable source of sand. The dredging plan was formulated with recommendations from NMFS and is described in detail in Section 2.5.5.2 of the PEIS. Section 4.3.6 outlines anticipated impacts on benthos from dredging. Dredging sand from either offshore shoal would have a significant and immediate adverse impact on the local benthic community of the shoal. However, it is expected that there would be a negligible impact on the regional benthic ecosystem.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	While the draft PEIS acknowledges that the shoreline at Wallops Island will certainly experience the effects of future sea level rise, sea level rise was not included as a variable in the models used to design SRIPP. Moreover, the Storm Damage Reduction Project Design for Wallops Island Virginia report (Appendix A) offered a very limited discussion on climate change and sea level rise and the only concession it made to address the problem is to follow current Corps' policy. …there was no discussion about what steps would be taken to account for sea level rise within the projects lifetime if renourishment at the required volume and frequency is no longer possible due to lack of funding or availability of beach compatible sand.	Sea-level Rise	The SRIPP project design and modeling was performed according to current USACE policy. In addition, Appendix A and Section 4.2.2.1 of the PEIS states that sea-level rise would be appropriately compensated for at each renourishment event. If renourishment were stopped before the end of the project lifetime due to funding limitations, the result would be that the infrastructure on Wallops Island would become increasingly vulnerable to storm damage and erosion as time goes on. This would happen whether the projected sea-level rise occurs or not; with sea-level rise, the vulnerability would be exacerbated.
Virginia Department of Game and Inland Fisheries	Ellie L. Irons	Offshore Dredging Activities. DGIF is concerned that the proposed project could impact sea turtles and other mammals.	Wildlife	NASA is coordinating with NMFS and the USFWS regarding the protection of sea turtles and mammals. Mitigation measures that have been developed for the project are explained in Section 5.1 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Amy Ewing	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 alternative presented in the draft PEIS	Wildlife	Comment noted. NASA recognizes that the SRIPP would have unavoidable adverse impacts on fish and wildlife resources and is committed to mitigating those impacts to the extent practicable.

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		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.		It should be noted that NASA's management of Wallops Island is based on its mission requirements as an aerospace research range which differ from those of the organizations that manage the other Virginia barrier islands. For additional information about NASA's mission see Chapter 1 of the PEIS.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: All potential sand mining impacts on the aforementioned shoals' avifauna and to fishes and other wildlife species that forage on the shoals' benthos.	Wildlife	The potential impacts on benthos at the shoals which is associated with dredging is discussed in several sections of the Final PEIS, including 4.3.3 Birds, 4.3.8 Finfish, and 4.3.9 Essential Fish Habitat. Removal of sand from the shoal(s) would alter the topography of the shoal and, as described in Section 4.3.2.5 (Finfish), may adversely affect fish populations in the area. As a result, dredging may indirectly affect seabird populations that prey on fish at the shoal by altering fish distribution and populations. However, since the shoals do not present a unique habitat and there are numerous other suitable shoals nearby, the adverse impacts would be temporary, localized and not significant.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend discussion in the EIS on: Consultations with National Marine Fisheries Service regarding potential impacts of hopper dredging on sea turtles.	Wildlife	Section 4.3.11.1 of the Final PEIS now includes a discussion regarding consultation with NMFS.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	Seawall Extension - According to the draft PEIS, impacts upon wildlife associated with extension of the seawall would he 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 he achieved by timing construction activities outside of shorebird nesting season. In addition, we recommend discussion in this section about potential impacts upon sea turtles.	Wildlife	The entire seawall extension would not occur at once; it would likely take place as funding allows. As the 435 m (1,430 ft) initial seawall extension is expected to require seven months of construction time, it is not possible to efficiently complete that work outside of nesting season. Additionally, the area that would be affected by seawall extension is currently intertidal (with little suitable nesting beach behind it), so direct effects on nesting birds or sea turtles are not expected to be substantial. However, if additional seawall extension (up to the maximum length of 1,400 m [4,600 ft]) takes place following the initial beach fill, the potential exists for direct impacts to nesting species. As such, NASA would conduct regular monitoring of the beach for potential nesting activity if these activities take place during shorebird or sea turtle nesting season. If a nest is detected, buffers would be established around the nest(s) where no work would occur until site-specific mitigation measures are formulated in conjunction with USFWS and VDGIF.

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				Given the availability of adjacent foraging habitat that would be available to non-nesting beach birds (including Red Knots), any startle effects from construction noise also would not present a substantial impact. As requested, additional information regarding potential impacts on sea turtles has been added to Section 4.3.10 of the Final PEIS.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	We recommend further explanation of possible adverse impacts resulting from any of the proposed activities and how such impacts may be mitigated.	Environmental Impacts - Miscellaneous	Potential environmental impacts from all alternatives are detailed in Chapter 4 of the PEIS and mitigation is addressed in Chapter 5.
Virginia Department of Game and Inland Fisheries		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 harrier islands that provide important shorebird and sea turtle nesting areas and other wildlife habitats.	Groin or Breakwater	Comment noted. NASA shares DGIF's concern regarding the potential effects of a south terminal groin, and as such has identified the Beach Fill Only project as its preferred alternative.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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 .	Project Support	Comment noted.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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.	Sea-level Rise	If funding for future SRIPP actions was not available, NASA would re-evaluate existing conditions and determine appropriate actions at that time. NASA would advocate to remove a groin or breakwater; however, NASA, as with all Federal agencies, is subject to appropriations from Congress, so there is no guarantee that the project would be continually funded over the 50-year planning horizon. However, for 2012 construction of facilities budget, the SRIPP was NASA's

