

APPENDIX A -SUBPART 4
COMMENTS RECEIVED AND RESPONSES

Submitted by: Garland B. Pardue, Ph.D., Ecological Services Supervisor, US Fish and Wildlife Service, October 30, 2003

* The following comments provided by the USFWS are based on their review of the Preliminary Draft EIS (PDEIS).

USFWS, PDEIS Comment #1: In section 5.4.3 entitled Birds the Service requests the heading be changed to Migratory Shorebirds including the piping plover.

Response #1: Section 5.4.3 Birds describes the listed threatened and endangered bird species that may undergo direct, indirect or cumulative impacts from each of the Alternatives analyzed. The section heading will not be changed since not all migratory shorebirds are listed as threatened or endangered under the Federal Endangered Species Act.

USFWS, PDEIS Comment #2: Under the No Action Alternative A the cumulative effect should be changed from negative to no effect.

Response #2: Noted.

USFWS, PDEIS Comment #3: Under Alternative B - Without Project - Relocate Homes the anticipated direct and indirect and cumulative impacts should be changed from negative to positive.

Response #3: Due to the existing relief along the Pointe and the scouring nature of the migrating channel, a steepened bank or bluff is expected to form along the west end of Emerald Isle should the homes be relocated. The removal of the homes would allow for regrowth of the maritime hammocks in place of the homes, while the east end of Bear Island would accrete. However the ocean shoreline of Bear Island, which is utilized by the piping plovers, would likely erode and therefore is not considered to be positive. However, cumulative impacts are not expected since the inlet complex would eventually return to the loss and reformation of sand bars and sand islands.

USFWS, PDEIS Comment #4: Under both Alternative E (Channel Relocation without Beach Nourishment) and Alternative F (Channel Relocation with Beach Nourishment) impacts would be negative but could be changed to no effect or even positive effect if all of the following measures are taken:

- Observe nesting moratorium for piping plover from April 1 - July 30.

Response #4: The construction timeframe for Alternative F (November 16th - March 31st) observes the nesting moratorium for Piping Plovers.

USFWS, PDEIS Comment #5: The Town acquires the new land (fee title) after allowing the property owners enough land to rebuild their house if faced with a catastrophe, and establishes a bird sanctuary on all of the new town property soundward of the proposed

beach ramp starting at the ramps edge and extending to within 30 feet of the inlet edge until reaching 100 feet from the point of the small cut where after it extends to the inlet edge. Vehicular access would be prohibited inland of the new access and seasonally restricted elsewhere.

Response #5: The Town of Emerald Isle is currently working with the USFWS and the NC Wildlife Resource Commission to develop a Waterbird Management Plan. The Town is currently pursuing ownership of all new lands per verbal commitment from current landowners (refer to NCCF, Response #44).

USFWS, PDEIS Comment #6: The Town commits to having this area posted as a bird sanctuary for perpetuity and to prohibit pedestrian and dog and cat access on the sanctuary. The Town commits to intensively patrol during the nesting season, provide public outreach and to monitor bird usage during breeding and non-breeding seasons and for a minimum of 3 years after the project.

Response #6: Refer to Response #5.

USFWS, PDEIS Comment #7: The Town establishes a fine via ordinance for persons walking within posted sanctuary or allowing dog or cats to run inside the sanctuary and agrees to enforce same (e.g. an extension of the leash law).

Response #7: Refer to Response #5. The Town currently has a leash law ordinance, any amendments to this law would be included in the Waterbird Management Plan.

USFWS, PDEIS Comment #8: If a research aspect is also accomplished that would provide useful information in regards to evaluation of similar projects in the future the impacts under Alternative E and F would become positive.

Response #8: The Cumulative Effects Assessment (Appendix F) evaluates similar projects and their effects on natural resources. Any research activities planned for beyond this analysis would be included in the management plan developed during the permitting stage of this project.

USFWS, PDEIS Comment #9: The Service suggests the Town work with the NC Wildlife Resources Commission (WRC) to accomplish these objectives. It is our understanding that agency is interested and could provide a cost bid for these services.

Response #9: The Town and its consultant (CPE) are actively working with the US Army Corps of Engineers, the NC Division of Coastal Management, the NC WRC, and the US Fish and Wildlife Service to ensure that all management and mitigation concerns are addressed.

USFWS, PDEIS Comment #10: On another subject, more information is needed before adequate assessment of potential impacts to submerged aquatic vegetation can be made.

Response #10: Refer to Sections 4.3.4 and 5.3.4 Submerged Aquatic Vegetation Communities in the Final EIS for details. The Submerged Aquatic Vegetation (SAV) 2003 Map provided in Appendix C provides the results of the field investigations conducted in September 2003.

Submitted by: Miles M. Croom, Assistant Regional Administrator,
National Marine Fisheries Service, Habitat Conservation Division,
November 13, 2003

NMFS, HCD Comment #1: The National Marine Fisheries Service (NOAA Fisheries) has reviewed the modified Essential Fish Habitat Assessment (EFH) dated September 2003, for the Bogue Inlet Channel Relocation Project (Action ID No. 200100632) at Bogue Inlet in the Town of Emerald Isle, Carteret County, North Carolina. The modified EFH Assessment adequately describes the physical and biological conditions at Bogue Inlet; the Federally managed fishery resources that are at risk by the proposed action; and it incorporates our previous recommendations regarding the content of the assessment.

Response #1: Noted.

NMFS, HCD Comment #2: However, NOAA Fisheries does not agree that the currently proposed mitigative measures are adequate to offset adverse impacts to EFH. In this regard, we note the following points concerning the adequacy in the EFH Assessment:

NOAA Fisheries has consistently advised that in-kind replacement of sub-tidal and intertidal EFH would be needed to offset expected losses and degradation of these aquatic resources. To address this, we have recommended that loss of approximately 25 of the 50 acres of these habitat types should be offset through in-kind habitat replacement. The EFH Assessment should be modified to address this need.

Response #2: Approximately 47.6 acres of shallow subtidal habitat of the ebb tide delta will be impacted due to dredging of the new inlet channel. Approximately 22.2 acres of subtidal and intertidal habitat along the existing channel location will be replaced due to the installation of the sand dike. Over a period of 4 years, a total of 127.5 acres will be reformed around the west end of The Pointe shoreline once the dike is installed. Approximately 18 acres of shoreline along Emerald Isle will erode and approximately 33 acres of shoreline along Bear Island will accrete due to the relocation of Bogue Inlet Channel. The sediment accumulation of the reformed spit will provide 101.9 acres of additional habitat adjacent to the impacted area. At this time it is uncertain if the 101 acres will be sub or intertidal habitat, however, post-construction aerial and ground-truth investigations will assist in determining this. Refer to Appendix C - Estimated Four-Year Time Lapse of Spit Development.

The Town of Emerald Isle recognizes the importance of the subtidal and intertidal habitat, which provides an important food resource to the finfish and bird species that utilize the area. Monitoring efforts of this resource includes identifying the infaunal species found in the subtidal and intertidal habitats of the existing and proposed channel alignments before construction. Currently, post-construction monitoring efforts of these same areas are proposed for three years post-construction. However, the Town is currently working with local Universities to

evaluate a research oriented infaunal study in lieu of post-construction monitoring on the beach. These efforts were entertained in discussions during the Project Delivery Team meeting held on December 4, 2003 (Appendix A, Subpart 1). Mr. Sechler (NMFS) expressed his support for the research efforts in a December 9, 2003 meeting, as mitigation for the impacts to subtidal and intertidal habitat.

Section 6 of the Final EIS contains a Monitoring / Mitigation Plan was developed under direct coordination with NOAA Fisheries during the PDT meetings, specifically during the December 4, 2003 PDT meeting. The Plan includes additional pre- and post-construction monitoring for macroinvertebrate and infaunal species, as well as submerged aquatic vegetation (SAV) and shellfish habitats. Monitoring efforts also include the acquisition of digital aerial photography and ground-truth investigations concurrent with pre-construction monitoring for SAV and shellfish.

NMFS, HCD Comment #3: Tables 4.2 and 4.3 (A-F) are missing from the revised assessment. Consequently, it is unclear whether these tables are consistent with the current version of the assessment. To address this, the tables be updated and submitted for our review.

Response #3: Tables 4.2 and 4.3 (A-F) of the EFH Assessment are included in the Draft EIS; however it appears that they were not included in NOAA Fisheries' copy of the Draft EIS. These tables were sent via electronic mail to Mr. Ron Sechler of NOAA Fisheries on December 5, 2003 for review.

NMFS, HCD Comment #4: The assessment includes a commitment to use the 2003 digital aerial imagery to assess changes in habitat types associated with the project; however, based on coordination with the NOAA Beaufort Laboratory, this imagery is not adequate to allow mapping of submerged aquatic vegetation (SAV) in the project area.

Response #4: Air space above Bogue Inlet is controlled by MCB Camp Lejeune, which severely limited time and availability of fly-overs for data collection in spring 2003. Other controlling factors included the need for low wind speed, minimal cloud coverage, low tide and good water clarity. All efforts were made to ensure that all of these conditions were met prior to flight to ensure that the digital imagery collected would be useful for aerial mapping. Although the digital aerial imagery of June 2003 did not meet the preferred quality (i.e., high glint on surface waters, reflection, and color) the images were found to be satisfactory for usage in the pre-construction habitat mapping efforts (Don Fields, NMFS, pers. comm.).

As requested by the NOAA Beaufort Laboratory additional aerial photography may be collected in spring 2004. Early coordination with MCB Camp Lejeune will occur well in advance of flight time to ensure that airspace is made available. In the event that airspace above Bogue Inlet is restricted to government issued aircraft, pre-construction aerial imagery may not be available.

NMFS, HCD Comment #5: Because SAV is identified as a Habitat Area of Particular Concern, we previously requested that the applicant make an additional attempt to obtain satisfactory imagery prior to project authorization. In this regard, we agree that follow up imagery taken approximately 18 months after completion of the project would be acceptable for detecting changes in EFH.

Response #5: Section 6 of the Final EIS contains a Monitoring / Mitigation Plan that includes a description of the SAV monitoring plan. The plan describes the collection of post-project multispectral aerial photography to be collected approximately 18 months post-construction (Summer 2006).

NMFS, HCD Comment #6: Section 11.0 (Summary) includes mitigative measures to offset adverse effects to EFH. While we support inclusion of these measures in the project, the current plans would provide only 25 acres of intertidal and sub-tidal habitat to replace the loss of 50 acres of these habitats. NOAA Fisheries understands the dynamic nature of the inlet area and the applicant's desire to place up to 800,000 cubic yards of extra material on the ocean beach for renourishment. Although providing restoration of an additional 25 acres of these habitats would reduce the volume of sand available for beach nourishment, adequate reduction in project related impacts to EFH is needed. As noted in Item 1 (Comment #1 above) NOAA Fisheries continues to recommend that 25 acres of up-front and in-kind replacement of EFH be provided.

Response #6: Refer to response #1.

Submitted by: Mike Marshall
North Carolina Division of Marine Fisheries, December 19, 2003

NCDMF Comment #1: Section 4.5.1 Inlet Resources Paragraph 1. The last sentence should be changed to read that oysters and hard clams can be found in the two strata, not all three shellfish species. The paragraph should also state that scallops are typically found in SAV. This change will make this paragraph agree with paragraph 7 on bay scallops. The three scallops taken while sampling the V and W strata are not the norm.

Response #1: Noted. As suggested, the appropriate changes have been made to Section 4.5.1.

NCDMF Comment #2: Paragraph 3. There are still issues with the area measurements. Further on in Section 5, Table 12 the area measurements for the shellfish strata are more accurately identified. There are concerns about those figures that are identified under Appendix C below. Paragraph 3 is still using the area sampled as the total area of the stratum. Your own figures in Table 12 indicate there are 3.5 acres of stratum W in the inlet area. We took 279 samples, each covering one square meter to assess the density of shellfish in that stratum. The stratum is not 279 square meters in size.

Response #2: Noted. This section has been revised to reflect the accurate acreage amounts for both shellfish habitats (strata v = 24.06 shellfish/square meters; strata w = 76.82 shellfish/square meters).

NCDMF Comment #3: Paragraph 6. A similar problem exists in paragraph 6 where the total area sampled is being called the study area. It would be more accurate to say that the study areas for strata V and W are the acreages listed in Table 12. The 50 m² and 279 m² are the area that was sampled within those two acreages.

Response #3: Noted. This paragraph has been revised to reflect numbers identified by NCDMF from their December 1990 and November 1991 shellfish mapping efforts.

NCDMF Comment #4: The EFH document does not appear to have been revised with the earlier comments on the shellfish section. Section 7.0 needs to be revised in light of the comments made concerning shellfish densities and areas of strata.

Response #4: Noted. The EFH Assessment has been revised.

NCDMF Comment #5: Appendix C - Shellfish Habitat Map 2003. I am concerned that the map shows all the V (intertidal hard vegetated w/out shell) strata in the survey area but only shows the W (intertidal hard non-vegetated shell) strata in the permit area. In order to present a complete and balanced picture of shellfish habitat, both strata should be shown in the coverage that is presented. Since this is the only shellfish habitat map,

the differences in the representation could cause confusion over the acreages in Table 12.

Response #5: A meeting was held on July 1, 2003 at the Beaufort, NC NOAA laboratory with representatives from USACE, NMFS, NCDMF and the Town's representative CPE. Meeting issues included the following: available shellfish data; shellfish habitat ground-truth investigations; clam habitat survey techniques; and NCDMF project requirements. During the meeting, NCDMF expressed their concern for the lack of current shellfish data in the vicinity of the project. NCDMF available data includes Shellfish Habitat Mapping Program Map C004 and Average and Maximum Collection Number of Bay Scallops 1984-2002. Shellfish identified from these maps include bay scallops (*Argopecten irradians*), hard clam (*Mercenaria mercenaria*), and eastern oyster (*Crassostrea virginica*). Bay scallops are typically found in SAV habitats; the eastern oysters are found just below MLW to approximately one meter above MLW; and hard clams are found buried beneath the sediment in protected waters (Section 4.5.1 Inlet Resources).

Ground-truthing investigations were discussed and agreed upon to include the V stratum within the immediate vicinity of the proposed inlet location (south side of Dudley Island; eastern end of Bear Island; the marsh system connected to the Coast Guard Channel; and the east side of the Eastern Main Ebb Channel) and the W stratum previously mapped in the Permit Area by NCDMF. NCDMF indicated that ground-truth investigations of hard clam and eastern oyster habitat would need to be conducted with the assistance of an NCDMF representative. As previously indicated, scallop habitat is consistent with SAV habitat which has been included in the monitoring plan.

Shellfish surveys for identifying these habitats were consistent with the NCDMF observation methods. Shellfish habitat mapping confirmation efforts were conducted on September 11, 2003 by CZR, Inc. and Mr. Clay Caroon (NCDMF) with the use of a stratifying pole and clam rake and mapped using multispectral photography. The NCDMF C004 Shellfish Habitat Map from 1990 and 1991, along with the June 2003 aerial were also used as field resources. Two strata W areas were found within the Permit Area and investigated over the course of two tidal cycles, high and low tides. The perimeters of each of the strata W areas were located via GPS to identify location and size of the areas.

Field investigations of the v strata found a direct correlation between this shellfish habitat and the low marsh habitat around Bogue Inlet. The shellfish habitat map 2003 represents all of the v strata found within the project area as it corresponds with the low marsh habitat. Ground-truthing investigations of the strata W habitat in the project area would require intensive field efforts and funding to complete this effort.

NCDMF Comment #6: Is the 1607 acres of low salt marsh in the permit area or the larger survey area?

Response #6: As indicated in Table 12, the 1,607 acres of low marsh was identified in the survey area (project area).

NCDMF Comment #7: I am also concerned because, if the W strata are not shown, they will not be monitored. Todd Miller and I expressed an interest in monitoring the W strata in the area behind Dudley's Island because we felt that, if impacts to the W strata occurred, it would be seen in that location. It was my understanding that agreement had been reached to include the W strata behind Dudley's Island in the one time shellfish monitoring event.

Response #7: Refer to Response #5. Shellfish habitat data collection behind Dudley Island was not agreed upon prior to the ground-truthing efforts of 11 September 2003.

Submitted by: Todd Miller, Executive Director,
North Carolina Coastal Federation, December 19, 2003

NCCF Comment #1: It could be argued that simply realigning the channel to a more central location in Bogue Inlet just speeds up a natural process that will occur anyway, and therefore environmental impacts associated with this project are of no serious concern. In fact, after the project is completed, there is little doubt that, without future human intervention, natural processes will reshaped the inlet and return it to a more natural configuration within time.

Response #1: Agree.

NCCF Comment #2: However, to adequately evaluate significant environmental impacts of this project, it is essential to evaluate all foreseeable outcomes that may occur within the first few years after project construction, and identify what long-term commitments may result from further human intervention in the natural processes of this inlet, and the environmental impacts of those longer-term commitments.

Response #2: Noted.

NCCF Comment #3: Proposed alterations to the inlet system resulting from this project by no means replicate what natural processes would produce. The new channel will be dredged to a depth and width that is larger than the natural ebb channel. For some period of time, the inlet system will still contain much of the old channel that has not been filled by the sand dike.

Response #3: The design of the channel cross-section is explained in detail in paragraphs 5.4 to 5.16 in Appendix B (Engineering Report) to the Draft EIS. Following the construction of the new channel and the sand dike, the effective cross-sectional area of Bogue Inlet, i.e., the cross-sectional area of the inlet that actually carries the flow, will be less than that of the existing inlet. While the existing channel would not be completely closed with the construction of the sand dike, the numerical model results show that the existing channel would carry a very small amount of the tidal flow at extremely low velocities. Most of the flow through Bogue Inlet would be concentrated in the new channel. As a result, the new channel will experience initial scour as the cross-sectional area adjusts to the tidal prism of Bogue Inlet. Residual flow in the abandoned existing channel will continue to decline over time as the new sand spit develops off the west end of Emerald Isle. The development of the new sand spit will completely fill the existing channel over a period of 4 to 6 years.