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				highest priority project.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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 aver the long term.	Alternatives	The greater frequency of beach renourishment likely needed in the reduced beach fill scenario would result in higher costs compared to other alternatives including the Preferred Alternative (full beach fill). That is one of the reasons this alternative was dismissed and not carried forward in the EIS analysis.
Virginia Department of Game and Inland Fisheries	Raymond Fernald	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.	Alternatives	Comment noted. The greater frequency of beach renourishment likely needed in the reduced beach fill scenario would result in higher costs compared to other alternatives including the Preferred Alternative (full beach fill). That is one of the reasons this alternative was dismissed and not carried forward in the EIS analysis.
Virginia Department of Health	Ellie L. Irons	The VDH-ODW (Virginia Department of Health, Office of Drinking Water) states that there are no apparent impacts to public drinking water sources due to the proposed project. There are no groundwater wells within a 1-mile radius and no surface water intakes located within a 5-mile radius of the project site. The project site is not located within Zone 1 or Zone 2 of any public surface water sources. The VDH-ODW states that potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility.	Project Support	Comment noted.
Virginia Department of Historic Resources	Ronald Grayson	Based upon the information provided, we concur with your determination that the Proposed Alternatives 1, 2 and 3 will not adversely affect any historic properties. In the event that previously unrecorded historic properties are discovered during project activities, stop work in the area and contact DHR immediately.	Project Support	Comment noted.
Virginia Marine Resources Commission	Ellie L. Irons	It appears that the project would require authorization from the VMRC. However, any dredging that occurs more than 3 miles offshore will not require authorization from the VMRC.	Permitting	Comment noted. As the preferred borrow site for the initial fill cycle would be in Federal waters, NASA would apply and receive authorization from BOEMRE prior to dredging.
Virginia Marine Resources	Ellie L. Irons	Provided that all VMRC regulations are complied with, the project will be consistent with the subaqueous	Permitting	Comment noted. NASA would comply with all VMRC regulations.

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Commission		lands management enforceable policy of the VCP.		
Virginia Marine Resources Commission	Ellie L. Irons	For any development that involves encroachments on primary sand dunes, a JPA must be submitted to VMRC for review and approval.	Permitting	Comment noted. NASA would submit a Joint Permit Application and obtain all necessary authorizations from VMRC prior to implementing either alternative.
Virginia Marine Resources Commission	Ellie L. Irons	Also, VMRC supports Alternative One, as this alternative would have less impact to the existing longshore transport of sand to Assawoman Island in the event that funding for the proposed 5-year beach nourishment cycles cannot be secured.	Project Support	Comment noted. NASA shares VMRC's concern regarding the potential effects of the project on neighboring islands, and as such has identified the Beach Fill Only project as its preferred alternative.
Local Government				
Accomack County Wetlands Board	David Fluhart	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.	Permitting	Comment noted.
Accomack-Northampton Planning District Commission	Eastern Shore Groundwater Committee	The Ground Water Committee would like to voice its support for the [SRIPP] at the Wallops Flight Facility on Wallops Island, Virginia. The Committee found your summary of the [DPEIS] at its last meeting to be very informative. The Ground Water Committee greatly supports the SRIPP.	Project Support	Comment noted.
Accomack County Supervisor, Grayson Chesser	Grayson Chesser	I'm the supervisor of Accomack County representing District 3. Before I spoke against the seawall. Now - not the seawall but the groin. I'm kind of unhappy to see [the groin] still on the list, but I'm very happy to see that it's dropped down to Number 2 because I think it would be disastrous for you if you go to that option. Its absolutely 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. I would rather see the groin completely eliminated because I've spent an awful lot of time out there in the winter..I started going out there in the 50s and seeing all the changes its very dynamic and I think the choice you have made [beach fill only as preferred alternative]	Groin or Breakwater	Comment noted. Modeling results indicate that the groin would not have substantial negative impacts. However, it is always possible that conditions could occur that are outside the range that were considered in the modeling effort. Uncertainty in the groin impacts on the shoreline is one of the reasons that this alternative is not the preferred alternative. NASA would determine the future need for sand retention structure(s) based on shoreline monitoring results using an adaptive management strategy.

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		if the only logical one to make.		
Accomack County Supervisor, Grayson Chesser		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.	Groin or Breakwater	Comment noted. NASA concurs that the Preferred Alternative (no sand retention structure) is the most appropriate solution for storm damage reduction on Wallops Island.
Other Organizations and Individuals				
Assateague Coastal Trust	Kathy Phillips	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.	Alternatives	Comment noted.
Assateague Coastal Trust	Kathy Phillips	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. 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. We agree with NASA's decision to dredge no deeper than the seafloor or base of the shoals; dredging pits could alter physical processes.	Dredging	Additional details regarding NASA's dredging plan has been added to Section 2.5.7.2 of the Final PEIS. Results of the USACE modeling to evaluate potential impacts from dredging on ASIS indicate that no measurable impacts would occur to the ASIS shoreline. In addition, NASA would follow guidelines recommended in the two most recent BOEMRE sponsored studies. As a result, the shoals would continue to dissipate incoming waves. Also, the dredged areas would fill in gradually over time from local sediment transport. The deep troughs landward of these two shoals would, in effect "isolate" the shoreline and its immediate profile off Assateague Island from the dredging effects. The shoals are detached shoreface ridges are isolated on the inner shelf. As such, these sand bodies have a high preservation potential and consequently, a low cross-shore sediment transport potential. Section 4.2.3.5 of the Final PEIS has been revised to provide additional information that supports this conclusion.
Assateague Coastal Trust	Kathy Phillips	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 by wind and by overwash. Such changes in sediments would affect the nesting and foraging behavior of	Grain Size	Sections 2.4.4, 2.4.5, and 2.4.6 of the Final PEIS describe the sediment sampling conducted by USACE to determine grain size suitability of the potential borrow areas. Only compatible sand (that which is adequately similar in grain size to that currently on Wallops Island beach) would be used for beach nourishment. The potential borrow sited were chosen based on the grain size evaluation. Several borrow sites were dismissed because they did not meet the criteria listed below for a useable

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		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.		source of sand.
Assateague Coastal Trust	Kathy Phillips	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.	Groin or Breakwater	Comment noted.
Assateague Coastal Trust	Kathy Phillips	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.	Project Impacts	Comment noted. NASA recognizes that there would be unavoidable adverse impacts to coastal resources, and as such, is committed to mitigating those impacts to the greatest extent practicable.
Assateague Coastal Trust	Kathy Phillips	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	Project Impacts - Shoreline	Results of the USACE modeling to evaluate potential impacts from dredging on ASIS indicate that no measurable impacts would occur to the ASIS shoreline. In addition, NASA would follow guidelines recommended in the two most recent BOEMRE sponsored studies. As a result, the shoals would continue to dissipate incoming waves. Also, the dredged areas would fill in gradually over time from local sediment transport. The deep troughs landward of these two shoals would, in effect "isolate" the shoreline and its immediate profile off Assateague Island from the dredging effects. The shoals are detached shoreface ridges are isolated on the inner shelf. As such, these sand bodies have a high preservation potential and consequently, a low cross-shore sediment transport potential. Section 4.2.3.5 of the Final PEIS has been revised to provide additional information that supports this conclusion.

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		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.		
Hampton Roads Military & Federal Facilities Alliance (HRMFFA)		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 j ob 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.	Project Support	Comment noted.
Self, Calvert Seybolt	Calvert Seybolt	My comment deals with the groin and 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.	Groin or Breakwater	Comment noted. Modeling results indicate that the breakwater or groin would not have substantial negative impacts on Assawoman Island. However, it is always possible that conditions could occur that are outside the range that were considered in the modeling effort. Uncertainty in the breakwater impacts on the shoreline is one of the reasons that this alternative is not the preferred alternative. NASA would determine the future need for sand retention structure(s) based on shoreline monitoring results using an adaptive management strategy.
The Nature Conservancy	Steve Parker	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. The Conservancy is in agreement with the preferred alternative.	Alternatives	Comment noted.
Virginia Nature		In addition, we believe it is imperative that NASA	Adaptive	Comment noted. Please refer to Section 2.3.3.1 of the Final

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Conservancy		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.	Management	PEIS which describes why relocating infrastructure is not a feasible or acceptable option for NASA WFF.
Virginia Nature Conservancy		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 Nature 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.	GENESIS model	Comment Noted.
Virginia Nature Conservancy	Robert S. Young. PhD, PG	The modeling used to examine the benefits and impacts of a proposed groin is critically flawed. See Dr. Young's paper for more details.	GENESIS model	As with all mathematical models, the models used in this study have limitations. They do not exactly mimic nature. While they do provide significant insights, the fact that they do have limitations is one of the principle reasons for adopting an

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				adaptive management strategy for the SRIPP. The advice and guidance found in ASBPA 2008, Kraus, Hanson and Blomgren 1994, National Research Council 1995, and Basco, D.R. 2002, all of which are USACE standards was followed in the design of the south terminal groin. NASA and the design engineer, USACE, disagrees with the statement that the methodology is critically flawed.
Virginia Nature Conservancy		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.	GENESIS model	As with all mathematical models, the models used in this study have limitations. They do not exactly mimic nature. While they do provide significant insights, the fact that they do have limitations is one of the principle reasons for adopting an adaptive management strategy. USACE employed globally standardized models to aid in the coastal engineering for the WFF SRIPP.
Virginia Nature Conservancy	Robert S. Young. PhD, PG	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.	Groin or Breakwater	As with all mathematical models, the models used in this study have limitations. They do not exactly mimic nature. While they do provide significant insights, the fact that they do have limitations is one of the principle reasons for adopting an adaptive management strategy. USACE employed globally standardized models to aid in the coastal engineering for the WFF SRIPP.
Virginia Nature Conservancy		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; See Letter dated April 19, 2010	Mitigation and Monitoring - Shoreline	As described in the Final PEIS, NASA would implement an Adaptive Design and Management strategy for the SRIPP. This approach would put into place a thorough monitoring program that would assess shoreline changes on Wallops and adjacent areas. Based on the results of the monitoring program, NASA would assess the need for future actions.
Virginia Nature Conservancy	Robert S. Young. PhD, PG	USACE (2010) seriously underestimates the closure depth along this shoreline leading to a significant underestimation of the amount of nourishment sand	Project Design	The closure depth was determined by a combination of using standard equations for its calculation and from interpreting the local geology. Additional fill was added to the nourishment