NCCF Comment #4: The project will also export and remove from the inlet system approximately 800,000 cubic yards of sand. And, the constructed sand dike designed to block off the old channel is a completely artificial geologic feature, unlike anything found in natural inlet systems.

Response #4: Agree that the sand dike will be an artificial feature, however, the crest elevation of the dike is 4.5 feet above NGVD or approximately equal to the crest elevation of the existing sand spit. Eventually, the sand spit will merge with the sand dike which, along with the reshaping of the spit and dike by waves, tides, winds, and currents, the sand dike will disappear as a distinguishable feature. Construction of the new channel and sand dike will result in a net displacement of approximately 800,000 cubic yards from the inlet. However, 565,000 cubic yards of material removed from the west end of Emerald Isle as the shoreline adjust to the new channel position will be transported into Bogue Inlet reducing the net loss from the inlet to 235,000 cubic yards.

NCCF Comment #5: In addition, this project is designed to keep the inlet from migrating within its full migration zone and thus will preclude the recreation of those special inlet habitats that occur periodically within at least a portion of the inlet hazard Area of Environmental Concern. If this project begins a long-term commitment to manage Bogue Inlet so as to prevent it from migrating within its entire migration zone, then it is essential to evaluate the long-term environmental consequences of this commitment.

Response #5: The project being proposed by the Town of Emerald Isle is a one-time project; therefore, there are no long-term commitments on the part of the Town of Emerald Isle to maintain the channel in a fixed location. Once the channel is repositioned, the Corps of Engineers would resume maintenance of the authorized navigation channel which measures 8 feet deep at mean low water by 150 feet wide. The Corps of Engineers maintenance activity is limited to the naturally deepwater channel that exists at the time maintenance dredging is performed, i.e., the Corps does not maintain the channel in a fixed location. In this regard, during the period from the mid 1980's to the present, when the channel was migrating rapidly to the east, the Corps of Engineers was continually performing maintenance dredging in the channel. Future attempts to maintain the Bogue Inlet channel in a fixed location could be a part of a sand management plan that would be developed by the Corps of Engineers as it evaluates various options for the long-term storm damage reduction project for all of Bogue Banks. If the Corps of Engineers proceeds along this line, the environmental consequences of maintaining the channel in a fixed location would have to be evaluated by the Corps in its NEPA document for the Bogue Banks project.

NCCF Comment #6: Predicting impacts from these human alterations to this natural system is an art at best, and fraught with uncertainty.

Response #6: Noted.

NCCF Comment #7: Based upon information presented to the PDT over the past year, we learned that there are three probable scenarios that could result from relocating the ebb channel to the middle of Bogue Inlet:

Scenario 1: The newly aligned channel does exactly what the DEIS predicts—moves either slowly or rapidly back to the east;

Scenario 2: The newly aligned channel moves either slowly or rapidly to the west; or

Scenario 3: The newly aligned channel divides into braided channels and which move all over the place.

Each possible scenario results in different but foreseeable significant environmental impacts. Moreover, a commitment to manage the inlet to prevent its natural migration within the entire inlet hazard area also results in foreseeable impacts. Historic photographs in the DEIS that date back to 1938 show that the ebb channel has acted in all three of the ways characterized by these scenarios at various times.

Response #7: The horizontal stability of the relocated channel is discussed in paragraphs 5.17 to 5.19 of Appendix B (Engineering Report) to the Draft EIS. As discussed above, there are no plans on the part of the Town of Emerald Isle to maintain the channel once it has been relocated. The predicted movement of the new channel was based on the actual history of channel movements from 1981 to the present. The Draft EIS acknowledges that some movement to the west is possible but any such shift is expected to be minor and of short duration. During the 63 year history of the inlet captured on aerial photographs (1938 to 2001), the only times the channel was oriented toward Bear Island was 1938, 1981, and 1984. The only times between 1973 and 2001 the channel moved to the west included a relatively rapid shift in the channel between 1973 and 1976 when the channel moved from a position near Emerald Isle to a more central location and a slight shift toward the west between 1976 and 1981 (352 feet). Since 1981, the channel has persistently migrated to the east. Accordingly, the history of Bogue Inlet supports Scenario 1 which was used as a basis for evaluating future impacts. Scenario 2, a rapid shift of the channel to the west, was not observed in the 63-year inlet photographic history; therefore, there is no reason to suspect such an occurrence in the future. Scenario 3, braided channels, did exist in 1949 and again in 1974 or just prior to the major shift of the channel to a more central location. However, as with Scenario 2, there is no historic reason to assume that this is a likely occurrence following the relocation of the channel.

NCCF Comment #8: These photos and local experience also document that even when the ebb channel was centrally located in the inlet, at times there was still significant erosion threatening houses on the eastern shoulder of the inlet. For example, houses at the Point in Emerald Isle were threatened in 1974 (at least one was relocated) even though at that time the main ebb channel was in the middle of the inlet.

Response #8: In 1974, the main ebb channel was oriented toward Bogue Banks and was located about 1,500 feet from the west end of Emerald Isle. A marginal flood channel was located east of the main channel and was positioned immediately adjacent to the Pointe shoreline. The erosion on the west end of Emerald Isle in the early 1970's was associated with this marginal flood channel. The marginal flood channel had shoaled significantly by 1976 or at the time the

channel shifted to a more central location. By 1976, the inlet shoreline showed signs of accretion. These natural occurrences are not unlike the predictions being made for the repositioned channel.

NCCF Comment #9: My previous written comments expressed concerns that the DEIS is flawed because it only focuses on one set of foreseeable environmental impacts that will occur if Scenario 1 takes place. The other two scenarios are not given equal attention or analysis even though the chances that they will occur are about the same as Scenario 1 (according to statements made by the project engineer).

Response #9: The project engineer did not say that Scenarios 2 and 3 had the same probability as Scenario 1, only that some movement of the channel to the west was possible. A major shift of the channel to the west was never represented as being a likely occurrence. Paragraph 5.17 in Appendix B (Engineering Report) to the DEIS acknowledges that the channel moved slightly to the west following its natural repositioning to a more central location in 1976 and indicated that a similar movement would be possible with the new channel. However, the prediction of the future behavior of the new channel was based on the persistent eastward migration of the channel since 1981.

NCCF Comment #10: There is no practical or legal rationale for not more fully investigating these two other scenarios, since the analysis required to do so is no more complicated or expensive than the analysis conducted to evaluate Scenario 1.

Response #10: Disagree. As discussed above, the historic record of Bogue Inlet does not support the contention that Scenarios 2 and 3 are just as likely to occur as Scenario 1. Due to the lack of historic evidence associated with a westerly migrating channel or braided channels and their possible impacts on the inlet shoreline and the shorelines of the adjacent islands, reliable predictions of possible impacts are not possible.

NCCF Comment #11: As a member of the PDT, I have expressed concern about adequately evaluating the impacts of various channel alignments numerous times over the past six months or longer, and therefore this is not a comment that has been submitted late in the review process.

Response #11: Comments on the preliminary draft of the EIS made by Mr. Todd Miller on November 11, 2003 are appended to the end of these response on the DEIS (Attachment 1). Also, response to his June 24, 2003 comments on the draft Engineering Report were included in Appendix A, Subpart 2 – Pertinent Correspondence in the DEIS.

NCCF Comment #12: The physical effects of alternatives on habitats (Table 12) is simply a snap-shot of impact estimates that might occur soon after the project is completed, and this assessment does not make clear the high level of uncertainty in predicting these impacts or give any upper and lower ranges that might give decision-

makes a clearer idea of “best case” and “worse case” scenarios resulting from the project.

Response #12: The information provided in Table 12 of the EIS document provides a best professional estimate of the physical impacts that may be incurred from the project using the best available data. There is no guarantee of what the effects of the project will be, however the numbers currently presented in the document are defensible based on an analysis of the current conditions coupled with historic data. The project includes monitoring of both pre- and post-project conditions (i.e., salt marsh, SAV, birds, shorelines, etc.) to accurately identify any effects of the project on the associated resource.

NCCF Comment #13: Federal regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1502.22) explicitly address the need to evaluate all foreseeable significant impacts of this project. The rules state that: “When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking...If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.”

Response #13: Noted. The DEIS includes a complete description of the foreseeable significant impacts of the project. However, since there is always some level of uncertainty associated with these types of predictions, post-project monitoring will be conducted over a three-year period to assess impacts of the project on salt marsh, macroinvertebrates/infauna, birds, submerged aquatic vegetation (SAV), and shellfish.

NCCF Comment #14: The permit area as shown on Page 2 of Section 4 is too limited, and should include the marshes and tidal creeks that are between the main ebb channel, Dudley’s Island, West Channel, and the State Park at Huggins Island. The photograph below of Dudley’s Island clearly shows one of many tidal creeks that flow into these highly sensitive salt marshes and shallow estuarine waters that are rich fisheries habitats and full of oysters, clams, and submerged aquatic grasses.

Response #14: The limits of the permit area were based on 1) the results of the numerical model and the redistribution of sediment from the new channel as it adjusts to flow conditions and 2) concerns for SAV’s, shellfish, and saltmarsh habitat beyond the redistribution area by PDT members. The numerical model did not indicate any significant change in flow conditions in Western or Eastern Channels while the redistributed sediment will move along the bottom of the channel as bed load. While the area in question is outside the permit area, post-project monitoring will include representative SAV and shellfish beds in these areas.

NCCF Comment #15: The permit area was determined, according to page 1 of Section 4, based upon the Hydrodynamic Model in Appendix B. Please provide information as to how the existence of these tidal creeks connecting to the main ebb channel and West Channel were factored into the Hydrodynamic model? If tidal flow through these creeks was modeled, did the model produce results that found no potential project impacts to this area? If the creeks were not included in the model, then predictions made based upon the model regarding the geographic range of project impacts are highly inaccurate.

Response #15: A description of the numerical model and its results are provided in Appendix B to the DEIS (Engineering Report – Appendix D – Hydrodynamic Model Results). The numerical model included Dudley Island and Huggins Island and the tidal creeks flowing through these two island complexes. Figures showing the results for the existing condition for peak flood and peak ebb are provided on Figures 4A and 4B in Appendix D of the Engineering Report while Figures 7A and 7B show the results for the proposed project for peak flood and ebb respectively. The model did not detect any measurable difference in tides or flows into and out of these channels for either condition.

NCCF Comment #16: The model needs to be corrected, the permit area redrawn, and the impacts to this high resource value area which is classified as Outstanding Resource Waters needs to be evaluated. This area should receive the same level of pre and post project monitoring as the permit area that is currently identified.

Response #16: Since the numerical model included the tidal creeks of Dudley and Huggins Island and did not indicate any difference in flows or tides between the existing condition and the proposed channel relocation, there is no need to perform any additional tests. As indicated above, SAV and shellfish beds known to exist within the island complex between Eastern and Western Channels will be included in the post-project monitoring as well as elevation surveys.



NCCF Comment #17: The cost/benefit analysis included in the DEIS needs to include all the known and potential costs of all mitigation measures, including the cost of placing beach fill on the oceanfront to mitigate for erosion losses as part of the “Phase 3” beach renourishment project.

Response #17: Estimates of the project costs, including pre- and post-project monitoring are included in Appendix B of the DEIS. As details of the post-project monitoring/mitigation plan are developed, the total cost presented in the FEIS will be changed to reflect these refinements. With regard to the Phase 3 beach fill, the Town of Emerald Isle, as part of this permit action, proposes to extend the Phase 3 fill 2,000 feet west of the previously permitted end which was located between Spinnakers Reach and Lands End. This 2,000-foot extension will be in the form of a taper section in which the cross-section of the fill will decrease from its full dimension to 0 at the west terminus. The revised western terminus of the project will be located near the intersection of Windjammer South and Sea Breeze. There will be no additional costs associated with this change as the volume of material removed from Bogue Inlet to relocate the channel will simply be distributed over the longer reach of shoreline.

NCCF Comment #18: There should be discussion about whether oceanfront erosion that is likely to occur along Emerald Isle will result in decreased property values. If property values will be negatively impacted, these depressed values need to be included as a “cost” of the project. If there is no negative impact to property values,

then the DEIS needs to explain why beach renourishment will be carried out on this section of beach at all, and how the “costs” of doing so are justified by the Town.

Response #18: The predicted erosion on the west end of Emerald Isle associated with the relocated channel would still leave a substantial beach in front of the existing development and would not place any of the homes in an eminent threat category. In general, the beach remaining in front of the homes would be comparable to the beach fronting homes east of the predicted erosion zone. According to the Carteret County Tax Office, threatened homes are evaluated on a case-by-case basis generally after the owner petitions the county for some adjustment in the tax rate. While there are no general standards being applied by Carteret County in this regard, devaluation normally does not occur until the home is in serious danger from being undermined or extremely vulnerable to damage by a coastal storm. Since the predicted erosion on the west end of Emerald Isle would not produce any of these conditions, the tax value of the homes will not be impacted. The Town of Emerald Isle has elected to extend the Phase 3 into the erosion impact area to assure the home owners in this area that the Town is concerned over their well being and will not abandoned their needs in response to the threat being posed by the inlet channel migration.

NCCF Comment #19: Since this project is “locally funded,” will the Town be using FEMA as an insurance policy to “repair” erosion and maintain the channel location if changes occur in the inlet as a result of future declared storms? If so, what liabilities is this project creating for the federal taxpayer in terms of future claims for disaster relief by the Town?

Response #19: The Town of Emerald Isle has no plans to use FEMA funds to repair erosion or maintain the channel location.

NCCF Comment #20: Is the Town willing to forgo using FEMA as its insurer so as to prevent this project cost in the future? If not, shouldn't this future anticipated cost be added to the price of the project? And if the Town intends to use FEMA to maintain the project after future storm events, is this project truly a “one-time” undertaking? If FEMA funds are likely to be used in the future to maintain the project, shouldn't the EIS be evaluating long-term impacts from multiple inlet projects?

Response #20: The Town of Emerald Isle has no plans to use FEMA funds to maintain the project after future storm events.

NCCF Comment #21: According the CEQ regulations, the EIS should include “appropriate mitigation measures” and the public must be given the opportunity to review and comment on these measures. This section of the DEIS is blank.

Response #21: The mitigation measures being developed by Federal and State resources agencies will be included in the FEIS. The mitigation plans include a bird management plan for the spit area of Emerald Isle and post-project

monitoring of salt marsh, macroinvertebrates/infauna, birds, SAV's, and shellfish. Future mitigation for project related impacts on these resources or their habitats will be based on the results of the post-project monitoring.

NCCF Comment #22: I understand that the complete mitigation package is still being developed, mostly through a separate process that does not include many members of the PDT. Mitigation measures are likely to increase the cost of the project and could have significant impact on the fiscal ability of the Town to proceed with the project. This information, once developed, should be circulated to allow for public review and comment. The full PDT should be briefed and allowed to comment on the entire set of mitigation measures before a final EIS is prepared.

Response #22: The Town of Emerald Isle is currently working with the USFWS and the NC Wildlife Resource Commission to develop a waterbird management plan. Once complete, this plan will be made available for review and comment.

NCCF Comment #23: In addition to these concerns, I previously submitted several sets of written comments as a member of the PDT. By reference, please consider these previous comments as formal comments on the DEIS.

Response #23: Comments on the preliminary draft of the EIS made by Mr. Todd Miller on November 11, 2003 are appended to the end of this response on the DEIS (Attachment 1). Also, response to his June 24, 2003 comments on the draft Engineering Report were included in Appendix A, Subpart 2 – Pertinent Correspondence in the DEIS.

NCCF Comment #24: I'm particularly concerned about how the project intends to comply with water quality standards that require protection of "existing uses" and don't allow for degradation of the Outstanding Resource Waters that are in close proximity to where a dredge pipe will be discharging spoils directly into the water column.

Response #24: The applicant is currently in discussions and filing with the North Carolina Division of Water Quality to ensure that the project is in compliance with the water quality standards. It is anticipated that specific water quality standards will be developed and apply to project construction.

NCCF Comment #25: Please provide explicit documentation of how numerical water quality standards as well as the State's Antidegradation Policy (a narrative water quality standard) will be enforced and not violated by this project.

Response #25: Refer to Response #24.

NCCF Comment #26: As required by CEQ rules, the final EIS should contain written responses to these comments. In addition, please respond to the following new questions that are not answered by the DEIS:

Response #26: Noted.

NCCF Comment #27: The DEIS says that the Phase 3 beach renourishment project will be used to mitigate beachfront erosion that may be caused by moving the inlet channel. Does this mean that the Phase 3 project is being extended further west as a result of the channel relocation (wasn't the beach renourishment suppose to stop at the property line between Spinnakers Reach and Land's End?)?

Response #27: The Phase 3 beach nourishment project is being extended to the west beyond its original terminal point near Spinnakers Reach and Land's End to assure the ocean front property owners on the west end of Emerald Isle that their well being is not be sacrificed to address the immediate threat and concerns for home owners at the Pointe.

NCCF Comment #28: If so, have potential impacts from renourishing this additional section of the beach already been evaluated and permitted under some separate permitting process? Is there an existing permit that allows the placement of material dredged from the offshore borrow areas west of Spinnakers Reach? Should potential impacts from extending the Phase 3 project further west be evaluated as part of this document and permit?

Response #28: The Bogue Inlet Channel Erosion Response Project is being pursued as a separate permit action and includes the expansion of the Phase 3 beach fill limits. Impacts of the expanded Phase 3 beach fill project are included in the DEIS.

NCCF Comment #29: How much additional sand will the extension of the beach renourishment project require (in combination with the needs for the rest of Phase 3 as well as the additional 128,000 cubic yards of sand the Town has told FEMA it needs to replenish hurricane losses from the Phase 2 project?

Response #29: Material placed on the beach as part of the Bogue Inlet Channel Erosion Response Project will be limited to the volume of material needed to reposition the channel midway between Bogue Banks and Bear Island less the 200,000 cubic yards needed to construct the sand dike across the existing channel. Current estimates indicate that 1,009,500 cubic yards will be removed to reposition the channel, thus, 809,500 cubic yards will be available for distribution along the 23,831 feet of beach included in Phase 3. The replacement of the 128,000 cubic yards of sand needed to repair hurricane damage to Phase 2 is being pursued as a separate action by the Town of Emerald Isle. That is, none of the 128,000 cubic yards will come from Bogue Inlet.

NCCF Comment #30: Does all this additional beach renourishment mean that more sand will have to be dredged from Bogue Inlet than has been stated in the DEIS (more than 1,009,500 cubic yards)? If so, what impact will the additional dredging have on

maintaining the existing "tidal prism?" Section 5.0 of the Engineering Study in the DEIS states that:

"If the channel is excessively large...the tidal prism of the inlet be increased.the material required to shoal the channel could adversely impact the sediment balance of the adjacent beaches. Accordingly, the design focus was on developing the proper size channel that would be large enough to remain open without an excessive amount of shoaling yet small enough not to cause excessive scour."

Response #30: The action being addressed for this project is the construction of a new channel midway between Bogue Banks and Bear Island. The dimensions of the new channel will include a maximum depth of 13.5 feet below NGVD and widths varying from 150 feet on the north or sound side, 500 feet across the main portion of the inlet ebb tide delta, and decreasing to 200 feet on the southern or ocean end of the channel. The current estimate of the amount of dredging needed to construct the channel was based on a survey of the inlet conducted in October 2001 by Coastal Science and Engineering, PLLC. Obviously, the volume of material that will ultimately be removed to construct the proposed channel will depend on conditions in the inlet at the time of construction. Accordingly, the final volume could increase or decrease relative to the quantities presented in the DEIS.

NCCF Comment #31: Thus, the project proposes to limit dredging in the inlet to removing 1.0095 million cubic yards of sand so as not to impact the existing tidal prism. Will the permit contain an enforceable limit that sets this as the maximum amount of cubic yards of sand that the Town will be allowed to dredge from the inlet?

Response #31: The permit action would limit dredging to that needed to construct the design channel dimensions. New surveys will be conducted during the preparation of the detail plans and specifications for the project at which time new estimates of the dredge volume will be made. As indicated above, the actual dredge volume could increase or decrease relative to the quantities presented in the DEIS.

NCCF Comment #32: Will this cap on the volume of sand that can be dredged be enforced even if the Town finds in the midst of the project that it has inadequate sand to accomplish all the project objectives (such as completing the sand dike which will be built after the beach is renourished)?

Response #32: The primary objective of the project is to relocate the Bogue Inlet to a more central location between Bogue Banks and Bear Island. The secondary purpose is to use the material from the inlet to nourish the west end of Emerald Isle. In this regard, the original beach fill template proposed for the west end of Emerald Isle (Phase 3) called for a net placement of approximately 35 cubic yards/lineal foot of beach. Assuming the volume of material available for beach nourishment from the channel relocation is 809,500 cubic yards, the net rate of placement along the 23,831 feet presently included in Phase 3 would be

approximately 31 cubic yards/linear foot (note: net rate of placement adjusted for anticipated losses during placement.). Should the actual volume of material removed to construct the new channel yield beach fill volumes less than 809,500 cubic yards, the length of beach nourished or the net rate of placement will have to be reduced. In like manner, should the dredge quantity increase due to conditions in the inlet at the time of construction, the net rate of placement would be increased but the length of beach would not change. If the volume of material removed from the inlet is not sufficient to complete Phase 3 of the beach nourishment project, the Town of Emerald Isle will have to consider other borrow source options under a new permit action.

NCCF Comment #33: Please explain what contingencies are in place to deal with potential shortages of sand, and the costs and environmental impacts associated with these contingencies.

Response #33: The two primary components of the proposed project that must be accomplished are the construction of a new centrally located channel and the closure of the existing channel by constructing a sand dike. A revised estimate of the volume of material available for beach fill will be determined from a pre-construction survey of the inlet with 200,000 cubic yards set aside to construct the sand dike. The balance of material will be used to nourish the ocean shoreline within the limits describe for Phase 3. There are no contingencies included in this proposal to make up beach nourishment shortages with sand removed from Bogue Inlet. If the inlet project does not provide all of the material needed to complete the Phase 3 fill, the Town of Emerald Isle will have to obtain a separate permit to complete this portion of the work.

NCCF Comment #34: What impact will stabilizing through renourishment the ocean beach in the active inlet hazard area between Lands End and the Point have on the possible future movement of the ebb channel? Will renourishment in this inlet hazard area result in a disequilibrium that would result in more rapid movement of the channel in one direction or the other?

Response #34: A discussion of the possible changes in sediment transport associated with the proposed action is included in Section 5.17.3 of the DEIS. As discussed in that section of the DEIS, the relatively small increase in beach width that would be provided by the Phase 3 fill along with the 2,000 foot taper section on the west end of the fill would not have a significant impact on the rate of longshore sediment transport moving toward Bogue Inlet. The major changes in sediment distribution will occur from the onshore movement of material from the abandoned portion of the ebb tide delta situated off the west end of Emerald Isle. Since the proposed action does not include the artificial filling of the existing channel except for the sand dike, much of the ebb tide delta material and material moving off the west end of Emerald Isle will initially be deposited in the outer portions of the existing channel or contained within the new sand spit that will develop off the west end of Emerald Isle. The interception of the littoral

material and ebb tide delta material by the existing channel should slow the rate of shoaling in the new channel slightly

NCCF Comment #35: What type of wave conditions are boaters navigating the new channel likely to encounter?

Response #35: Wave conditions in the new channel would be essentially the same as under existing conditions, however, with the channel aligned perpendicular to the adjacent shorelines, the crest of the waves approaching the outer limits of the channel should also be aligned more perpendicular to the channel rather than at an angle as is often the case under existing conditions. Wave heights in the channel would be no different than those that are presently encountered.

NCCF Comment #36: Will locating the channel through the extremely shallow ebb tidal delta subject boaters to more hazardous wave conditions than they experience in the existing channel? If so, how will this impact of the project be mitigated?

Response #36: The existing channel is located through the extremely shallow ebb tide delta with depths immediately west and east of the channel ranging from 0 feet NGVD to -2 feet NGVD. Similar depth conditions would exist for the new channel, therefore, boaters would not be subjected to conditions more hazardous than presently exists.

NCCF Comment #37: Is the town subject to any liability issues if boaters have mishaps as a result of the new channel alignment?

Response #37: No. Once the channel is relocated and new channel markers installed, the channel will continue to be maintained as a Federal navigation channel as long as Congressional funding is made available.

NCCF Comment #38: Does the U.S. Coast Guard need to approve closing the inlet to navigation while the project is underway and does it need to issue a Section 10 permit for this project?

Response #38: Relocating the channel will require coordination between the Town, Coast Guard, and the Corps of Engineers. During the period of time in which the existing channel is being closed, the inlet will be closed to navigation. The time period for this closure should be no more than 30 days. A notice to mariners will be published to inform boaters of the inlet closure.

NCCF Comment #39: What mitigation commitments will the Town need to make if the newly relocated channel fills in rapidly, and must be dredged on a more frequent basis than the existing channel?

Response #39: Once the channel is repositioned, maintenance of the authorized 8-foot mean low water by 150-foot wide channel will continue to be the responsibility of the Corps of Engineers. Predictions of possible channel shoaling indicate that controlling depths in the new channel will be reduced to less than 8 feet mean low water in approximately 12 months resulting in the resumption on normal maintenance dredging by the Corps of Engineers. Since the authorization of the Bogue Inlet navigation project in 1983, the Corps has not been able to maintain the authorized channel dimensions for any length of time and similar results are anticipated for the new channel.

NCCF Comment #40: What kind of dredge will be needed to perform such maintenance – the sidecast dredge currently being used or an ocean going certified dredge that will be used to establish the new channel?

Response #40: The Corps of Engineers will most likely continue to use sidecast dredges to maintain the channel with occasional operations performed by a U.S. Government shallow draft hopper dredge. The 8-foot mean low water authorized depth of the channel does not allow the Corps of Engineers to use any type of dredge that requires greater depths to operate, such as an ocean certified pipeline dredge or commercially available hopper dredges.

NCCF Comment #41: If channel maintenance costs increase substantially above what is currently being spent by the US Army Corps of Engineers, will those increased costs be the responsibility of the Corps or the Town?

Response #41: The Corps of Engineers will be responsible for maintaining the new channel.

NCCF Comment #42: What happens if the new channel rapidly shoals, and the inlet is no longer navigable? Will it be the responsibility of the Corps or Town to reopen the channel?

Response #42: Following completion of the new channel and the reestablishment of the navigation aids, the Corps of Engineers will assume full responsibility for maintenance of the channel.

NCCF Comment #43: How much would such emergency dredging potentially cost?

Response #43: There are no practical ways to make any predictions on future dredging costs. There have been numerous occasions in the past in which controlling depths in the channel have been less than 4 feet mean low water and the response by the Corps has been to detach one of its sidecast dredges to the inlet. During the 3-year period from 2000 to 2002, the Corps of Engineers spent over \$1.2 million per year in attempts to maintain the channel. Prior to that time, the annual cost were generally around \$400,000 to \$500,000. The higher cost during the 2000 to 2002 time period were not necessarily in response to an

emergency situation with regard to channel depths but may have been due to attempts by the Corps to move the ebb shoal away from the Pointe area of Emerald Isle.

NCCF Comment #44: Ownership of the existing sand spit on the eastern shoulder of the inlet may still reside with private property owners according to Frank Rush, the Emerald Isle Town Manager. At the November PDT meeting, he provided assurances that the Town will obtain fee simple ownership of this property as well as obtain from all private landowners along the inlet legally binding agreements that any newly formed property would be owned by the Town and maintained in perpetuity in public ownership with a permanent ban on development. Has ownership of the property been secured by the Town?

Response #44: The Town has obtained informal commitments from the affected property owners at the Pointe to provide a fee simple transfer of lands that accrete west of their historic property lines. The formal agreement is still being drawn but is expected to be completed prior to the issuance of State and Federal permits. The Town has also begun negotiations with the property owners of the spit to obtain similar commitments. Finally, the Town has made a formal request to the Honorable Jean R. Preston, NC House of Representatives, to introduce legislation allowing the Town of Emerald Isle to extend its boundaries to include the upland areas of the spit.

NCCF Comment #45: If not, will there be a permit condition that requires the town to secure ownership of this land prior to the beginning of the project?

Response #45: At this time we cannot state for sure what conditions will be included in the permit. These conditions are the responsibility of the various State and Federal agencies. However, the Town of Emerald Isle is committed to obtaining ownership of the land in question.

NCCF Comment #46: Who will hold the conservation easement on this land to assure that it is never sold and developed?

Response #46: If the Town of Emerald Isle obtains ownership of the lands, no conservation easement would be needed as the Town would have complete control over its future use.

NCCF Comment #47: Please include in the final EIS copies of all the landowner agreements that provide assurances that all newly formed land on the eastern shoulder of the inlet will forever remain undeveloped and in public ownership.

Response #47: If such agreements are available at the time the final EIS is released for public review and comment, copies of the agreements will be included in the document.

ATTACHMENT 1

Submitted by: Todd Miller, Executive Director,
North Carolina Coastal Federation, November 4, 2003

Re: Comments on Preliminary Draft EIS

NCCF, PDEIS Comment #1: Alternative G, use of hard shoreline protection structures to stabilize the inlet shoreline and channel does not satisfy the project objectives and is contrary to the State of North Carolina regulations (this is now against the law, not just regulations) governing the use of such structures to protect upland properties from erosion. Therefore, this alternative has been eliminated from further consideration.

Response #1: Paragraph will be modified to indicate that hard structures are against NC law.

NCCF, PDEIS Comment #2: General Environmental Consequences. Overall comment: Tom has said numerous times that the channel after it is relocated could move east or west, and he really has no way to predict which way it will go. In all the following analysis, however, estimated impacts are based on the channel moving east which project applicant is hoping it will do. I have requested numerous times as a member of the PDT that the analysis be expanded to predict impacts from the channel moving in both directions. Until the EIS includes the full range of potential impacts from the channel moving in both directions, it is a seriously flawed document and it fails to give decision-makers the full range of potential environmental consequences of the project. This is a serious flaw in the document, and it shouldn't be sent out for public review until it is corrected. Leaving this discussion to the end of this section is not adequate since there's no reason to put more weight on the chances of the channel moving east rather than west. All of the following sections on potential impacts are flawed until the various potential consequences of a westward movement of the channel alignment are evaluated and included in each section of the draft EIS. Finally, as I noted at the end, the methodology used to predict impacts of a westerly moving channel may significantly understate the potential for shoreline erosion on Bogue Banks if recent erosion (since the mid 1980s) on Bear Island is any indication of what could potentially occur in the future.

Response #2: Risks and uncertainty associated with the movement of the new channel and its impacts on the adjacent shoreline are included in paragraph 5.29 of the revised document. Mitigation measures that could be adopted to address these uncertainties are given in paragraph 5.30 of the revised document.

NCCF, PDEIS Comment #3: (I continue to disagree that the area north of Dudley Island and south of Huggins Island is not in the permit area. This is the most sensitive environment in the entire inlet area with hundreds of acres of salt marsh, shellfish beds, and lots of SAVs. There are numerous creeks and channels that connect the permit area to this area. The permit area surrounds this excluded area on three sides. Water

flows freely between the permit area and excluded area. Concluding that these resources are outside the permit area and is isolated from potential impacts of the project (when the permit area surrounds it) is simply an arbitrary decision.)

Response #3: The limits of the permit area were based on the results of the numerical model and the redistribution of sediment from the new channel as it adjusts to flow conditions. The numerical model did not indicate any significant change in flow conditions in Western or Eastern Channels while the redistributed sediment will move along the bottom of the channel as bed load. While the area in question is outside the permit area, post-project monitoring will include representative SAV and shellfish beds in these areas.

NCCF, PDEIS Comment #4: Alternative A – No Action (A lot of this discussion is pretty speculative and calls natural processes of inlet movement “impacts.” This inlet has existed pretty well on its own as its migrated back and forth over the years. Adjacent resources change and adapt, but that’s what happens around inlets.)

Response #4: The document attempts to describe consequences that could occur should the inlet channel continue to migrate to the east. The breaching of the sand spit and evolution of the sand spit to an overwash terrace is not beyond reason since this condition has existed in the past. The revised document recognizes the natural changes in Bogue Inlet and downplays the significances of these natural changes on birds, turtles, etc.

NCCF, PDEIS Comment #5: Direct and Indirect Impacts. Erosion of the ocean shoreline along the eastern 7,500 feet of Bear Island is likely to continue as long as the inlet channel maintains a position adjacent to the west end of Emerald Isle. Erosion of the east end of Bear Island will result in the loss of beach and dune habitat. (The further the channel moves west, eventually Bear Island will grow east and enlarge the State Park providing the public with more public recreational area unless the author assumes that Bogue Inlet will keep growing wider and wider—which I don’t believe is probable.)

Response #5: The impacts on Bear Island for the without project conditions assumes that the channel will continue to move to the east for at least the next 10 years. Moving the channel back to the middle of the inlet will result in the impacts on Bear Island as mentioned in the comment.

NCCF, PDEIS Comment #6: (If the channel continues to move east, Bear Island will eventually start growing east. It already has to some extent in the last year. This habitat on the inlet shoulder is extremely important for wildlife and fisheries.)

Response #6: During the period from 1984 to the present, the channel moved to the east, however, the east end of Bear Island eroded. Predictions on future changes associated with the continued movement of the channel to the east

were based on the entire historic record. Granted, there could be some short-term changes over a year or two but these do not represent long-term trends.

NCCF, PDEIS Comment #7: Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. (Again, this is projected based on an eastern movement of the channel after relocation. What happens if it moves west?)

Response #7: Refer to paragraphs 5.29 and 5.30 in the revised document.

NCCF, PDEIS Comment #8: 5.3.4.1 Alternative A – No Action, Cumulative Effects. (This is highly speculative and shouldn't be concluded in this document. If Corps dredging is damaging SAVs, then it would have to change its practice since such damage is illegal.)

Response #8: The potential impacts on SAV are not being attributed to the Corps dredging since SAV appear to be located in the same areas today as they were in 1992. The impacts discussed are those that could occur should the Emerald Isle sand spit be breached. Again, the breaching of the sand spit could occur with continued eastward migration of the inlet channel.

NCCF, PDEIS Comment #9: 5.3.4.4 Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. Channel relocation to the center of the Inlet and the construction of the sand dike is predicted to temporarily increase the turbidity in the Inlet. (How are these predictions made? The engineering report showed a large "plume" throughout much of the inlet. These are ORW SA waters with exceptional water quality. Has there been any numerical modeling done, or is this someone opinion? Will the turbidity standard be violated in open SA ORW waters—yes or no.)

Response #9: Prediction on the suspended sediment plume are discussed in detail in Appendix B, the Engineering, Geology, & Geotechnical Report and were based on flows in the inlet during dike construction, the concentration of the slurry discharged from the dredge pipe, and the sediment size distribution of the inlet material.

NCCF, PDEIS Comment #10: Compatibility with Project Objectives. SAV resources in the project area should not be significantly impacted by Alternative E. Therefore, inlet habitats including SAV resources would be protected and restored in support of the Town of Emerald Isle's project objectives. (By leaving the area north of Dudley's Island out of the permit area, it is much easier to reach this conclusion since the largest area of SAV's has been systemically excluded from analysis.)

Response #10: While no impacts on SAV's are predicted, some SAV and shellfish beds outside the permit area will be included in post-project monitoring program.

NCCF, PDEIS Comment #11: Direct and Indirect Impacts. Maintenance dredging activity in Bogue Inlet by the USACE Navigation Branch has not had any know impact on sea turtles in the inlet; therefore, none is expected during future maintenance activities under Alternative A. Erosion of the inlet shoreline will continue under the no action alternative which will negatively impact sea turtle nesting along the 700 feet inlet shoreline of Emerald Isle presently protected by sandbags. (I seriously doubt this inlet bank is a good location for turtle nests and that there have been negative impacts to turtles from the bags. However, there is great habitat elsewhere that has been created by the current channel location.)

Response #11: Agree. The revised document attributes no significant impact on turtles to the continued eastward migration of the channel.