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		required, the storm benefits of the project, and project durability.		volume specifically to address any potential underestimation.
Virginia Nature Conservancy		In addition, Dr. Young raises serious concerns regarding the USACE's 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 durability, impacts from storm events, and the overall movement of sand within the project area.	Project Design	The closure depth was determined by a combination of using standard equations for its calculation and from interpreting the local geology. Additional fill was added to the nourishment volume specifically to address any potential underestimation.
Virginia Nature Conservancy		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.	Project Support	Comment noted.
Virginia Nature Conservancy	Robert S. Young. PhD, PG	The impacts of rising sea level along Wallops Island over the next 50 years are also greatly underestimated.	Sea-level Rise	Current USACE policy was followed in the beach fill modeling to account for impacts from sea level rise. This has been primarily accomplished by providing an additional sediment volume during each renourishment event that would raise the level of the entire beach fill by an amount necessary to keep pace with the projected rate of sea-level rise.
Virginia Nature Conservancy		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. 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	Sea-level Rise	Comment noted. Sea-level rise has been accounted for in the project design. Section 4.2.1.1 of the Final PEIS has been updated to include the following: The renourishment fill includes the advanced fill volume and a sea-level rise volume. The sea-level rise fill volume was accounted for by including an additional amount of material at each renourishment event that would raise the entire beach profile by an amount equal to the projected amount of sea-level rise, as estimated by King et al. (USACE, 2010a) in the USACE analysis and design. Additional consideration on the impacts of sea-level rise has been added to Section 4.7.2 of the Final PEIS.

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		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.		
The Nature Conservancy	Steve Parker	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.	Project Support	Comment noted.
Internal Technical Review Team (ITR)				
ITR	ITR	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.	Adaptive Management	This type of analysis is beyond the scope of the PEIS. If Wallops Island is abandoned by NASA, any structures along the shoreline would be evaluated for removal. Prior to future actions, NASA would complete NEPA documentation that would fully evaluate potential alternatives using an adaptive management approach based on monitoring results. As such, NASA would notify the public and consult with appropriate agencies regarding potential alternatives (such as removing structures if warranted) and impacts.
ITR	ITR	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.	Adaptive Management	The PEIS has been revised to incorporate a new section (1.4) that addresses adaptive design and management.
ITR	ITR	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	Adaptive Management	The PEIS has been revised to incorporate a new section (1.4) that addresses adaptive design and management.

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		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.		
ITR	ITR	Offshore Sand Shoals is not as detailed as the "Bathymetry" section on p. 81.	Affected Environment	The Bathymetry section (Section 3.1.3) provides more detailed information regarding the bathymetry in the SRIPP project area, including a map showing the bathymetry of both Unnamed Shoals A and B from data collected by NASA during a 2009 survey of the shoals. Since the shoals are a part of the geomorphology of the project area, the shoals are also discussed under "Offshore Sand Shoals" discussion in Section 3.1.4.4. A reference is made back to section 3.1.3 in Section 3.1.4.4 rather than repeating the level of detail provided in Section 3.1.3.
ITR	ITR	Zhang's paper cited as the only one that demonstrates storminess is not linked to global warming… but hurricanes are!	Affected Environment	The PEIS has been revised to state that increased hurricane activity/intensity is linked to increased seawater temperatures and global warming.
ITR	ITR	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.	Affected Environment	Figure 26 has been revised to show position of nodal zone and 95% confidence values as suggested. For Figures 42-44, the location of the nodal point and the width of the nodal zone shifts slightly from year to year. Additional figures (ADD NUMBERS) have been added to the Final PEIS that show the Year 5 net longshore transport rates with 95% confidence intervals for Alternatives 1-3.

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ITR	ITR	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.	Affected Environment	Mention of these two storms has been included.
ITR	ITR	Level 1 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. 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	Affected Environment	The discussion in the Draft PEIS explains the direction of net sediment transport and the photos are merely presented for visual understanding to the reader of what the net sediment transport north and south looks like along the shoreline - the photographs are not intended to represent direct evidence of net sediment transport over many years because they are only a snapshot in time. As recommended, a statement has been added to Section 3.1.5.4 of the Final PEIS noting that the photographs may be capturing seasonal reversals thereby making it difficult to conclusively determine net long-term transport directions from aerial photographs.

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		analysis and adding a statement to the effect of that discussed in 2 above.		
ITR	ITR	Cannot erode an inlet (Assawoman)	Affected Environment	Assawoman Inlet is completely filled in with sediment currently; therefore although it is still referred to as an inlet, it is erodible at the present time.
ITR	ITR	In discussing air pollutants emitted it states that "Allowance was made for 10% downtime…." Is the downtime relevant to total emissions released?	Air Quality	An assumption of downtime was used in estimating the amount of time that equipment would be operating to complete the air emission calculations. It is a practical assumption that allows for weather conditions, refueling, and mechanical problems. If downtime wasn't allowed for, then emissions would have been slightly higher.
ITR	ITR	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	Alternatives	Using the best available data and understanding of the sediment transport system at the time the DPEIS was developed, Alternative 2 (w/ groin) and Alternative 3 (w/ breakwater) modeled specific sand retention structures at the southern end of the project area. The PEIS has been revised to clarify that sand retention structures may be considered elsewhere along the Wallops shoreline as part of NASA's Adaptive Management and Design approach and based on the results of future monitoring efforts. Prior to implementing any measures outside of what has been analyzed in this PEIS, additional NEPA documentation would be prepared.
ITR	ITR	Level I Comment #2: 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 location1 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	Alternatives	We concur that the ITR puts forth a strong case for a groin at the north end of the project area. NASA's initial alternatives analyses included evaluation of sand retention structures at both the north and south ends of Wallops Island. Although a southern sand retention structures are presented for analysis and comparison in the PEIS, NASA's preferred alternative is not to initially construct a sand retention structure but instead to collect data and use an adaptive management approach to determine the need for and location of a sand retention structure. If the data supports construction of a sand retention structure, supplemental NEPA documentation (and consultation with cognizant stakeholder groups) would be prepared during the planning process.