NCCF, PDEIS Comment #12: Direct and Indirect Impacts. Relocating the houses on western Emerald Isle will result in the further abandonment of the shoreline and continued erosional losses of Critical Habitat for Wintering Piping Plover as the inlet shoreline and sand spit recede. Disappearance of Island 2 and the continued erosion of the east end of Bear Island are also possible under this without project alternative. Therefore, negative direct impacts could occur. (There is no basis for these claims. Movement of the channel is a natural process, and the current eastern movement has created great habitat for nesting elsewhere in the inlet.)

Response #12: Agree. The revised document attributes no significant impact on birds to the continued eastward migration of the channel.

NCCF, PDEIS Comment #13: Cumulative Effects. Cumulative impacts to the Piping Plover from the sand bag revetment alternative should be comparable to the impacts associated with the no action alternative. (The sand bags have interfered with public access (walking and vehicles) to the back side of the inlet that probably has benefited nesting.)

Response #13: Agree. The revised document acknowledges increased pedestrian and vehicular access to the inlet shoreline could have a negative impact on birds.

NCCF, PDEIS Comment #14: Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. In the event that the channel relocation without beach nourishment alternative is selected, piping plover-habitat could be increased by the direct filling of the existing channel which would be followed by the rapid development of a sand spit off the west end of Emerald Isle. (These claims are pretty speculative. If the inlet does its thing, there will probably never be a net gain in these habitats overall—what is created on one side is taken away on the other, and vise-versa.)

Response #14: Disagree. The type of habitat that would be created with the development of the sand spit off the west end of Emerald Isle would be suitable

habitat for piping plovers and would not be unlike the habitat that presently exist at the north distal end of the existing sand spit.

NCCF, PDEIS Comment #15: Shellfish - (Overall comment: I don't know what has been found regarding shellfish populations in the inlet, but last weekend my six year old son dug up clams along the landward shoreline at the tip of Island #2 while building a sand castle. Based upon his extensive sampling, I've concluded that clams are growing within the inlet.)

Response #15: The results of the shellfish survey will be included in the DEIS. By the way, I though public access to Island 2 was restricted.

NCCF, PDEIS Comment #16: Cumulative Effects. If the sand spit breaches and the a direct exchange of oceanic water through the Coast Guard Channel occurs, shellfish resources could be cumulatively affected by the alteration of tidal flows and water quality in the estuary. (This could increase flushing, and help improve water quality.)

Response #16: What is the basis for improved water quality? Increased flushing or flow would not in and by itself improve water quality since increased flow could also simply transport more pollutants into and area. This was the position taken by the resource agencies when debating the pros and cons of the Mason Inlet relocation project, i.e., they would not accept claims of improved water quality.

NCCF, PDEIS Comment #17: Beach Resources (OVERALL COMMENT: If this is a discussion about the natural values of "beach resources," the mixing of human impacts with natural resource impacts in this section is not appropriate. Natural resources won't be damaged by the shifting of the inlet channel—that's what they do. Impacts to humans (and their properties) should not be discussed in this section, but evaluated in sections of the EIS dealing with the human environment.)

Response #17: Impacts on beach resources would occur if the channel continues to migrate to the east. Also, the discussion includes the impacts of the Phase 3 nourishment on beach resources. Therefore, this discussion is appropriate.

NCCF, PDEIS Comment #18: Cumulative Effects. Dunes are important to the North Carolina coast by providing protection from large storm surges and hurricanes, in addition to providing habitat for flora and fauna. In some places along western Emerald Isle, dune ridges reach up to 4 to 5 m (13 to 16.4 ft) in elevation. With the continuation of the eastern migration of the inlet channel over the next 10 years, beach and dune communities located 600 feet east of Bogue Inlet may be lost, resulting in less protection from hurricanes and less floral and faunal species. The potential for the reformation of beach and dune habitat along western Emerald Isle could not occur, as the area would be lost due to erosion and overwash. Losses would also continue on Bear Island as the east end of the island would become more exposed to wave attack with the eastward movement of the channel and ebb tide delta. Therefore, negative cumulative impacts to beach and dune communities in North Carolina could result from

the no action alternative due to the extensive loss of a section of the essential dune ridge and the loss of the potential for formation of beach and dune communities in the area. (If you consider the entire inlet system, the losses along EI would be compensated for elsewhere as the channel shifts. Thus, these conclusions just are true for the entire system.)

Response #18: The document discusses losses on Bear Island and gains and losses on Emerald Isle associated with the continued eastward migration of the inlet. There is no question that dunes are being lost on Bear Island and gained on Emerald Isle. The continued eastward movement of the inlet channel could also damage or destroy dunes along the ocean front of Emerald Isle. The document also points out that the relocation of the channel could cause the development of new dunes on Bear Island but similar losses on Emerald Isle.

NCCF, PDEIS Comment #19: Sea Turtle Nesting Habitat. Alternative F – Channel Relocation with Beach Nourishment, Cumulative Impacts. The expansive beach habitat from immediate beach nourishment should provide additional habitat for nesting turtles and thus, positive cumulative impacts may result. The inlet shoreline would continue to evolve following the relocation of the channel, producing a large expanse of suitable turtle nesting habitat. Erosion of the western 7,500 feet of Emerald Isle could negatively impact sea turtle nesting, however, this should be offset by the accretion of the eastern 7,500 feet of ocean shoreline on Bear Island. (It is correct to make this statement here, but why isn't this same logic used throughout the report to show that natural habitat impacts in one location due to channel movement are adjusted for elsewhere in the inlet system?)

Response #19: The revised document presents the impact of gains and losses on sea turtle nesting in a more balanced manner. Agree that the preliminary draft placed too much importance on shoreline changes and how they would impact turtle nesting.

NCCF, PDEIS Comment #20: 5.7.1.2.4 Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. Stockpiling of the 800,000 cubic yards (Why is this additional material? Won't the project remove 800,000 cubic yards and pump it on the ocean beach. The way the project is designed, there is no increase in material, it's just being moved around.) of material at a location in the inlet complex may have direct and indirect impacts to colonial waterbirds by burying foraging habitat and smothering the prey. The removal of the stockpiled material and deposition of the material in the existing channel will create foraging habitat once the areas are colonized by organisms moving in from adjacent areas.

Response #20: Both Alternatives E and F would involve the removal of 1,009,500 cubic yards of material to construct the new channel. Alternative E was included by the PDT as an attempt to hasten the recovery of the inlet shoreline by stockpiling material for eventual disposal, via mechanical means, in the existing channel. The new channel would be cut through the ebb tide delta and connect

with the existing channel opposite Island 2 to establish flow in the new channel. Once this is done, material would be pumped directly from the landward end of the new channel into the existing channel to construct the dike. Once the dike is completed, the stockpiled material would be pushed into the existing channel. Dike construction would require 200,000 cubic yards, therefore under Alternative E, 809,500 cubic yards would have to be stored on the existing Emerald Isle sand spit.

NCCF, PDEIS Comment #21: 5.8.1.4 Turbidity. Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. Dredging operations may increase turbidity levels in the construction area, and may potentially affect areas outside the construction zone if the material being dredged has a high percentage of silt/clay. The state guideline for turbidity in North Carolina waters is limited to less than 25 NTU which is not expected to be exceeded outside the immediate area of construction (Please provide a map that shows the exact boundaries of this area. I'm assuming this is what you consider to be your compliance boundary. This boundary needs to be defined. If turbidity is exceeded outside of these boundaries, will the project then be in violation of water quality standards? Why is the project allowed to exceed the standard in what is now SA ORW waters?) due to the low percentage of silt/clay in the material to be excavated. Vibracores taken at Bogue Inlet in 2002 show that, on average, only 1.25% of the material is classified as silt/clay. Thus, it is not expected that the project will cause significant or persistent increases in turbidity values above the State standards. Turbidity is expected to increase during project construction which will likely result in minimal and temporary direct and indirect effects to water quality in Bogue Inlet.

Response #21: The revised document has been changed to indicate that the WQ standard will be exceeded in the construction area. Reference to the 25 NTU standard has been deleted as it does not apply to class SA waters. Whether or not this will be allowed will be determined during the permitting process. Appendix B includes a figure that shows the extent of the suspended sediment plume which could be used as the compliance boundary if required by the NC Division of Water Quality. If needed, the exact boundaries of this plume can be determined and included in the permit.

NCCF, PDEIS Comment #22: Alternative F – Channel Relocation with Beach Nourishment, Direct and Indirect Impacts. Construction of the sand dike across the existing channel will result in the suspension of the silt and clay material with this material being transported toward the sound and the ocean during the flood and ebb phases of the tide respectively. The low silt/clay content of the inlet material will result in relatively low concentrations of suspended sediment outside the immediate area deposition. Estimates of the travel distance and concentrations of suspended sediment during the dike construction (see Figure 6.1 in Appendix B) found that suspended sediment should average around 6 parts per million (ppm) from the dike area to the confluence of the inlet channel with the Eastern Channel and average 4 ppm seaward of the dike. While there is no direct correlation between suspended sediment

concentrations and turbidity, the low concentration of suspended sediment indicates that turbidities are likely to remain low during dike construction. (On an incoming tide, why would this plume not go through the tidal creeks that bisect Dudley's Island and go outside the permit area? Please show why the plume only stays in the main body of the inlet, and does not go with the tide into these more sensitive locations?)

Response #22: Please refer to Section 6.0 in the Engineering, Geology, & Geotechnical Report for an explanation on how the sediment plumes were determined.

NCCF, PDEIS Comment #23: 5.12.1 Alternative A – No Action, Direct and Indirect Impacts. The offshore borrow material that would be used to nourish Phase 3 of the Emerald Isle beach nourishment project would probably contain a high concentration of shell and shell hash similar to the fill material placed on other sections of Bogue Banks. The shell and shell hash tends to accumulate in the area between mean low water and mean high water making walking across the area in bare feet uncomfortable and possibly dangerous due to the possibility of being cut by the sharp edges of the larger shell pieces. This appears to have been the biggest complaint from visitors using the newly nourished sections of Bogue Banks. While the impact does not appear to have been profound, as tourism during 2003 appeared to be strong, if the 2003 visitors experienced an unfavorable experience as a result of the shell, they could elect not to return to Bogue Banks in the future.

The continued erosion of the inlet shoreline would make it impossible to reestablish public access to the inlet shoreline. (Please explain how the project will provide public access to the beach if this is being claimed here. So far, the exact plans have been pretty vague.) In years past, when public access was still possible at the Pointe, the Town of Emerald Isle maintained a public beach access at the end of Inlet Drive that included some parking spaces. The loss of this public beach access was of major concern to residents of all of Emerald Isle who enjoyed the scenic beauty of the inlet and easy access to preferred fishing spots.

Response #23: The revised document clarifies that public access could not be established to the same extent as existed in the past. Past public access included a parking area and access ramp.

NCCF, PDEIS Comment #24: 5.13.4 Alternative E – Channel Relocation without Beach Nourishment, Direct and Indirect Impacts. The dimensions of the centrally located channel, which would have a depth of 13.5 feet below NGVD (15 feet below MLW) and a maximum width of 500 feet across a large portion of the ebb tide delta, would greatly exceed the authorized dimensions of the navigation channel. As a result, the new channel would provide a relatively deep and reliable channel for some period of time following its construction. However, even this positive impact is expected to be relatively short lived as estimates of shoaling of the new channel for the case in which the existing channel is artificially filled indicates that controlling depths will again approach 8 feet MLW within 9.5 months after construction. (This is an average estimate

of time, what is the shortest amount of time that could elapse before the channel needs more dredging (in the event of storms, etc.) On the positive side, the USACE Navigation Branch could suspend maintenance dredging in the inlet during the channel construction period and for the 9 to 10 months following completion of the channel. Based on recent dredging costs in Bogue Inlet, this could save the USACE Navigation Branch approximately \$1.0 million. (The new channel will run through extremely shallow waters and as discussed in this section is likely to fill in quite quickly. The ebb tidal delta is very hazardous for navigation, even more so than the natural channel that tends to follow the deepest part of the inlet (in relative terms). How safe will the new channel really be for boats compared to the existing channel, and does the town incur any liability if someone has a boating mishap as a result of rough wave conditions in the new channel. What if the new channel shoals more quickly than anticipated? Is the town ready to compensate the USACE if dredging costs go up as a result of the project?)

Navigation in the inlet would be impacted for a brief period during the construction of the new channel primarily during the time the sand dike is being constructed across the existing channel. Construction of the sand dike is expected to take less than 10 days, however, once the new channel is completed, new navigation aids would have to be installed along the new channel alignment. The total amount of time Bogue Inlet would likely be closed to navigation would be approximately 30 days. Since construction of the new channel is scheduled for November 2004 to March 2005, closure of the inlet to navigation would occur during a period when navigation activity in the inlet is normally low. (Does the Coast Guard have to approve blocking the inlet for 30 days? Please provide data showing how much boat traffic there is in and out of the inlet during the month that the inlet is projected to be closed.)

Response #24: Part 1: Higher rate of shoaling than predicted. The only way to treat higher shoaling rates would be through some type of storm probability analysis. While this would be possible, once the channel shoals back to a depth less than the 8-foot controlling depth, the presumption is that the Corps would reinitiate maintenance dredging. There is probably a greater risk that the Corps will not resume maintenance dredging, due to limited funding, than there is with the channel shoaling to less than 8 feet in less time than predicted. In any event, while there is a potential for some savings to the Corps for reduced maintenance dredging following the relocation of the channel, navigation benefits were not evaluated or included in the justification for the project.

Part 2: Liability. Once the channel is repositioned and marked by the Coast Guard, it would become a Federal responsibility. The Corps maintenance of the new channel would be subject to the availability of funds. If funds are not available, Bogue Inlet would probably be abandoned as a Federal navigation channel and the Coast Guard would not maintain any navigation aids in the inlet. The situation with regard to future Federal funding is not related to the channel relocation as Operation and Maintenance funding for Corps projects is on the

decline and the Corps will have to reevaluate the Federal interest in continuing to maintain projects such as Bogue Inlet.

Once the new channel shoals to depths less than 8 feet MLW, shoaling rates should be comparable to shoaling rates in the existing channel. In this regard, the Corps has not been very successful in maintaining the authorized depth in the past and will probably experience the same degree of success with the new channel. The safety of the new channel would not be any different than that associated with the existing channel.

Part 3: Coast Guard approval. A notice to mariners will have to be published by the Coast Guard regarding the temporary closure of the inlet. We were unable to determine the exact volume of boat traffic in Bogue Inlet for the time the inlet would be closed (probably in late February and early March), however, indications are that there is very little boat traffic during this time.

NCCF, PDEIS Comment #25: Economics, Alternative A – No Action. (Do these figures reflect the current values of waterfront properties that are now non-conforming uses because of erosion? What is the date of the data included in these tables?)

Response #25: The economic impact analysis, which is provided in detail in Appendix E of the Engineering, Geology, & Geotechnical Report, was based on the 2002 tax value of the properties. If a property is non-conforming, the tax value was assumed to reflect this status. According to Frank Rush, only two properties in the impact area are non-conforming and their value would not significantly impact the analysis.

NCCF, PDEIS Comment #26: 5.23.1.3 Compatibility with Project Objectives. Alternative A would fail to reduce erosion of the inlet shoreline and as a result would not preserve or maintain the town and county tax base. The continued eastward migration of the inlet shoreline would also destroy a considerable amount of infrastructure including 1,640 feet of roads and associated utilities. Damages to homes and infrastructure would range from \$1.6 million in year 2 to \$11.5 million in year 10 with the total economic impact ranging from \$1.9 million in year 2 to \$14.6 million in year 10. Since the Town of Emerald Isle would have to revert to using an offshore borrow area to complete Phase 3 of its beach nourishment project, the quality of the beach nourishment material the resulting fill could contain higher percentages of shell and shell hash compared to the natural beach. The public access to the inlet shoreline could not be reestablished which would have an impact on the recreational use of the inlet beaches. (There is no value being placed on the approximately one mile of oceanfront lots on Emerald Isle that will be eroded by having the channel relocated. Do these property owners agree with that conclusion that loss of their land has no economic impact, and have they signed waivers allowing the town to erode their property by relocating the channel? This analysis does not include any estimate of property damage that would occur if the channel migrates west instead of east. Is the

Town prepared to pay to renourish this beach if it erodes too much? How much will that cost the town?)

Response #26: The Phase 3 beach fill has been extended by the Town of Emerald Isle to include 3,000 feet of the impacted beach area. The extended fill will extend 2,000 feet past the Lands End Subdivision. In addition, the Corps of Engineers, subject to the availability of funds, will likely continue to deposit material from maintenance of the AIWW and the Bogue Inlet connecting channel, on the extreme west end of Emerald Isle. This disposal operation will cover 1,000 to 2,000 feet of the affected shoreline. The Federal storm damage reduction project, presently being evaluated by the Corps of Engineers, could extend into the affected area providing additional protection for the impact area. The risk associated with future shoreline changes on the west end of Emerald Isle are addressed in the revised document. The acceptance of this risk by the ocean front property owners is something the Town will have to determine before proceeding with the project. The changes on the west end of Emerald Isle will be monitored. If erosion becomes a problem, the Town will have to take up that issue at that time. Note that in the absence of the channel relocation project, 600 feet to 900 feet of ocean shoreline on the west end of Emerald Isle could be impacted by the eastward migration of the inlet channel, therefore, the without project conditions also present risks to the ocean front property owners.

NCCF, PDEIS Comment #27: Non-Relevant Resource Issues. The following issues have been determined to be non-relevant due to the absence of project affects on the resource. (Please include the NC Mining Act and explain why what is being proposed is not a mining activity pursuant to the Act.)

Response #27: Mickey Sugg discussed this issue at the last PDT relating his discussions with Judith Wehner (Land Quality Section in Raleigh) and Dan Sams (Land Quality in Wilmington). Both indicated that neither a mining permit or an erosion control plan would be required for the Bogue Inlet project. However, a final determination in this regard will be made during the permit review.

NCCF, PDEIS Comment #28: Clean Water Act. An application for Section 401 Water Quality Certification will be submitted to the North Carolina Division of Water Quality. All State water quality standards will be met under this project.

There needs to be a further discussion of water quality classifications and standards as they relate to this project. This project impacts SA, SB, ORW, HQW waters, and there are a long list of regulatory standards that apply to each of these classifications. Also, compliance with the both the federal and state Antidegradation Policies should be explicitly addressed.

Response #28: The revised document addresses the water quality issues in much more detail.

NCCF, PDEIS Comment #29: Coastal Zone Management Act. A federal consistency determination in accordance with 15 CFR 930 Subpart C will be included in this report. State consistency review will be performed during the coordination of the Draft EIS document to ensure that the project is consistent with the North Carolina Coastal Area Management Act (CAMA) of 1974, as amended 1981 (Ch. 932, s. 2.1). (No CAMA permit can be granted if a project violates water quality standards.)

Response#29: Noted.

NCCF, PDEIS Comment #30: (The NC Sedimentation and Erosion Control Act of 1973 does apply to this project and needs to be discussed here.)

Response #30: See response to comment on paragraph 5.24 above.

NCCF, PDEIS Comment #31: Applicant's Preferred Alternative Alternative F, channel relocation with beach nourishment, positively addresses all of the project's goals and objectives and would not significantly impact environmental resources in the area. Therefore, Alternative F is the Applicant's Preferred Alternative. Negative impacts associated with the implementation of Alternative F would include: (a) temporary increase in turbidity in Bogue Inlet during channel and sand dike construction; (b) temporary increases in turbidity at the discharge point during nourishment of the Phase 3 shoreline; (c) burial of infauna prey resulting from beach nourishment; (d) temporary decrease in tidal flow as the inlet adjust to the new channel (4 to 6 weeks); (e) increase bed load transport into Eastern and Western Channels during the 4 to 6 week channel adjustment period; (f) removal of 50 acres of shallow bottom habitat due to channel construction; and (g) cumulative negative impacts due to erosion of the western 7,500 feet of ocean shoreline on Emerald Isle. (Please explain why these losses don't violate the Antidegradation Policies of EPA and the EMC.) Positive environmental impacts include: (a) partial restoration of 25 acres of subtidal and intertidal habitat from the construction of the sand dike; (b) restoration of the inlet shoreline habitat with the development of a sand spit off the west end of Emerald Isle; (c) accretion of the eastern 7,500 feet of ocean shoreline on Bear Island; (d) relatively rapid recovery of the beach nourishment area due to the highly compatible nature of the inlet material; (e) creation of new shorebird, waterbird, and colonial waterbird habitats with the gradual filling of the existing channel and sand spit development; and (g) prevention of anthropogenic pollution and solid waste disposal due to the destruction of utilities and other infrastructure in the Pointe subdivision. (These positive benefits to the natural environment are overstated. The inlet will adjust naturally to provide a variety of habitats, so moving the channel will not change that. The potential benefits include better management of nesting areas (if that's part of the mitigative commitments, reestablishment of public access (if that can be done while achieving wildlife management as well), better quality beach material for renourishment (assuming it can't be found elsewhere), and cleaning up some short-term pollution that would be caused by the loss of structures.) Positive economic impacts would include the preservation of the town and county tax bases, maintenance of the Emerald Isle economy by preventing a reduction in household spending, increased recreational opportunities

resulting from the restoration of public beach access (this provision of access needs to be clearly detailed in the plans—are we talking about a ramp, parking lot, or what?) to the inlet shoreline, creation of a high quality recreational beach along the 20,000 feet of ocean shoreline included in Phase 3, and accomplish the protection of the Pointe subdivision and restoration of the town’s ocean shoreline in one operation.

Response #31: Part 1: Antidegradation Policies of EPA and the EMC. This determination will be made by the review agencies and whether or not mitigation will be required.

Part 2: Positive impacts. The revised document acknowledges natural changes in the inlet and that the impacts of the relocated channel would not be of great significance. A possible bird management plan is included in the revised document in paragraph 5.30.

Part 3: Access. Once the inlet shoreline recovers sufficiently, the intent of the Town of Emerald Isle is to reestablish public access to past conditions. That could include a parking lot, once enough land accretes to the west end of the island, and an access walkway. This access would be tempered by the adoption of a bird management plan.

NCCF, PDEIS Comment #32: Irreversible and Irretrievable Commitment of Resources. (Again, these estimates are based on what the applicant is hoping will occur in terms of channel migration. It does not account for impacts that may occur if the channel does something different (move west, become braided, forms secondary channels, etc.) than what is hoped will occur. Tom has repeatedly said that he really can’t predict what the channel will do—so making the definitive estimates of impacts is really wishful thinking).

Response #32: The uncertainty associated with the future changes in the inlet channel and impacts on the adjacent island is discussed in paragraph 5.29 of the revised document.

NCCF, PDEIS Comment #33: Uncertain, Unique, or Unknown Risks. The major uncertainty associated with Alternative F is the magnitude of the shoreline adjustments along the western 7,500 feet of Emerald Isle. The predicted amount of erosion on the west end of Emerald Isle following the relocation of the was based on the position the Emerald Isle shoreline occupied in the late 1970’s when the Bogue Inlet channel was located midway between Bogue Banks and Bear Island. The average amount of recession near the inlet was predicted to be 350 feet with a maximum possible recession of 400 feet. Shoreline recessions for areas located between 5,000 and 7,500 feet east of the inlet should average around 10 feet but could erode as much as 80 feet. A review of shoreline positions on Emerald Isle prior to the mid 1970’s determined that the minimum shoreline position, i.e., the most landward position, between 1943 and 2001 would result in shoreline recession approximating the predicted maximum shoreline recessions along the western 5,000 feet of Emerald Isle.

(From the engineering report, it is stated that: “*The pattern for the inlet shoreline changes along the Bear Island shoulder is somewhat similar to that for the Bogue*

Banks, but the scale of change is significantly greater (Fig. 3.11)...Since the mid 1980's the Bear Island shoulder has eroded approximately 2,975 feet (169 feet/year)." Stations 19-23 (a distance of approximately 2,000 feet) have completely washed away on the tip of Bear Island during this period. In this part of the EIS, you predict the worst possible recession at 400 feet on Emerald Isle based upon a methodology that uses the landward position of the shoreline between 1943 and 2001. Please apply that same methodology to Bear Island, and explain how well it predicts the amount of erosion that has occurred since the mid 1980s. Does the methodology work to accurately forecast what has happened to Bear Island in the past 15 years? If the forecast works for what has occurred on Bear Island, than it's correct to use it in the EIS. If it does not provide an accurate forecast, than the methodology isn't appropriate to develop "worst case" scenario for what might happen to Emerald Isle if the channel migrates west and not east.

Response #33: Paragraph 5.29 in the revised document includes figures showing the historic shoreline positions on Bear Island for the period 1938 to 2001 and 1943 to 2001 on Emerald Isle. The inordinate amount of erosion on the east end of Bear Island between 1976 and 2001 was due to the large seaward protuberance that existed on the east end of Bear Island when the channel was located midway between the islands. The predicted shorelines for both Bear Island and Emerald Isle are based on the historical records of Bogue Inlet, i.e., the actual inlet was used as a model to predict shoreline positions for various channel orientations and positions. If a proposal had been made in 1976 to move the channel to the east and the same method of shoreline predictions used on Bear Island (assuming that there was a sufficient photo data base to make such an analysis), the analysis would have indicated the same degree of erosion that actually occurred with the eastward migration of the channel.

Submitted by: Tere Barrett, North Carolina
Division of Coastal Management, December 23, 2003

NCDCM Comment #1: A CAMA / D&F Permit will be required for the project.

Response #1: Noted. A CAMA and Dredge & Fill Permit will be applied for when the USACE publishes their Record of Decision.

NCDCM Comment #2: The applicant has made a concerted effort through months of meetings to address the issues over which the review agencies have shown concern. The document includes an Engineering Report with the factual information necessary to support most of the conclusions, a Biological Assessment, a Cumulative Effects Assessment, and a Monitoring and Mitigation Plan. The historical accounting is excellent. With few exceptions, the document fully addresses the project need, the reasonable alternatives available to meet the desired end, and the possible impacts to be incurred from the alternatives. The minutes of the meetings are included.

Response #2: Noted.

NCDCM Comment #3: There are data missing from this document that I can only assume will be in the FEIS, such as the proximity of the project to the high marsh, low marsh, and SAV. The DEIS states this distance is "0".

Response #3: For each resource identified in Section 4.0 of the document, a distance was measured from the Permit Area to the resource boundary. A distance of "0" was used when the community or resource being described fell within or on the Permit Area boundary.

NCDCM Comment #4: The Biotic Communities map is missing.

Response #4: The Biotic Community Map can be found in Appendix D.

NCDCM Comment #5: The potential positive impacts for certain habitats and communities, such as bird, seabeach amaranth, beach area, etc, under Alternatives A, B, C should be more fully disclosed. In the absence of this project, with the continuation of the erosion and loss of homes, the potential is for the over wash area to evolve into new beach and marsh habitat, bird foraging area, etc.

Response #5: The DEIS attempted to indicate that changes in the natural system under Alternatives A, B, and C would not have significant impacts on turtles and birds. However, the beach fill that would accompany all three of these alternatives could have potential beneficial impacts on seabeach amaranth.

NCDCM Comment #6: There remain in the document several assertions that are not proven. These statements need to be made in the inconclusive rather than the absolute. Examples are "Relocation of the inlet channel and construction of the dike

would significantly reduce erosion of the inlet shoreline and initiate a fairly rapid recovery of the inlet supratidal beach and dune communities;" "Alternative F would substantially reduce erosion of the inlet shoreline for at least 15 years..."

Response #6: Agree. The FEIS has been revised to remove definitive statements where predictions or projected outcomes are subject to a certain levels of uncertainty.

NCDCM Comment #7: One potential impact not disclosed in the document is the potential for a loss of tax base with the possible devaluation of property along the beachfront with the predicted level of erosion to occur post project.

Response #7: According to the Carteret County Tax Office, property threatened by erosion is reassessed on a case-by-case basis at the request of the affected property owner. That is, the County Tax Office does not have any prerequisites for reducing the tax values based on erosion threats. For example, the properties located at the Pointe that have been devaluated due to the erosion threat were done so at the request of the property owners and only when the threat to the structure became eminent, i.e., the owners needed to install temporary sandbags to protect their homes. The shoreline adjustments predicted for the preferred alternative would not result in an immediate threat to any properties located along the extreme west end of Emerald Isle. Accordingly, a reduction in the tax value of these properties would probably not occur.

NCDCM Comment #8: In Section 5.29 of the document regarding uncertain or unknown risks, there is no mention of the risk associated with the creation of the dike within a high-energy open water system, during unpredictable weather and tides, with the possibility of malfunctioning machinery extending the timeframe for the dike construction, etc.

Response #8: Section 6 of Appendix B to the DEIS (Engineering Report) explains the assumptions used to determine the amount of time needed to construct the dike. Construction of the sand dike was based on a production rate of 900 cubic yards/hour which is only 60% of the normal production rate expected for an ocean certified pipeline dredging discharging material through the relatively short pipeline that would be required from the landward end of the channel to the dike. Also, the amount of material needed to construct the dike (148,500 cubic yards) was increased by 35% to account for uncontrolled losses resulting in a total volume requirement of 200,000 cubic yards. Based on these assumptions, the time to construct the dike was predicted to be between 9 and 10 days. If the dredge works at its normal rate of 1,500 cubic yards/hour, the construction time would be between 5 and 6 days. Accordingly, the estimate implicitly includes allowances for downtime due to mechanical failures or weather; however, weather should not be a major factor given

the protected area in which the dredge would be working.

NCDCM Comment #9: The discussion of Environmental Commitments in Section 5.30.1 of the document should include Coastal Wetlands.

Response #9: Noted. Salt marsh areas have been added to Section 5.30.1 to be recognized as a primary concern for the preferred alternative.

NCDCM Comment #10: In Appendix C, the map entitled "Surface Area of Reformed Sand Spit" has an erroneous legend.

Response #10: Noted. Legend will be corrected in the FEIS.

NCDCM Comment #11: In the Cumulative Effects Assessment, Section, Section 4.2.7, the document states that the project "will not alter tidal flows to the estuarine habitat..." Relocating and re-directing the channel will change flow patterns, and could re-direct energy to the estuarine habitat of Dudley Island.

Response #11: The Cumulative Effects Assessment has been changed to indicate that current patterns will be altered by the new channel, however, tidal flow in and out of Bogue Inlet would not be changed by the project.

NCDCM Comment #12: The Mitigative Measures Section of the CEA refers to the dike construction in #'s 3 and 4. Construction of the dike is not a measure intended to mitigate impacts from this proposal; rather it is the proposal.

Response # 12: The numerical model tests indicated that a dike would be desirable to assure that the new channel would assume the majority of the tidal flow and eliminated residual currents in the existing channel. Construction of the dike was also supported by the National Marine Fisheries Service (R. Sechler) who expressed concern for the re-establishment of the intertidal habitat for infauna habitat. The dike should quicken the process for the development of the reformed spit, providing inter- and supra-tidal habitat to the closed off channel. This measure should immediately replace a portion of the habitat lost during channel relocation and quicken the reestablishment of intertidal habitat for infaunal recruitment. Accordingly, the dike is both an integral part of the proposed plan and a mitigative element with respect to the recovery of the intertidal habitat.

NCDCM Comment #13: The same is true for #12, discussing the compatibility of the material to be generated for beach re-nourishment.

Response #13: Disagree. The material used for beach nourishment along Emerald Isle is of a higher quality material. The use of this material for

nourishment should be identified as a part of the project that may minimize or avoid adverse impacts to resources.

NCDCM Comment #14: Numbers 5 and 6 are anticipated impacts from the proposal, not mitigation for the proposal.

Response #14: Agreed. Numbers 5 and 6 have been removed from Section 13.0 of the Cumulative Effects Assessment.

NCDCM Comment #15: The monitoring report for the project needs to increase the monitoring frequency for coastal marsh from once a year to at least twice annually.

Response #15: The salt marsh monitoring plan will be changed to include monitoring two times per year.

NCDCM Comment #16: There needs to be an additional monitoring station located internal to Dudley Island on the south side.

Response #16: A salt marsh monitoring station will be located on the internal portions of Dudley Island. Pre-construction monitoring efforts will be conducted in September / October 2004.

NCDCM Comment #17: The plan needs to include at a minimum: Stem density of both high and low marsh, speciation, normal high water contour, escarpment edge, and representative elevation transects. These transects should encompass the tidal creeks within the island.

Response #17: The salt marsh monitoring plan includes the collection of stem density, speciation, sedimentation and visual observations of marsh edge erosion. The X, Y, and Z coordinates collected during the hydrographic and bathymetric surveys will provide the elevation data.

NCDCM Comment #18: The Town of EI must commit to restoration of estuarine habitat from impacts deemed significant by the DCM.

Response #18: The Town of Emerald Isle understands that the determination of the significance of post-project impacts will be determined jointly by State and Federal resource protection agencies. The Town is fully committed to accomplishing mitigation deemed to be required based on the results of the post-project monitoring program.

NCDCM Comment #19: The proposal to restrict access to the newly formed supratidal area for protection of bird habitat needs to be coordinated very carefully to meet with 15A NCAC 07H .0306(a)(6) which states that "Established common-law and statutory public rights of access to and use of public trust lands and waters in ocean hazard areas shall not be eliminated or restricted."

Response #19: The bird management plan will be fully coordinated with

the NC DCM and Attorney General's Office.

NCDCM Comment #20: Numbers 8 and 9 of the Proposed Monitoring/Mitigation Plan need to be removed, as they are not a part of this project.

Response #20: The comment apparently is referencing a draft proposal presented to the PDT for its review and comment. A revised draft of the monitoring and mitigation plan will be included in the FEIS with items 8 and 9 excluded.

NCDCM Comment #21: In the Biological Assessment, the Biological Monitoring Stations Map shows salt marsh monitoring stations located in open water areas.

Response # 21: Noted. The appropriate changes have been made to the map.

NCDCM Comment #22: The above comments regarding the Proposed Monitoring/Mitigation Plan also apply to Section 18 of the BA.

Response #22: Noted.

NCDCM Comment #23: The FEIS should include changes to the document to satisfy the concerns addressed in this memo.

Response #23: Noted. Changes will be included in the FEIS.

NCDCM Comment #24: All in all, I feel the document has been well prepared and needs minimal tweaking.

Response #24: Noted. All of the changes suggested will be incorporated into the FEIS.

Submitted by: David McHenry, Northeast Coastal Region Coordinator
NC Wildlife Resources Commission, December 23, 2003

NCWRC Comment #1: Table of Contents. The title of section 5.7.1 should be "Shorebirds" instead of "Inlet Resources"

Response #1: Title of section in the Table of Contents will be changed to "Shorebirds."

NCWRC Comment # 2: Section 4. p. 49, first sentence: This sentence should read "...numbers of several species are declining..." since not all waterbirds are declining. Please correct this sentence so there is no confusion.

Response # 2: Noted.

NCWRC Comment # 3: Section 4. p. 49, last sentence: The numbers given are not correct as written. I provided CPE with data on the number of nesting sites (see email 10/24/03) used by colonial nesters. It's important to note that the number of nesting sites used by these birds has declined, but the way the data is presented is incorrect. The number of nesting sites can not be added because many of these species nest at the same sites. I recommend using numbers for one species as an example (e.g. the number of sites used by nesting black skimmers is down from 26 in 1977 to 15 sites in 2001). The point to make here is that the species mentioned are finding fewer and fewer suitable nesting sites, which makes the state's nesting populations vulnerable to catastrophic events at the few remaining nesting sites. This makes it even more critical to protect all remaining nesting sites.

Response #3: Noted. The appropriate changes have been made to better reflect NCWRC's findings and potential impacts to nesting populations

NCWRC Comment #4: The legends for Tables 4 and 5 indicate the data presented run until 2001, when in fact there are data included from 2002.

Response #4: Noted. The table legends have been revised.

NCWRC Comment #5: Section 4.6.2 is not titled correctly or should be changed to accurately reflect the section title.