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		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 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. 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		

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		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.		
ITR	ITR	"Bathymetry is the measurement of depth". Isn't bathymetry the product of the measurement of depth?	Bathymetry	The term "bathymetry" can refer to either the measurement of water depth at various places in a body of water, or to the information obtained from such measurements. The sentence in Section 3.1.3 of the PEIS has been revised to read "Bathymetry is the measurement of depth at various places in a body of water".
ITR	ITR	Section on "bathymetry" only addresses Assateague and Fishing Point, but not Wallops.	Bathymetry	A description of nearshore bathymetry has been added to the PEIS.
ITR	ITR	"Continental shelf edge sightings were generally associated with the 1,000-m depth contour…" The continental shelf edge is usually taken as 200 m.	Bathymetry	Sentence has been revised to read: Sightings were generally associated with the 1,000-m (3,280-ft) depth contour during all times of the year (CeTAP, 1982).
ITR	ITR	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	Dredging	Page 274 of the Draft PEIS incorrectly stated the duration of dredging. The renourishment dredging cycle would take approximately 2 months as stated in Chapter 2 (Implementation Schedule). The transportation section of the Final PEIS has been revised accordingly.

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		months during the initial construction phase and approximately 2 months during each renourishment cycle." Why the disparity?		
ITR	ITR	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.	Dredging	Information on the proposed dredging plan has been added to Section 2.5.2.2 of the Final PEIS. Shallow dredging has been recommended in two recent MMS-funded studies examining dredging on shoals offshore of DE, MD, and VA (CSA International Inc et al., 2009; Dibajnia and Nairn [*in press*]). While a relatively shallow excavation over a broader area results in more surface area disturbance and greater short-term biological impacts, sediment reworking and site infilling in general proceed more rapidly than would occur with deeper, more spatially restricted dredging (CSA International Inc., 2009; Byrnes et al., 1999). In turn, benthic recovery would follow the recovery of the physical habitat. A deep dredging footprint would result in increased benthic recovery time as well as potential permanent changes to the geomorphic integrity of a shoal. Section 4.7.2.2 of the Cumulative Effects section addresses benthic impacts from trawling. Trawling disturbs the sediment and associated benthic community however unlike dredging it does not remove sediment and disturbs a shallow depth than dredging.
ITR	ITR	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.	Dredging	The proposed dredging depth will be relatively shallow (2 to 3 meters) and will not create pits. It is expected that bedload transport will move sediment from adjacent undredged areas into the dredge footprint.
ITR	ITR	Fishing Point is a "cape?"	Editorial	Fishing Point shares features with other shoreline locations that are called capes, such as the three large North Carolina Capes (Hatteras, Lookout, and Fear), most prominently because of the 90 degree convex change in shoreline orientation. There are also certainly differences between Fishing Point and the three North Carolina capes, such as in size and longevity.
ITR	ITR	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	Editorial	Changes have been made to the Executive Summary table to better reflect the most important impacts, and for clarity.

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		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…"		
ITR	ITR	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").	Editorial	The text heading referred to (page 31 of Draft PEIS) and the last column of Table 1 (page 32 of Draft PEIS) has been revised to "Anticipated Change in Sand Availability for Longshore Transport" as recommended.
ITR	ITR	To increase readability of the document by reducing repetition, is it possible to make some 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)	Editorial	The recommended changes have been made to the Final PEIS.

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		· 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		
ITR	ITR	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.	Editorial	Language has been changed to be gender neutral.
ITR	ITR	Second sentence of second paragraph- clarify. Doesn't make sense as written.	Editorial	The sentence has been re-written for clarity.
ITR	ITR	Define acronym "BMP" at first use in each chapter.	Editorial	BMP has been spelled out in the acronym list and at first usage in text.
ITR	ITR	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.	Editorial	Paragraph has been re-written for clarity.
ITR	ITR	Reads: "…and 11 seconds apart with an 11 second period." Should read "…with an 11 second period."	Editorial	The error has been corrected in the Final PEIS.
ITR	ITR	Figure 33 – PHOTO MISSING	Editorial	In the versions of the Draft PEIS that were distributed, Figure 33 is not missing.
ITR	ITR	Should be "218 people per km2".	Editorial	The error has been corrected in the Final PEIS.
ITR	ITR	Fourth Line: Should read "Three" rather than "Two".	Editorial	The error has been corrected in the Final PEIS.
ITR	ITR	"slowing wave energy". Not standard terminology. "Reduce wave energy"?	Editorial	The text has been changed from "slow" to "reduce" where found throughout the Final PEIS.

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ITR	ITR	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.	Editorial	The error on page 274 of the Draft PEIS was corrected - the value of miles and kilometers was mistakenly interchanged. Other conversions may not appear to be exact because rounding was used to remain consistent with the level of precision presented. For example, if 25 miles is shown, then the value presented for kilometers was 40 instead of 40.2. If the conversion was originally done from miles to kilometers and rounding occurred to present the correct level of precision in the document, if the reader then tried to convert kilometers to miles the values would appear incorrect. Using the 40 kilometer (25 mile) example from above, if you convert 40 kilometers back to miles you get 24.8 miles. The conversions in the Final PEIS were checked again for accuracy and changes made as needed.
ITR	ITR	“Nor’easters are difficult to predict because their wind speed is not always related to their wave heights.” ????	Editorial	Sentence has been re-written for clarity.
ITR	ITR	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.	Editorial	Sentence has been re-written for clarity.
ITR	ITR	First mention of “monitoring,” but unspecified (“on a regular basis”)	Editorial	The concept of monitoring is introduced in this paragraph, but is not intended to specify monitoring intervals. That level of detail is presented in Section 5.2 Monitoring.
ITR	ITR	p. 57, the term “beach” used incorrectly twice	Editorial	The term "beach" has been replaced by the term "shoreline" in the two instances.
ITR	ITR	Redundancies: waves, shoals, geographic setting	Editorial	Although some repetition will occur in a document of this nature and complexities, the Final PEIS has been edited for redundancies in the sections referred to in the comment.
ITR	ITR	Strange terms: “benefit to sediments?” “opposite of the breakwater?”	Editorial	The sentence regarding benefit to sediments has been revised to read: Minor losses of sediments are anticipated in the immediate vicinity of the breakwater during the construction period. The term "opposite" has been replaced by "perpendicular."
ITR	ITR	wording. “driving the suction through the pipe”.	Editorial	The sentence has been revised to read: "the sound of suction through the pipe".