Response #5: Noted. Section 4.6.2 has been renamed as Nearshore Turtle.

NCWRC Comment #6: Section 5 - Piping plovers. We disagree with the claim that the overall impact of alternatives E & F “should be positive”. This conclusion does not take into consideration the value of migrating inlets to piping plovers or the impacts of increased human disturbance that will occur on the spit as a result of the project. They will be negatively impacted although these negative impacts can be reduced if newly created habitat is properly protected.

Response #6: The redevelopment of the sand spit off the west end of Emerald Isle is expected to provide additional suitable habitat for piping plovers. However, the natural changes in the inlet system that would continue to occur under Alternatives A, B, and C are not necessarily detrimental to the species. Accordingly, the EIS will be modified to reflect the ability of piping plovers to adapt to natural changes in the inlet.

The Town of Emerald Isle is currently working with the NCWRC to develop a Waterbird Management Plan. Once complete, this plan will be made available for review and comment. The intentions of this plan are to limit negative impacts to birds from the anticipated increased usage of the reformed sand spit.

NCWRC Comment #7: Shorebirds. p. 59, Direct and Indirect Impacts: The erosion of Dudley Island should not be listed under direct/indirect impacts of alternative A, B and C since you claim that it will erode under all of the alternatives.

Response # 7: Agree. Dudley Island will continue to experience erosion under all alternatives; however, the erosion may be temporarily reduced during the time the new sand spit develops off the west end of Emerald Isle. The EIS will be changed to reflect this.

NCWRC Comment #8: Clarify how long you expect recovery to infauna to take after sand is placed on the beach. For example, on p. 60 under Alternative E, you state that “it has been shown that infauna should recruit and repopulate quickly” when discussing the effects of stockpiling material on the spit. Yet in other sections of the DEIS (e.g. Section 5, Piping Plovers) you state it will take 1-2 years for infauna to recover (a relatively long time). You should quantify, whenever possible, the amount of time expected for recovery of macroinvertebrates.

Response #8: The recovery time for macroinvertebrates on the sand spit will be 1 to 2 years. The discussion on p. 60 has been changed accordingly.

NCWRC Comment #9: Colonial Waterbirds. p. 62, last paragraph: Remove the sentence “For example, colonial waterbirds can easily move to marsh habitat...” We are talking about two very different habitat types and the marsh habitat is not a substitute for intertidal and beach habitat. As with the shorebirds, colonial waterbirds are adapted to these transitory barrier island habitats. The species that are utilizing supratidal and intertidal habitat will move in response to the shifting sand under alternatives A, B and C.

Response #9: Noted. This sentence on page 62 has been deleted.

NCWRC Comment #10: Other Waterbirds. p. 66: There are obviously some sections that have been cut and pasted from other sections that don't fit here. For example, the stockpiling of material won't have much impact on these birds since they do not forage, roost or nest in this habitat. Also, the construction of the sand dike will not replace habitat used by these birds. Take out all reference to nesting in this section. Most “other waterbirds” don't nest in N.C. and those that do nest in completely different habitat. Remove all reference to “shorebird” habitat in this section.

Response #10: Noted. This section has been revised.

NCWRC Comment #11: Table 21. Critical Habitat for Wintering Piping Plover, alternatives A, B, and C: I disagree with the first sentence in analysis of impacts. If Island #2 may disappear under all scenarios, than its disappearance should not be listed as a cumulative impact due to alternatives A, B and C.

Response #11: Agree. Table 21 will be changed to indicate that changes in Island 2 for Alternatives E and F will be the same as under Alternatives, A, B, and C.

NCWRC Comment #12: Shorebirds and Colonial Waterbirds, alternatives A, B and C: Don't include Dudley Island if you think it will erode under all scenarios. I also disagree with the finding of negative cumulative impacts from the erosion of nesting, foraging and roosting habitat on Bogue Banks sand spit because as you've acknowledged in other parts of the document, this sand has accreted somewhere else and is providing habitat.

Response #12: The impacts on Dudley Island would not be the same under Alternatives E and F compared to Alternatives A, B, and C. As indicated in Table 21, erosion of Dudley Island should be reduced during the spit redevelopment period which is 2 years for Alternative E and 4 to 6 years for Alternative F whereas under Alternatives A, B, and C, erosion of Dudley Island will likely continue unimpeded.

NCWRC Comment #13: Shorebirds and Colonial Waterbirds, alternatives E and F: Mention the increase in public access and human disturbance that will occur at The Pointe.

Response #13: Agree. The following statement will be added to Shorebirds and Colonial Waterbirds under Alternatives E and F in Table 21: “Long-term negative impacts due to increased pedestrian and vehicular access to the inlet shoreline.”

NCWRC Comment #14: Other Waterbirds, all alternatives: There is information that doesn't pertain to other waterbirds. See earlier comments on section 5.

Response #14: Noted.

NCWRC Comment #15: Restoration of beach and inlet habitats: Make it clear that you are only referring to the section that is eroding. You did this in the text, but it needs to be corrected in the table as well.

Response #15: Table will be changed to indicate that only the section of the west end of Emerald Isle presently protected by sandbags will be restored.

NCWRC Comment #16: Environmental Commitments. In addition to concerns over impacts of increased human disturbance to waterbirds at the end of Bogue Banks, I am also concerned with loss of waterbird habitat and/or a reduction in quality of waterbird habitat. This is why we are doing the pre-project and post project monitoring within the inlet complex. This section should reflect this.

Response #16: Noted. The final EIS will contain information on the proposed monitoring and mitigation plan.

NCWRC Comment #17: The title of section 5.30.2 should be changed to Bird Management/Monitoring Plan and should commit to post project monitoring within the inlet complex as well as implementing a bird management plan of the end of Emerald Isle. Commitments should also include a contractor during the nesting season to implement management and monitoring and to educate the public at The Pointe. Someone needs to be on the ground, during the nesting season to implement the management plan.

Response #17: The details of the Bird Management Plan and Monitoring Plan are presently being developed by the U.S. Fish and Wildlife Service. Those plans will be coordinated with the NC Wildlife Resources Commission and the NC Division of Coastal Management. These plans will be included in the final EIS.

NCWRC Comment #18: General Comments. The DEIS fails to adequately address Island #2 which is extremely valuable to waterbirds. This island, while ephemeral in nature, may not disappear naturally for many years. As far as I know, no modeling was done or estimates of erosion rates given for this island. The only mention of Island #2 in the DEIS is that it “appears to be migrating to the west and may eventually disappear.” It seems that we really don’t know what will happen to Island #2 under any of the scenarios.

Response #18: Island #2 first appeared in 1996 and has been undergoing continual change since that time. The size of Island #2 has been continually changing since its formation experiencing both increases and decreases in size. This erratic pattern of behavior did not make it amenable to analysis of long-term changes or predictions. None of the Alternatives are expected to have any impact on Island #2.

NCWRC Comment #19: Will the habitat mapping that is being done, answer any of the questions about what is happening and will happen to Island #2? Did Cleary have any predictions on how long it would take Island #2 to disappear under natural conditions? It seems possible that relocating the channel could accelerate the loss of this island and this needs to be addressed in the EIS.

Response #19: Island #2 will be included in the post-project habitat mapping which will provide information on the behavior of the island. For the reasons mentioned in the previous response, Dr. Cleary was not able to make any predictions on the fate of Island #2 either for existing or no action conditions or for the channel relocation proposal. There was nothing in the past history of Bogue Inlet in general and Island #2 in particular that would suggest that the island would behave any differently than under existing conditions.

NCWRC Comment #20: An unstated, but implied goal of this project is to prevent the relocated channel from migrating naturally. Doing so would create additional negative impacts. If there are plans to attempt to keep the channel in its relocated position, this needs to be addressed in the EIS and taken into consideration when evaluating impacts and proposing mitigation.

Response #20: The project being proposed by the Town of Emerald Isle is a one-time endeavor. Once the channel is repositioned midway between Bogue Banks and Bear Island, maintenance of the channel for navigation purposes will be resumed by the Corps of Engineers. Past channel maintenance activities by the Corps of Engineers has been limited to the deepwater channel that exist at the time of the maintenance operation, i.e., there has been no attempt by the Corps to maintain the channel in a fixed location. The Corps of Engineers, as part of the long-term protection plan for Bogue Banks, may consider some sand management alternatives for Bogue Inlet that could involve periodic dredging and repositioning of the inlet channel. If so, consideration of the future impacts of this

activity will have to be addressed by the Corps in its environmental document for the Bogue Banks Storm Damage Reduction Project.

NCWRC Comment #21: The document does not fully demonstrate an appreciation of the value of natural inlets and barrier islands. There is still language in the DEIS that suggests that letting the inlet migrate naturally will result in a loss of habitat to waterbirds. For example, in your analysis of impacts to shorebirds in Section 5, you still claim that erosion of Bear Island will result in loss of habitat under alternatives A, B and C. There are contradictory statements throughout the DEIS on this matter. For example in one sentence you state that shorebirds can readily adapt to dynamic beach environments while in another you claim that erosion could result in a loss of foraging habitat.

Response #21: Agree. Some sections of the DEIS still imply that natural changes in the inlet could negatively impact waterbirds which is not the case. Reference to negative impacts of natural inlet migration on waterbirds will be eliminated in the Final EIS.

NCWRC Comment #22: In many places, you state that after the old channel is diked, new habitat will be formed as the new spit forms. It should be made clear that this habitat may not be the same quality as lost habitat within the inlet. For example you claim that the dike construction and the formation of the new sand spit will create suitable foraging habitat for piping plovers. Again, this is only true if the birds can use the habitat.

Response #22: The characteristics of the habitat lost in the existing inlet due to the eastward migration of the inlet channel consist of a low sand spit with maximum elevations ranging from 3 to 5 feet above NGVD. The existing sand spit formed as sediment migrated from the ocean beach into the inlet and was reshaped by waves, tides, and currents within the inlet system. Since the new sand spit will also form from sediments transported into the inlet from the west end of Emerald Isle or from the collapse of the abandoned portion of the existing ebb tide delta lying off the west end of Emerald Isle, the characteristics of the new sand spit should be similar if not identical to the existing sand spit.

NCWRC Comment #23: It is possible that human disturbance could be so great as to prevent birds from utilizing all of the available habitat. Although a bird management plan with help alleviate impacts, it should not be assumed that the newly created habitat would be the same quality as what's there now.

Response #23: The bird habitat that exists on the existing sand spit is subject to human disturbance. A bird management plan will be implemented that will control human and dog access to protected areas of the spit. The bird management plan will provide more positive steps at protecting piping plovers than presently exists. This along with the wider expanse of the habitat should result in positive impacts.

Submitted by: Matthew Godfrey, Sea Turtle Project Manager
NC Wildlife Resources Commission, December 23, 2003

NCWRC Comment #1: I have read through the most recent version of the draft EIS for the proposed Channel Relocation Project. In terms of impacts on sea turtles, I think it adequately portrays the expected impacts.

Response #1: Noted.

NCWRC Comment #2: I would like to stress that I feel that the principal issue concerning turtles is sand quality: the draft EIS states that the sand to be used for the nourishment on Emerald Isle is essentially the same as the existing natural sand on the beach. This would help minimize potential negative impacts on nesting success, hatching success and sex ratio production of sea turtles in Bogue Banks.

Response #2: Agreed.

NCWRC Comment #3: The legends of Table 4 and Table 5 say the data presented run until 2001, when in fact there are data from 2002.

Response #3: The legends associated with Tables 4 and 5 have been revised to include 2002.

NCWRC Comment #4: Section 4.6.2. is not titled correctly or should be changed to accurately reflect the section title.

Response #4: Noted. Sections 4.6.2 and 5.6.2 have been renamed to *Nearshore Sea Turtle Habitat*.

Submitted by: Michelle Duval, Ph.D.
Environmental Defense Fund, January 3, 2004

EDF Comment #1: Project Risks / Uncertainty. The likelihood of the relocated channel migrating east, back toward the Pointe shoreline, is acknowledged and addressed but the equally likely alternative of the relocated channel moving west has not been sufficiently addressed. My concern is that neither the residents of Emerald Isle nor the general public are made adequately aware of this in the DEIS.

Response #1: Disagree that a shift of the channel to the west is just as likely as its predicted migration back to the east. The Geomorphic Analysis developed by William J. Cleary (provided in Appendix B of the Engineering Report) describes in detail the anticipated effects of the relocated channel (Impact of Proposed Channel Relocation). This report clearly discloses the research and analysis involved in determining the expectations involved in the new channel alignment location.

Appendix C from the Engineering Report (Channel Stability Analysis - C.10 Horizontal Stability New Channel states that the relocated channel "...may forego a future shift in the channel to this central location but will not prevent the relocated channel from migrating either to the east or to the west." The preferred design reflects the mid-1970's location, which based on the studies conducted by W. Cleary, showed a slight migration to the west; however the primary channel migration was to the east.

EDF Comments #2: Are the residents of the Town prepared to accept a rate of oceanfront erosion greater than that predicted in the DEIS should the new channel move westward? The final EIS should address this scenario in both Section 5 (Environmental Consequences) as well as Appendix F (Cumulative Effects Assessment) and include mitigative measures needed to offset such impacts.

Response #2: The development of the Draft EIS involved a continual effort to include the public, as well as all State and Federal agencies (Section 2.0 Scoping and Issues). This process allowed for many opportunities for the residents to contribute to and remain aware of the issues and potential uncertainties involved in the channel relocation efforts. The Public Hearing held on December 8, 2003 involved many of the residents of Emerald Isle whom expressed their support for the channel relocation efforts.

The Monitoring / Mitigation Plan included in Section 6 of the Final EIS identifies the survey efforts proposed for the eastern two miles of Bear Island (Commitment 6b). The findings of these surveys will assist in determining if any shoreline changes have occurred as a result of the project. If so, corrective actions will be negotiated between the Town of Emerald Isle and the State and Federal agencies.

Section 5.29 of the Draft EIS provides information on the uncertainties associated with future shoreline positions on both Emerald Isle and Bear Island. Plots of the predicted future shorelines on Emerald Isle and Bear Island with the proposed channel relocation are provided in Appendix C of the Draft EIS. Property owners along the ocean front on the west end of Emerald Isle in the predicted shoreline adjustment zone have been made fully aware of the potential shoreline changes during project scoping meetings, Project Delivery Team (PDT) meetings, the public hearing, and special reports to the Town during regular meetings of the Emerald Isle Board of Commissioners.

EDF Comment #3: Definition of Project Success. What are the criteria for and definition of project success? The project needs are clearly laid out in Section 1.3.1. Will the project be considered “successful” only if all of the stated needs are met?

Response #3: The main purpose of the proposed project is to protect development at the Pointe presently threatened by the eastward migration of the inlet channel. Relocating the channel 3,500 feet to the west is predicted to provide at least 15 years and perhaps 35 years of relative shoreline stability along the Pointe shoreline. During the period of time in which the channel maintains a position west of the Pointe shoreline, the area is expected to recover with the formation of a new sand spit off the west end of Emerald Isle. Accordingly, success of the project will be based on the amount of time the channel remains west of the Pointe shoreline.

EDF Comment #4: How far outside of the predicted limits can the completed project fall and still be considered successful? Unsuccessful?

Response #4: If the new channel does not impact the Pointe shoreline for at least 10 years, the Town of Emerald Isle will probably consider the project a success.

EDF Comment #5: The DEIS states that maintenance dredging of the relocated inlet is only likely to be delayed for one year post-construction; if dredging is required sooner than this, has the project achieved its objectives?

Response #5: Yes. The project goals and objectives do not address future maintenance dredging of the authorized navigation channel. Any reduction in maintenance dredging of the authorized channel by the Corps of Engineers following channel relocation should be considered as a secondary benefit. Maintenance dredging is required when the authorized navigation depth of the channel shoals to less than 8-feet mean low water. Once maintenance dredging resumes, future maintenance dredging should be comparable to past efforts.

EDF Comment #6: What if scour occurs in the abandoned channel?

Response #6: The purpose of the sand dike across the existing channel is to reduce flows and current velocities in the existing channel to facilitate the

deposition of littoral material moving off the abandoned portion of the ebb tide delta and material transported by littoral currents off the west end of Emerald Isle. With the dike in place, the hydrodynamic model results, reported in Appendix B of the DEIS (Engineering Report) indicated velocities well below 1 foot/second. In general, current velocities would have to approach 3 feet/second to initiate scour in the abandoned channel. The predicted formation of a sand spit off the west end of Emerald Isle, which would gradually fill the existing channel, was also supported by the results of the geomorphic analysis of the inlet (see Appendix B). However, acknowledging the possibility that some residual currents could continue in the abandoned channel, the preferred plan would allow the existing sand bag revetments to remain in place for up to 2 years following the relocation of the channel. If the abandoned channel fills as anticipated and the shoreline along the Pointe recovers, the existing sandbag revetments would be removed earlier.

EDF Comment #7: Has the Town of Emerald Isle been asked to define project success?

Response #7: As discussed above, the Town of Emerald Isle would probably consider the project a success if the development at the Pointe is provided at least 10 years of relief from the erosion threat.

EDF Comment #8: Permit Area / Survey Area. Although the PDT had a lengthy discussion regarding this issue and the differences between the "permit area" and "survey area", I strongly believe that Dudley Island and the surrounding area should be included in the permit area given the uncertainty regarding the future migration of the relocated channel. It is quite likely that this area will be subject to direct secondary as well as cumulative impacts.

Response #8: The limits of the Permit Area (6.8 square miles) were initially based on the results of the hydrodynamic modeling efforts that provided tidal flow patterns in the inlet complex. The sedimentation deposition area was then expanded to accommodate the concerns of the resource agencies for any anticipated effects in the north reaches of the Western and Eastern Main Ebb Channels, as well as along the eastern end of Bear Island and adjacent shoreline. The primary and secondary effects of the project are anticipated in the Permit Area. The Project or Survey Area (13.8 square miles) was extended beyond north of the Permit Area to include Dudley Island, west end of Bogue Sound and the marsh system north of Bear Island. The Survey Area was delineated to identify any cumulative effects that may occur from the project outside of the inlet complex. See Section 4 - Permit and Project Area Maps.