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ITR	ITR	Should “induced” be “multiplier”?	Editorial	The term "induced effect" has been replaced by the term" ripple effect". The text in question has been revised as follows: In turn, the labor force would re-spend a portion of their salary and wage earnings on various consumer expenditures, producing a “ripple effect”. This effect is observed as indirect economic activities, such as demand for goods and services, respond to the direct economic stimulus. Some non-local construction workers and vessel operators and crew are anticipated to require lodging in local motels and hotels.
ITR	ITR	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.	Editorial	The column header has been changed to "Anticipated Level of Storm Damage Reduction" as suggested.
ITR	ITR	Above Table 35. The ratio above this table should be dimensionless and should be: 0.047/7,150 = 6.6x10-6.	Editorial	The comment refers to the following statement: "These data show the ratio of CO_2e emissions resulting from Alternative 1 to all sources in the United States is approximately 0.047/7,150 million metric tonnes. CO_2e emissions from this alternative would amount to approximately 6.62x10-4 percent of the total GHG emissions generated by the United States". While the commenter is correct that 0.047/7,150 = 6.6x10-6, the statement as written, as a percentage, is correct.
ITR	ITR	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.	Editorial	The emissions shown in Table 33 and other related tables are not averaged over a 50-year time period and instead show estimated emissions for 1) initial dredging/placement emissions, and 2) renourishment emissions for one renourishment event. In theory the reader could multiply the renourishment emissions times the 9 renourishment events and add that to the initial dredging emissions to come up with a 50-year total emissions;' however, this methodology is not consistent with the Clean Air Act because regulatory thresholds

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				are provided on an annual basis. Also, emissions are going to dissipate over the region annually so adding them cumulatively does not provide useful environmental impact information.
ITR	ITR	Why is section 3.1.3 Previous Erosion Prevention and Shoreline Restoration Efforts in Chapter 3: Physical Environment section?	Editorial	Section 3.1.3 of the Draft PEIS "Previous Erosion Prevention and Shoreline Restoration Efforts" has been moved from Chapter 3: Physical Environment to Chapter 1: Introduction/Background in the Final PEIS as recommended.
ITR	ITR	In Tables 31 through Table 47, why are some of the columns in tons per year and some in metric tons per year?	Editorial	Both English and metric units of measure were provided in the air emissions results because U.S. (EPA) air emissions are regulated/permitted in English units (tons) and greenhouse gas (GHG) emissions are considered on a global scale and the accepted unit of measure when presenting GHG emissions is metric.
ITR	ITR	Explanation of “minimum target fill” unclear and not carried out in the discussion	Editorial	Additional explanation of minimum target fill was added to Section 2.5 (Proposed Action Alternatives) of the Final PEIS. The concept is now given several sentences of explanation/summary; if the reader wants to follow up on details of how each component within the minimum target fill was derived by USACE modeling, they can read Dr. King's report in Appendix A.
ITR	ITR	“Construction activities would cause erosion in the short-term..”. Please explain the mechanism whereby construction activities causes erosion.	Environmental Impacts - Miscellaneous	Construction activities such as grading, clearing, and use of heavy equipment result in removal of vegetation and disturbance of the ground surface which often result in wind and water erosion because the soil particles are exposed to the weather and easily become dislodged and transported (erosion) whereas typically they would be protected by vegetation.
ITR	ITR	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.	Figures	Plots of shoreline change rate have been added to Section 4.2.3.4 of the Final PEIS as suggested (Figures 49, 52, and 53 in the Final PEIS). These show the projected Year 5 shoreline positions with confidence limits, the projected accretion adjacent to each end of the project and continued erosion further to the south on Assawoman Island.
ITR	ITR	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	GENESIS model	Some of the beach fill material will pass to the south, which will help alleviate the erosion problem on Assawoman Island. The majority is expected to pass to the north and accumulate on the north end of Wallops Island. The PEIS has been updated to include this information.

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		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 …."		
ITR	ITR	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	Grain Size	The USACE report in Appendix A of the Final PEIS has been updated to include more information on how grain size samples were taken and the analysis was conducted.

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		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).		
ITR	ITR	...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.	Groin or Breakwater	Using the best available data and understanding of the sediment transport system at the time the DPEIS was developed, Alternative 2 (w/ groin) and Alternative 3 (w/ breakwater) modeled specific sand retention structures at the southern end of the project area. The PEIS has been revised to clarify that sand retention structures may be considered elsewhere along the Wallops shoreline as part of NASA's Adaptive Management and Design approach and based on the results of future monitoring efforts. NASA would conduct additional analysis and prepare NEPA documentation if this alternative would be pursued.
ITR	ITR	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.	Groin or Breakwater	Comment noted. Modeling results indicate that the groin would not have substantial negative impacts. However, it is always possible that conditions could occur that are outside the range that were considered in the modeling effort. Uncertainty in the groin impacts on the shoreline is one of the reasons that this alternative is not the preferred alternative. NASA would determine the future need for sand retention structure(s) based on shoreline monitoring results using an adaptive management strategy.
ITR	ITR	How is the inventory of invertebrates known?	Invertebrates	This section, like other affected environment sections, was based off of the NASA 2008 Environmental Resources Document. A statement indicating this has been added to the introduction of the Affected Environment chapter.
ITR	ITR	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	Invertebrates	In Section 4.3.6 Benthos, Alternative One, we state that "Due to the handling and pumping activities, the dredged sand itself would also be devoid of live benthos." The statement concerning the mobility of the benthos at the sand placement site has been clarified.

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		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).		
ITR	ITR	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	Mitigation and Monitoring - General	Chapter 5 has been updated to include more information regarding the monitoring of physical coastal processes. NASA's monitoring plan would be modified based on the adaptive management strategy and monitoring results. Chapter 5 of the Final PEIS includes all details that are known at this time. As funding allows, NASA would conduct as many recommended monitoring procedures as practicable. NASA would follow standard USACE bathymetric survey procedures as stated in USACE survey manual publication number EM 1110-2-1003.

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		shallow for fathometer soundings while maintaining adequate “overlap” with the fathometer data for quality control.)		
ITR	ITR	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. 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.	Mitigation and Monitoring - General	NASA would create and implement a monitoring plan that would be modified based on the adaptive management strategy and monitoring results. Chapter 5 of the Final PEIS has been updated to provide additional details that are known at this time. As funding allows, NASA would conduct as many recommended monitoring procedures as practicable.
ITR	ITR	How are Longshore Sediment Transport direction known?	Project Design	Wave data were used in USACE modeling to determine longshore sediment transport directions on Wallops Island. Chapter 5 of the USACE report (Appendix A of the PEIS) details what data was used and how it was applied into the models. The Longshore Sediment Transport section of Chapter 3 in the PEIS includes the following discussion: "Waves coming from the southeast have roughly the same height everywhere along the shoreline, but waves coming from the northeast have dramatically decreasing height (and thus energy) the further north they are along Wallops Island. This means that they have less ability to transport sand to the south. The wave sheltering from Fishing Point and the offshore shoals is the primary reason that the net sediment transport in most years along Wallops Island is to the north."
ITR	ITR	Year 2 nourishment placement activities to “its equilibrium profile.” How known?	Project Design	Chapter 2 of the EIS has been updated to provide a better explanation of what an "equilibrium profile" is and that the USACE modeling determined that in Year 2 under the Preferred Alternative it would be reached. A detailed explanation of the modeling and USACE analysis that were done to reach this conclusion are provided in the USACE report

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				which is Appendix A of the Final PEIS.
ITR	ITR	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?"	Project Impacts	The isthmus separating Tom's Cove from the Atlantic Ocean is narrowing primarily because the Atlantic Ocean shoreline is eroding. This is expected to continue whether offshore shoals are mined or not. The modeling of the shoal mining impacts on the shoreline specifically addressed this issue. The modeling results indicated that mining either shoal A or shoal B would not produce significant changes from the current conditions. Furthermore, mining shoal A (the preferred alternative) would produce the fewest changes in the Tom's Cove area.
ITR	ITR	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.	Project Impacts	The north end of Wallops Island accumulates sand from both the south (northward transport along Wallops Island) and east (westward transport across Chincoteague ebb shoal). This accumulation of material at the north end of Wallops Island is causing the inlet to migrate to the east. The amount of material proposed to be mined from the north end of Wallops Island is intended to be equal to this excess that is being deposited. This is expected to help stabilize the location of Chincoteague Inlet and is not expected to provide a force that helps shift the inlet to the west. While it is recognized that inlets are dynamic features, removal of this sand is expected to (if anything) help stabilize the inlet.
ITR	ITR	Accuracy of statement – 1st sentence under "Impacts on the Shoreline from Seawall Extension?"	Project Impacts	The sentence in question, "The fact that sand behind the seawall extension would be retained instead of eroded (erosion in the area of the seawall extension would occur under No Action Alternative) would lead to the potential to exacerbate the erosion on the adjacent shoreline south of the extension" was provided by Dr. David King, which he determined via modeling (see Appendix A of the Final PEIS). Because sand would be retained behind the newly built portion of the seawall instead of remaining available for sediment transport, more erosion would occur on the shoreline south of the seawall extension only if it was constructed and the beach fill was not implemented. The statement is accurate.
ITR	ITR	Level I Comment #8: Downdrift Impacts. The downdrift impacts of Alternatives Two and Three are oversimplified and questionable: What is the principle whereby the breakwater causes an impact over a shoreline segment that is eight times	Project Impacts - Shoreline	The groin and detached breakwater are located in the vicinity of a divergent nodal zone. The beach responses at this type of location can be expected to be substantially different than what would occur along a more typical shoreline where the transport is predominantly in one direction. The modeling effort requires