The Project Delivery Team contributed to and reviewed the monitoring plans developed for the project, starting in November 2002. Members of the PDT requests additional detailed monitoring efforts in April 2003. These requests included the acquisition of additional aerial photography, ground-truthing of submerged aquatic vegetation (SAV), biotic communities (including high and low

marsh) and shellfish habitats. The level of monitoring for the Permit Area was intended to receive more comprehensive investigations as compared to the Survey Area (i.e., 100% vs. 10% SAV population confirmed; intensive vs. limited ground-truthing investigations of marsh and biotic communities). Due to concerns expressed by the PDT, SAV mapping in the interior of Dudley Island was concentrated on during the field investigations. Additionally, in January 2004 the NCDCEM requested a fourth salt marsh monitoring station to be included on the south side of Dudley Island to monitor sedimentation and erosion rates. This station will be established in September or October 2004.

The intensive pre- and post-construction monitoring efforts for this project should adequately address any uncertainties associated with the potential impacts of the project on Dudley Island and its sensitive habitats.

EDF Comment #9: Environmental Consequences (Section 5). As mentioned previously, this analysis needs to be expanded to include the impacts of the possible westward migration of the new channel.

Response #9: The Geomorphic Analysis developed by William J. Cleary (provided in Appendix B of the Engineering Report) describes in detail the anticipated effects of the relocated channel (Impact of Proposed Channel Relocation). This report clearly discloses the research and analysis involved in determining the expectations involved the new channel alignment location.

Appendix C from the Engineering Report (Channel Stability Analysis - C.10 Horizontal Stability New Channel states that the relocated channel "...may forego a future shift in the channel to this central location but will not prevent the relocated channel from migrating either to the east or to the west." The preferred design reflects the mid-1970's location, which based on the studies conducted by W. Cleary, showed a slight migration to the west; however the primary channel migration was to the east.

Based on the past behavior of the inlet channel, a major shift in the channel position to the west does not seem highly probable. However, acknowledging the uncertainties associated with future shoreline predictions, the adjacent shorelines will be monitored for 5 years following the relocation of the channel and appropriate mitigation initiated should negative impacts related to the project be identified.

EDF Comment #10: I am skeptical of the assertions of full recovery of the benthic infaunal community within a period of 12 months, but am particularly concerned about the cumulative impacts of the hydrodynamic changes associated with the inlet relocation and the potential for alteration of critical fish habitats beyond shellfish resources.

Response #10: Several studies have been conducted along the eastern Atlantic shoreline, which have focused on the recovery rate of infaunal macroinvertebrate communities from beach nourishment activities (National Research Council, 1995). Findings from these studies indicate that the effects from nourishment activities in the dredged area have an initial short-term negative effect on the species abundance and diversity; however these numbers return to pre-construction conditions within one year. However, the recovery rate is also dependent on the compatibility of material. The material to be used for beach nourishment along Emerald isle is well-sorted, native beach material that is expected to contribute to a rapid recovery of benthic populations.

The hydrodynamic model used to evaluate changes in flow and flow patterns in Bogue Inlet following the relocation of the channel and closure of the existing channel are reported in detail in Appendix B (Engineering Report) of the DEIS, specifically in paragraphs 5.20 to 5.25 in the main text and in Appendix D of the Engineering Report. Immediately following the relocation of the channel and closure of the existing channel, flows in Bogue Inlet would be slightly less than under existing conditions due to a slight reduction in the cross-sectional area of the inlet. However, the cross-sectional area of Bogue Inlet will adjust over a period of 4 to 6 weeks with flows returning to normal. As a result, the tide ranges in the sound and current velocities in the connecting channels will be restored to pre-project conditions. The major impact of the channel adjustments during the 4 to 6 week period will be an increase in sediment bed load transport into the lower portions of Eastern and Western Channels. Accordingly, no cumulative impacts on the hydrodynamics of the Bogue Inlet complex are anticipated.

EDF Comment #11: On November 16, 2000, the NC Marine Fisheries Commission approved a new policy for the protection of marine and estuarine resources under its authority from the effects of beach dredge and fill activities and related coastal engineering activities (copy attached). The Habitat and Water Quality Standing Advisory Committee of the NC MFC developed the policy in response to increasing number of beach engineering projects being developed and the inadequate consideration of cumulative and long-term impacts of these projects. I strongly suggest that this document be reviewed and the issues contained within addressed in the final EIS, especially the details of a mitigation plan. While I realize that the mitigation plan is not yet complete, the specifics – including impact thresholds and authority for determination of impact -- need to be included in the final EIS.

Response #11: A detailed Monitoring / Mitigation Plan is included in the Final EIS under Section 6. Determining the effects of the project will rely heavily on comparing the pre- and post-project monitoring results, including the use of pre- and post-construction digital aerial photography. Corrective negotiations between the Town of Emerald Isle, NCDCEM and the USACE will occur if post-project assessments reveal that impacts to biological resources are clearly associated with the project.

EDF Comment #12: Finally, I have expressed concern previously regarding the characterization of habitat losses/impacts from alternatives A, B and C. It is not accurate to characterize habitat changes such as the evolution of high marsh to low marsh as a “loss” through the pursuance of any of these alternatives. These gradual changes would be the result of allowing natural inlet processes to occur, rather than the direct and sudden loss of habitat from construction activities.

Response #12: Although the effects from the natural changes in the inlet flow patterns are part of an evolutionary process, these effects will be transitional in nature, at best. These habitat changes will be a loss to the ecosystem and are therefore considered to be a negative effect. However, DEIS attempts to characterize these changes as being part of the normal behavior of tidal inlets and generally discounts the changes as having any significant impacts on birds, turtles, and other species that have become adapted to such environments.

Construction activities will involve the relocation of sediment from a subtidal area to adjacent subtidal and intertidal zones. The effects from these activities are expected to have a short-term effect on the infaunal community due to the disturbance of their relocation. The effects of this will result in burial of many organisms, unless the infauna can burrow towards the surface. Maurer reported that most organisms are capable of burrowing towards the surface from 40 cm deep (depending on sediment composition and temperature). Others (Lynch, 1994) found that several infaunal species from the southeastern beaches were capable of burrowing from 0.6 m to 1m. (National Research Council, 1995)

EDF Comment #13: Appendix F - Cumulative Effects Assessment. Section 7.5 states that “because of current regulations....nourishment projects are not recognized to have long term cumulative effects to these resources [shorebirds, waterbirds, sea turtles, seabeach amaranth]”. Insomuch as current regulations may be intended to prevent such impacts, that does not guarantee that such impacts do not occur; therefore, nourishment projects must be “recognized” as potentially impacting these resources in a cumulative manner.

Response #13: This response has been noted and the wording in Section 7.5 will be revised to reflect the concerns of this comment.

EDF Comment #14: I am also distressed by the repeated statements of no expected cumulative impacts to fishery resources from the preferred alternative, simply because it has been designed to maintain the same volume of tidal flow. As stated previously, the concern is with hydrodynamic and therefore sediment transport changes, particularly within the estuarine environment.

Response #14: Sediment transport from construction activities and the equilibrium effects of the newly relocated channel are not expected to extend beyond the southern reach of the Western or Eastern Main Ebb Channels. Therefore impacts from the project are not expected to occur in the estuarine

environments surrounding the Bogue Inlet complex. However, monitoring of the adjacent estuarine environments and its resources (i.e., SAV, salt marsh and shellfish habitats) will occur as presented in the Monitoring / Mitigation Plan presented in Section 6. The predicted transport area is based on the ADCIRC results presented in the Hydrodynamic Modeling Results (Appendix B).

EDF Comment #15: Finally, Table 12.1 (CEA Step 9), which evaluates the magnitude and significance of cumulative effects, is supposedly based on the total number of cumulative effects in Table 7.1. (Incidentally, the Bogue Inlet sandbags are missing from Table 7.1).

Response #15: Tables 7.2 (previously Table 7.1) and 12.1 will be revised to include an assessment of the Bogue Inlet Sandbags project.

EDF Comment #16: However, the “magnitude” column of Table 12.1 doesn’t appear to correspond to the impacts in Table 7.1. For example, the Bogue Banks Beach Scraping project has a magnitude listing of 2+/0-, while Table 7.1 details 4 negative impacts and 2 positive impacts.

Response #16: Noted. Table 12.1 was revised to reflect the numbers assigned in Table 7.2 (previously Table 7.1).

EDF Comments #17: Table 12.1 needs to be reevaluated or at least more thoroughly explained.

Response #17: Table 12.1 lists the projects evaluated in the Cumulative Effects Assessment and their status of occurrence (i.e., past, present, reasonable foreseeable future). The magnitude column is a summation of the cumulative effects assigned under Table 7.2. The significance column gives a final rating to the project based on the total number of cumulative effects (positive and negative) listed in the magnitude column. The significance rating is as follows: Minimal = 0, Very Low = 1, Low = 2-4, High = 5-7, and Very High = 8-9. For example, a low rating of 3 would indicate that the project was deemed to have an overall low cumulative effect on biological resources.

Submitted by: Brian Strong, Environmental Review Coordinator,
North Carolina Division of Parks and Recreation, January 9, 2004

NCDPR Comment #1: Description of Bear Island. Section 4.1.2 Bear Island, contains a discussion of the natural resources of Hammocks Beach State Park. The discussion is brief and focuses mainly on location, dimensions, etc. I would suggest that additional information that describes the unique features of the Park be mentioned in the discussion. I have included some information that could be included in the re-write.

Response #1: Noted. Changes have been made section 4.1.2 of the document to include some additional information on Bear Island. Rare plant and animal species data for Bear Island is provided in the appropriate resource section under Section 4.0 Affected Environment.

NCDPR Comment #2: Shoreline loss. The report discusses the impact of residual currents along the inlet shore causing potential erosion. Would this be true for the shoreline along Bear Island? If so, this potential loss should be discussed in the report. In addition, how long will this potential impact occur for.

Response #2: Refer to Section 5.30.4 - Shoreline Changes for a complete description of anticipated shoreline changes along Bear Island. Estimated timeframes are also included in this section. Also, refer to Appendix C which shows the maximum and minimum shorelines for Bear Island.

NCDPR Comment #3: In addition, when Chris Freeman did his shoreline and elevation survey, the shoreline was surveyed at low tide, shouldn't the near shore sandbars also be surveyed? If there is an issue with shoreline loss on Bear Island, the first place it would show up would be in these near shore sandbars.

Response #3: Disagree. Nearshore sand bar formations are ephemeral and are not a reliable indicator of shoreline changes. These features can be transient tend to migrate in the direction of longshore drift. Changes in ocean shorelines are best defined by the mean low water line.

NCDPR Comment #4: What specific thresholds, for which negative impact considered (3 feet, 30 feet, 300 feet, etc.)?

Response #4: Refer to Section 5.30.4 - Shoreline Changes.

NCDPR Comment #5: Monitoring. What types of monitoring would take place after the project was completed (i.e., shore line, marsh line, colonial nesting birds, sea turtles Sea Beach Amaranth)? Who will be responsible for the monitoring process, how long will it occur for, and how frequent will the reporting occur?

Response #5: Refer to Section 6.0 - Monitoring and Mitigation for project monitoring details. Also, refer to NCWRC response #6.

NCDPR Comment #6: Recreation. Section 5.12, Recreation Resources, have any estimates or modeling been developed that would determine if turbidity from the relocation project will impact swimming on Bear Island or any other recreational activities (swimming, fishing, etc.).

Response #6: No. This comment is unclear. Turbidity levels are expected to be temporarily increased within the immediate vicinity of the dredge and dike during construction, however no additional adverse impacts to water quality are expected from the project.

NCDPR Comment #7: Navigation. Section 5.13, Navigation, I would like to know if Alternative F - Channel Relocation with Beach Nourishment, will result in any short term impacts to Cow Channel. Will the project accelerate silting issues associated with the channel.

Response #7: The hydrodynamic model used to evaluate changes in flow patterns in Bogue Inlet following the relocation of the channel and closure of the existing channel are reported in detail in Appendix B (Engineering Report) of the DEIS. The flow patterns and velocity modeled around Cow Channel did not indicate a change, and therefore is not anticipated to show a change in sedimentation rate. A salt marsh monitoring station was established near Cow Channel that will be monitored for sedimentation accumulation rates.

NCDPR Comment #8: Mitigation. There is no discussion of mitigation in this document. Where will this discussion occur? DPR is still concerned about what will be done to mitigate any impacts to Bear Island that occur outside of the project scope. This remains DPRs #1 concern.

Response #8: Refer to response #5.

NCDPR Comment #9: What is the timeframe of the project. For example, when can we expect that impacts to Bear Island or other resources be judged to be outside of the Bogue Inlet project. In addition, how will it be determined that impacts from storms or other natural occurrences were not exacerbated by the Bogue Inlet project.

Response #9: Refer to Section 5.30.4 - Shoreline Changes for details.

Submitted by: Dr. Gerald Miller, Sr. Ecologist, NEPA Program Office,
U.S. EPA Region 4, January 22, 2004

USEPA Comment #1: Pursuant to Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA), EPA, Region 4, has reviewed the subject document, an evaluation of the environmental consequences of shifting the main ebb channel in Bogue Inlet (BI) to the west [to an approximation of its position during the 1970s]. This work is being proposed as a means to reduce the erosion on the eastern shoulder of the Inlet resulting from the channel's recent migration. As the channel tracked to the east, the effects of tidal currents [normal ebb and flow] on the adjacent shoreline were exacerbated with annual maintenance volumes recently increasing from 150K to 500K cubic yards.

Response #1: While maintenance dredging has increased substantially over the last 3 maintenance cycles (2000 to 2002) the problem associated with the easterly migration of the inlet channel was initiated prior to this increased dredging activity. The DEIS does not associate the movement of the channel to past dredging efforts.

USEPA Comment #2: However, there is an inherent instability in all inlet features. The increase in annual erosion rate may just be part of a longer cycle making itself manifest as the channel oscillates between the inlet margins and/or the inlet becomes a sink for eroded sediments.

Response #2: The DEIS presents the channel migration as a natural phenomenon that is having a negative impact on the Pointe subdivision. The historic behavior of the inlet channel was fully addressed in the DEIS, specifically in Appendix B (Engineering Report) to the DEIS.

USEPA Comment #3: Nonetheless, this erosion is threatening the integrity of a subdivision (The Pointe) located in what was probably the original foredunes, i.e., inlet hazard zone.

Response #4: The inlet hazard area for Bogue Inlet was established by the North Carolina Coastal Resources Commission in 1978 and was based on the migratory history of the inlet as depicted on aerial photographs dating from 1938. The Pointe subdivision was established prior to the area being declared an inlet hazard area.

USEPA Comment #5: It was noted that without some kind of intervention up to 50 homes along with their associated roads/infrastructure would be destroyed in 10 years. Health and safety considerations dictate that absent abandonment or moving the structures some efforts be made to protect these properties, at least in the short-term.

Response #5: Agree.

USEPA Comment #6: We understand from staff coordination that this effort to fix the channel to a central alignment will only be accomplished once and should not be construed as a long-term commitment.

Response #6: That is correct. The Town of Emerald Isle has no plans to reposition the channel in the future.

USEPA Comment #7: Further, if the recent migration reoccurs, routine maintenance will continue along the evolving alignment [path requiring least excavation] as is currently the case.

Response #7: The Corps of Engineers will presumably resume its normal maintenance operations once the new channel shoals to depths less than the authorized 8-foot mean low water depth. The Corps of Engineers maintenance operation is limited to the deepwater channel that exist at the time maintenance is performed, i.e., the Corps does not attempt to maintain a fixed channel alignment.

USEPA Comment #8: If this is a correct interpretation of the Wilmington District's policy in this regard, it should be made clear to all involved parties in the final EIS and subsequently codified in the project's Record of Decision.

Response #8: The DEIS clearly indicates that the proposal does not include future maintenance operations to maintain the channel position.

USEPA Comment #9: As a practical matter it may be difficult to abandon the subject at-risk properties to subsequent erosional forces if the central channel alignment fails to remain fixed. This possibility should be examined in the final EIS along with the environmental consequences of the cumulative impacts associated with repetitive episodes of ever expanding solutions to protect them.

Response #9: The relocate channel is expected to behave in a manner similar to the existing channel, i.e., migration back to the east could occur in as little as 15 years or perhaps as long as 35 years. In any event, the Pointe area could be faced with potential erosion problems in the future. All of Bogue Banks, including the Town of Emerald Isle, is being considered for long-term storm protection as part of a federal feasibility study being conducted by the Corps of Engineers. The Corps has indicated that it may consider some type of a sand management plan for Bogue Inlet that would include combining the navigation authority with storm damage prevention. This could involve future channel dredging operations to obtain material for beach nourishment purposes as well as maintain the navigability of Bogue Inlet. If the Corps proceeds with such a proposal, the environmental impacts associated with repeated channel dredging and repositioning would be included in its NEPA document.

USEPA Comment #10: This discussion should also include how the at-risk property will be affected by even a nominal rise in sea level over the project life which may render the location of the inlet channel moot.

Response #10: The history of the inlet used in the formulation of the channel relocation proposal occurred during a period of time when relative sea level was rising at a rate of between 0.75 and 1.0 foot per century. The major impact of sea level rise would be to increase the elevation of the ebb tide delta and hence the volume of material retained on the ebb tide delta over time. Changes in sea level could also impact the volume of water flowing in and out of Bogue Inlet as larger areas in the connecting sound system would begin to contribute to tidal storage and exchange. However, even if the rate of rise in sea level increases, the increased rate over the next 15 to 35 years should not significantly impact channel stability relative to its impact on past behavior.

USEPA Comment #11: There is also a water quality issue regarding this erosion which must be taken into consideration, viz., the subdivision lacks a central sanitary system with each of the houses using an individual septic tank and accompanying drain field. It is doubtful that the most at-risk [seven houses protected by sand bags] of these individual systems are functioning optimally given the noted encroachment.

Response #11: Noted. The replacement of the existing sanitary systems with a central system is beyond the scope of this project. However, the potential problems associated with damage to the existing septic tanks and the potential for the release of fecal material and other pollutants into the inlet and estuarine system was identified as a possible consequence of the without project conditions included in the DEIS.