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		longer than the groin?		the assignment of a permeability to each groin and a transmission coefficient to each detached breakwater. While these two parameters are somewhat analogous, there are significant differences in how the model treats them. In the initial modeling effort, these parameters were varied to help understand their impacts, but there was never an attempt to adjust them so that the two different structures would produce similar downdrift impacts. For the final modeling effort, reasonable values (0.2 for the groin permeability and 0.3 for the breakwater transmission coefficient) were used.
ITR	ITR	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?	Project Impacts - Shoreline	The comment deals with the following statement from the PEIS: "There would be an accumulation of sediment on the updrift side of the groin, and it is possible that groin would function as a "shadow," causing an increase in erosion downdrift of the area within the groin shadow. If the nodal zone is on Wallops Island, the groin could result in erosion within a 300-m (1,000-ft) "shadow" area south of the structure." The groin is specifically designed to allow sand to pass through the structure and was modeled as such. If there were no beach fill, the groin would exacerbate the downdrift erosion on Assawoman Island. However, because the beach fill would be in place, more sand would be moving onto the north end of Assawoman Island than is occurring at present. This would reduce the erosion rate on the north end of Assawoman Island. In fact, sand would be supplied at a rate that the models indicate that the north end of Assawoman Island will begin accreting. The greatest impacts will be immediately adjacent to the project and exponentially decrease with distance from the project. Over time, the effects would continue to grow. If the groin is built as designed and if the models are not inaccurate, then there would be no "shadow" zone south of the groin where there would be an increase in erosion. The quoted statement in the PEIS has been removed and the discussion above added to Section 4.2.2.1.
ITR	ITR	Level I Comment #8: Downdrift Impacts. The downdrift impacts of Alternatives Two and Three are oversimplified and questionable: p. 205 (and elsewhere), is the impact of the breakwater (i.e., erosion and LST) no more than 2.5 km?	Project Impacts - Shoreline	The comment deals with the following statement from the SRIPP (pg 205): "The extent of the erosion would depend on the rate of longshore sediment transport in the breakwater area, but based on the results of the USACE modeling (presented on Figure 41), the direct effects would not likely occur more than 2.5 km (1.5 mi) downdrift of the breakwater." As with the

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				groin, the detached breakwater is an inherently leaky structure. Modeling results indicate that with the breakwater and the beach fill, more sand would be moving onto the north end of Assawoman Island that is occurring presently. This would not just slow the rate of erosion currently occurring on the north end of Assawoman Island, it would cause accretion to occur. The greatest impacts would be immediately adjacent to the project and exponentially decrease with distance from the project. Over time, the effects would continue to grow. If the breakwater is built as designed and if the models are not inaccurate, then there would be no "shadow" zone south of the structure where there would be an increase in erosion. The quoted statement in the PEIS has been removed and the discussion above added to Section 4.2.2.1.
ITR	ITR	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 exposure to achieve a better balance.	Project Support	Comment noted. NASA has added more text and content regarding benefits of the SRIPP to Section 2 of the Final PEIS.
ITR	ITR	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: o Abstract – no mention of SLR o Executive Summary – "storm" used 9 times; "sea level" used 0 times o Chapter 1 - "storm" used 7 times; "sea level" used 0 times	Sea-level Rise	Sea-level rise has been incorporated into more sections of the Final PEIS as suggested.

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		o 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 Flight Facility (WFF) Shoreline Restoration and Infrastructure Protection Program (SRIPP). The SRIPP encompasses a 50-yearplanning 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.”		
ITR	ITR	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: 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 much 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.	Sea-level Rise	Sea-level rise has been incorporated into more sections of the Final PEIS as suggested.

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ITR	ITR	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: 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…" In addition, state the basis for this claim.	Sea-level Rise	An increase in the mean water level on a beach can be expected to cause an increase in erosion of the upper beach face (the portion of the beach profile above zero elevation) for two reasons. First, as the waves approach the shoreline, the waves are in deeper water than they would be without the sea level rise, so less of their energy is dissipated by breaking and thus more energy reaches the vicinity of the shoreline. Secondly, beaches typically have concave (upward) profiles. Waves break higher up on the profile than before where the profile is steeper (out of equilibrium). The profile adjusts to this new condition by flattening out, which means removing (additional) material from the upper shoreface. However, for this project it is planned that additional material will be provided at each renourishment interval which will act to raise the entire profile by an amount equal to the amount of sea level rise. It is not clear whether the quoted statement refers to increased longshore or cross-shore sediment transport. This response deals mainly with cross-shore transport. For longshore transport to increase, either wave heights need to increase or wave angles need to change in appropriate ways (or both). Global warming may not only cause sea-level rise, but also an increase in the frequency and intensity of storms. Increased storminess could increase wave heights along Wallops Island; however, the increased storminess is an even murkier issue than sea-level rise. Increased water levels will affect wave refraction, but not much and it is not clear that the overall change in wave angle would be in the appropriate direction to increase the longshore transport. The bottom line is that sea-level rise would have an unquantifiable but probably minimal impact on erosion rates for the SRIPP. Due to the confusion about the quoted statement, it has been removed from the Final PEIS.
ITR	ITR	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.	Sea-level Rise	The Final PEIS has been revised to include the following information: Data gathered from long-term tidal gauges in Hampton Roads, Virginia indicate that between 1930 and 1960 the average relative sea-level rise for this location was 4.2 mm per year (NOAA, 2004).
ITR	ITR	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	Sea-level Rise	Suggested change has been made.

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		a particular area." Of the items listed, only subsidence affects relative sea-level rise rate. The other items in the list should be removed.		
ITR	ITR	NRC (1987) Report referenced for high/low eustatic SLR? Need newer reference.	Sea-level Rise	Dr. King utilized the USACE 2009 document "Water Resource Policies and Authorities Incorporating Sea-Level Change Considerations in Civil Works Programs" (http://140.194.76.129/publications/eng-circulars/ec1165-2-211/entire.pdf) in formulating the methodology for his report. The NRC 1987 reference comes directly from 2009 USACE guidance.
ITR	ITR	Though Fig. 15 appropriately shows a blue "sea-level rise fill layer" as included in the design, the approach and significance of this is not addressed in the main text, rather one must search for it in the appendix. Suggest adding an explanation within the description and comparison of alternatives in Chapter 2.	Sea-level Rise	A brief explanation of the sea-level rise fill volume has been added to Chapter 2 Preferred Alternative.