USEPA Comment #12: Relocation of the channel might militate this potential water quality problem with the material applied during the Phase 3 nourishment providing some further buffering. However, even under the best of circumstances, the use of individual systems in this substrate environment is ill-advised. We recommend that they be replaced as soon as practical, i.e., The Pointe connected to a waste water treatment plant.

Response #12: Noted.

USEPA Comment #13: Material excavated in the construction of the new alignment [approximately 1 million cubic yards] will be used to close the existing channel [20%] with a sand dike system at each end. The remaining sand will be placed along a four mile reach of the shoreline at the west end of the Town of Emerald Isle [the noted Phase 3 Nourishment]. BI hydraulics will be altered [to some greater or lesser degree] with the removal of 50 acres of shallow ebb tide delta from the new channel alignment and creation of 25 acres of new subtidal habitat by the dike system.

Response #13: Following a brief period of adjustment (4 to 6 weeks) during which the new channel should undergo cross-sectional adjustments to accommodate the tidal prism of Bogue Inlet, the hydraulics of Bogue Inlet are predicted to return to normal. Accordingly, the total volume of water flowing in and out of the inlet during flood and ebb respectively should return to existing levels. As a result, there would not be any impact on tidal elevations in the system. The major changes in inlet hydraulics would be in the area located between Bogue Banks and Bear Island where the majority of flow would shift from its present position adjacent to the west end of Emerald Isle to a more central location.

USEPA Comment #14: The inlet material proposed for beach nourishment is slightly coarser than the native sediments, but is otherwise considered compatible. It also has the added advantage of having a very nominal shell content [$<1\%$] whereas previous sand sources used in previous beach nourishment phases averaged between 35-44%. There was general consensus that the latter material did not make optimal beach fill because of its tendency to consolidate and its admixture of shells made use somewhat less than ideal for contact recreational purposes.

Response #14: Agree.

USEPA Comment #15: The central channel alignment should lessen the erosion occurring along the eastern margin of Hammocks Beach State Park.

Response #15: Agree. The geomorphic history of Bogue Inlet strongly suggests that the east margin of Hammocks Beach State Park should accrete in repose to the central channel location.

USEPA Comment #16: On the other hand, other portions of the BI system will receive less sand via this modification in littoral dynamics and will experience increased degradation.

Response #16: The expected redistribution of sediment in the Bogue Inlet complex following the relocation of the channel is presented on Figure 8.1 in Appendix B of the DEIS. The ebb tide delta is predicted to assume a more symmetric configuration, a sand spit should develop off the west end of Emerald Isle filling the existing channel and merging with the sand dike, the ocean shoreline of Emerald Isle for a distance of 7,500 feet east of the inlet should experience some erosion in response to the new inlet configuration, and the eastern 7,500 feet of Hammocks Beach State Park should accrete. Other than the possible increase in erosion on the west end of Emerald Isle, the expected changes in the Bogue Inlet complex should not degrade the system.

USEPA Comment #17: Experience suggests that similar credits and debits in the sand budget can be expected throughout the project effects' area. Hence, this proposal could have some unforeseen consequences both in the short- and long-term.

Response #17: The DEIS acknowledges that uncertainties exist with respect to predicted shoreline and inlet responses to the proposed channel. As a result, detailed plans have been established to monitor changes in the salt marsh, submerged aquatic vegetation, shellfish beds, macroinvertebrate/infauna, and the adjacent shorelines. Also, a comprehensive bird management plan will be implemented to assure that increased public access to the area does not negatively impact birds that rely on the inlet environment for foraging, resting, and nesting. Details of these plans will be included in the FEIS.

USEPA Comment #18: It is the uncertainty of what, where, and how much will happen that make modifications [dredging] in these dynamic inlet systems so perplexing.

Response #18: Agree.

USEPA Comment #19: Because submerged aquatic vegetation can be an indicator of subtle changes in an ecosystem, we suggest that monitoring be continued on their overall health, distribution, and extent within the project effects' area.

Response #19: Submerged Aquatic Vegetation (SAV) will be monitored for a period of 3 years post construction using resource mapping from aerial photographs and ground truth surveys of known SAV areas. The SAV monitoring plan has been developed in cooperation with, and full participation of the National Marine Fisheries Service.

USEPA Comment #20: For perspective, the final EIS would be improved with some additional discussion regarding the cumulative environmental impacts of providing similar structural protection to other at-risk coastal development.

Response #20: A Cumulative Effects Assessment is included in the DEIS (Appendix F of the DEIS). This document will be revised in accordance with review comments and included in the FEIS.

USEPA Comment #21: The DEIS tries to make the case that regardless of attendant environmental losses, the value of ocean front property and its attendant infrastructure [appraised in this instance at \$11.0 million] warrants preservation. We are concerned that this will seem to set the precedent that an engineering solution [channel/inlet stability, excavation/fill, etc.] will always be applied to lessen the effects of these natural marine processes.

Response #21: The primary purpose of the channel erosion response project is to preserve the existing tax base for the Town of Emerald Isle and Carteret County. Also, the other economic impacts are of a major concern to the town and county. There is no question that the overriding need on the part of the town is to maintain its economic viability. In this particular case, moving the channel and combining the channel relocation with beach nourishment along the ocean

front made economic sense. In some other cases, economics and environmental consequences could dictate other approaches.

USEPA Comment #22: In summary, the routine maintenance to sustain the physical integrity of beach developments fosters direct, indirect, and cumulative impacts on the biological resources which are recurrently destroyed in the process of recurrent sand manipulation.

Response #22: Noted. The cumulative impacts associated with beach nourishment are address in the Cumulative Effects Assessment (Appendix F of the DEIS).

USEPA Comment #23: Moreover, there are significant long-term economic and health/safety considerations which prompt a ripple of cause-effect impacts, especially when coastal municipalities have to compete for scarce renourishment [sand] resources. As a result of our continued discussion with Corps' technical staff, the District is aware of our perspectives regarding the overall merits of beach nourishment.

Response #23: Noted.

USEPA Comment #24: However, as additional future nourishment projects [which are effectively efforts to establish a fixed shoreline] are almost a given, we believe it would be helpful for the District to examine them from a more comprehensive perspective.

Response #24: Noted.

USEPA Comment #25: On the basis our review, a rating of EC- 2 has been given. This is, we have some environmental concerns to attempting to establish a fixed channel alignment in a dynamic inlet system even though the underlying reason(s) of its recent migration are incompletely known.

Response #25: Noted.

Submitted by: Sidney Maddock, Environmental Analyst,
Center for Biological Diversity, January 30, 2004

Center, Comment #1: The Center for Biological Diversity (“Center”) is a national, nonprofit environmental group that protects endangered species and wild places through science, policy, education, and environmental law (www.biologicaldiversity.org). The Center’s North Carolina office has concentrated its efforts on coastal species, with special attention to conservation efforts for the threatened piping plover (“PIPL”). On behalf of our 9,000 members nationwide, we submit the following comments on the Draft Environmental Impact Statement, Bogue Inlet Channel Erosion Response Project, Emerald Isle, North Carolina (“DEIS”).

Response #1: Noted.

Center, Comment #2: In summary, the DEIS contains important omissions or errors; many changes will be necessary for the Final Environmental Impact Statement (“FEIS”) to be consistent with the National Environmental Policy Act (“NEPA”). While repeatedly noting the possible benefits of the proposed action for those who voluntarily made the decision to settle near a dynamic inlet, the DEIS does not adequately acknowledge the positive geological and biological benefits of inlet migration and the potential adverse impacts from stabilization efforts to the threatened PIPL and other shorebirds and waterbirds.

Response #2: The EIS has been modified to indicate that the natural changes in Bogue Inlet would not negatively impact piping plovers, shorebirds, and waterbirds. These species are well adapted to environmental changes associated natural alterations in the inlet environment.

Center, Comment #3: The DEIS also does not adequately address the significant threat of predation to breeding shorebirds and waterbirds and the significant threat of human disturbance to breeding, migrating, and wintering shorebirds and waterbirds.

Response #3: The FEIS recognizes the impacts that predation and humans can have on breeding, migrating, nesting and wintering shorebirds and waterbirds and has developed a Waterbird Management Plan that reflects these concerns. This plan is currently being reviewed by both the State and Federal agencies (e.g., USACE, USFWS, NCWRC, and NCDCEM). This plan will be circulated through the Public Notice process when it is available. The Cumulative Effects Assessment (Appendix F) also discusses these issues.

Center, Comment #4: Questions about how artificially created habitats will be managed are left for a “management plan” that is not discussed in sufficient detail in the DEIS. However, such management actions will play a central role in determining the effects of the proposal. Thus, a full discussion of management actions must be included in the FEIS.

Response #4: Refer to Response #3.

Center, Comment #5: Given the significant impacts associated with the proposal, the lack of information about management of the created habitats, and other concerns, we urge the Corps to publish a revised DEIS on the project. We also strongly urge the Corps to initiate formal consultation pursuant to section 7 of the Endangered Species Act (“ESA”); given limited information in the DEIS about the effects of the project, uncertainties regarding project mitigation, and the scientific information regarding the piping plover, we believe that the failure to consult formally violates the ESA.

Response #5: The Applicant has been coordinating with the USACE, the National Marine Fisheries Service and the U.S. Fish and Wildlife Service since October 2002 in accordance with Section 7 of the Endangered Species Act of 1973, as amended. The USACE initiated 'informal consultation' with the USFWS in December 2002. The USACE will continue coordinating with the U.S. Fish and Wildlife Service to ensure that the project is in compliance with the Section 7 of the Endangered Species Act. Based on information submitted to the National Marine Fisheries Service (NMFS) under Section 7 consultation, NMFS has determined that the proposed action is not likely to adversely affect any listed species under their purview. Refer to Appendix A Subpart 2 (Pertinent Correspondence).

Center, Comment #6: The comments are provided by listing the document section and, in parentheses, the page of the paragraph. The DEIS repeats certain statements multiple times; however, these comments will not repeat our response. Rather, our comment should be read as applying to the same statement or issue, no matter how many times it appears in the DEIS.

Response #6: Noted.

Center, Comment #7: 1.7.9 (12) We request additional discussion of the Coastal Barrier Resources Act, and the consistency of the proposed project with the Section 6 exceptions; to the extent any of the proposed action is inside of the COBRA area, it is not clear how the proposal is consistent with any of the seven listed exceptions.

Response #7: Refer to Section 5.25.12 in the Final EIS.

Center, Comment #8: 3.2.4 (7) This section briefly discusses channel maintenance activities, notes recent sharp increases in dredging amounts (151,000 to 514,200 cubic yards/year), and notes “the assumption associated with the suspension of USACE maintenance dredging is that the eastward migration of the channel would slow and a new channel location would eventually breach through the ebb tide delta in a more central location.” The Center questions whether the increased channel maintenance dredging is responsible, at least in part, for the channel migration, and if so, whether modification of the maintenance dredging – not “suspension” – would be an acceptable alternative.

Response #8: The EIS does not associate the eastward migration of the inlet channel to any channel maintenance activities by the Corps of Engineers. To the contrary, the document indicates that the channel movement appeared to occur independent of the maintenance efforts. The quoted sentence was extracted from the discussion of Alternative D – Suspension of Channel Maintenance, which was eliminated as a feasible alternative.

Center, Comment #9: 3.2.6 (9) The Center requests additional discussion in the EIS of why the “optimum” channel depth is 13.5 feet. What are the characteristics of the boats that are using this inlet, including number of boats and their draft and length? It is not clear if this figure is selected because of engineering considerations (a specific amount of dredged sands), navigation considerations, hydraulic considerations, or other factors.

Response #9: The Bogue Inlet Channel Erosion Response Project is not a navigation improvement project; therefore the characteristics of the boats that use the inlet were not included in the plan formulation. As discussed in detail in Appendix B of the DEIS, the design of the channel was based solely on its ability to capture the majority of the tidal flow and maintain the existing tidal prism of the inlet. The authorized depth and width of the Federal navigation channel in Bogue Inlet are 8 feet deep at mlw and 150 feet wide respectively. The Corps of Engineers is responsible for maintenance of this channel and cannot increase the channel dimensions without specific approval by the Chief of Engineers or Congress.

Center, Comment #10: 4.1 (5) Due to extensive channel maintenance efforts as well as the placement of sandbags on the east side of the inlet, we question whether the DEIS can accurately state that the inlet is “similar to other natural channel systems....”

Response #10: The reference to “natural” will be deleted from this statement.

Center, Comment #11: 4.4.3 (26). It is not clear what “the region” means, but if it refers to the North Carolina coast, we believe that the coast is “extremely important” for migrating piping plover (PIPL); our 2003 surveys at Cape Hatteras National Seashore (“Seashore”) have documented very high numbers of migrating birds, e.g., 79 on Ocracoke on August 12, 2003; 39 on Bodie Island on August 2, 2003. In addition, Dinsmore et al. (1998) compared their survey results to other locations, and concluded that of 7 Atlantic flyway locations, the Outer Banks of North Carolina ranked second in regional importance for the piping plover, with only Monomoy National Wildlife Refuge in Massachusetts having a higher peak migration count. Likewise, the Revised Recovery Plan for the Atlantic Population of PIPL notes the importance of North Carolina sites to migrating PIPL (FWS 1996: 13).

“Plovers have been documented arriving on their breeding grounds from late March to April. By early September, both adults and young may depart for other wintering areas.” Our surveys here at the Center show the peak of PIPL fall migration to be in late July or

early August, which is much earlier than the quoted statement about September; in addition, we have migrating birds arriving as early as the second week of July. At the Seashore, we have had initial observations of banded PIPL in November and December, suggesting that even after the traditional “fall migration” is considered over, there can be southward movement of birds in response to weather or other factors. In addition, in 2003, we still had large numbers of migrant PIPL using the Bodie Island spit in the last week of April. We suggest that the DEIS utilize dates from the chart in the Atlantic Coast Population Revised Recovery Plan (FWS, 1996: 5), or, even better, just reproduce the chart. The longer window for spring and fall migration than what is acknowledged in the DEIS suggests that the DEIS may under-represent impacts to migrating PIPL.

Response #11: Noted. Correspondence with the North Carolina Wildlife Resource Commission (S. Cameron, pers. comm.) identifies the following wintering, breeding and migratory periods for piping plovers: wintering (12/1 thru 2/28 or 2/29; spring migration 3/1 thru 4/30; breeding 5/1 thru 7/13; and fall migration 7/14 thru 11/30. Section 4.4.3 has been changed to reflect these time periods.

Center, Comment #12: While we acknowledge that the data discussed in the DEIS is based only on an April-September 2003 period, we believe that with appropriate management, i.e., control of human disturbance and predation – and maintenance of habitat conditions, PIPL will utilize available habitats in the “permit area” on a year-round basis. The fact that breeding PIPL are not currently known from this area could be based at least in part on inadequate management of predation and human disturbance as well as the very low number of breeding birds in the Southern Recovery Unit.

Response #12: Refer to Response #3.

Center, Comment #13: Scientific studies back up our concerns about the necessity of appropriate management of PIPL habitats. Regarding the adverse effects of predation, the FWS states:

Predation has been identified as a major factor limiting piping plover reproductive success at many Atlantic Coast sites (Burger 1987a, MacIvor 1990, Patterson et al. 1991, Cross 1991, Elias-Gerkin 1994). As with other limiting factors, the nature and severity is highly site specific. Predators of piping plover eggs and chicks include red foxes, striped skunks, raccoons, Norway rats, opossums, crows, ravens, gulls, common grackles, American kestrels, domestic and feral dogs and cats, and ghost crabs.

Substantial evidence exists that human activities are affecting types, numbers, and activity patterns of predators, thereby exacerbating natural predation. Non-native species such as feral cats and Norway rats are considered significant predators on some sites (Golden et al 1990, Post 1991, see also Appendix C)... Humans have also indirectly influenced predator populations; for instance, human activities have abetted

the expansions in the populations and/or range of other species such as gulls (Erwin 1979, Drury 1973) and opossum (Gardner 1982). The availability of trash at summer beach homes increases local populations of skunks and raccoons (Raithel 1984). Strauss (1990) found that the density of fox tracks on a beach area was higher during periods of more intensive human use.

Response #13: Noted. The Waterbird Management Plan has been developed with the intent of minimizing the impacts of humans and dogs on the bird habitat. Refer to Response #3.

Center, Comment #14: With the Town of Emerald Isle so close to the inlet area, we are concerned that without adequate measures to address feral cats and other predators, even if suitable open sand nesting habitats are created by the proposal, the area could act as a sink, due to predation causing unsuccessful nesting attempts for PIPL and other shorebirds or waterbirds.

Response #14: The Town of Emerald Isle currently has a leash law ordinance in place that includes dogs. The Town recognizes the concern for the impacts of predators, such as cats and is investigating a modification to the law to include them.

Center, Comment #15: Management of human disturbance also will play a significant role in determining the effects of the proposal; the proposal will increase recreational levels to certain existing areas as well as newly created habitats on the east side of the inlet. The FWS notes:

Non-motorized recreational activities can be a source of both direct mortality and harassment of piping plovers. Pedestrians on beaches may crush eggs (Burger 1987b, Hill 1988, Shaffer and Laporte 1992, Cape Cod National Seashore 1993, Collazo et al. 1994). Unleashed dogs may chase plovers (McConnaughey et al. 1990), destroy nests (Hoopes et al. 1992), and kill chicks (Cairns and McLaren 1980; Z. Boyagian, Massachusetts Audubon Society, pers. comm. 1994).

Concentrations of pedestrians may deter piping plovers from using otherwise suitable habitat. Ninety-five percent of Massachusetts plovers (n=209) observed by Hoopes (1993) were found in areas that contained less than one person per 8100 m[squared] of beach...

Pedestrians may flush incubating plovers from nests..., exposing eggs to avian predators or excessive temperatures. Repeated exposure of shorebird eggs on hot days may cause overheating, killing the embryos (Bergstrom 1991).... Pedestrians can also displace unfledged chicks (Strauss 1990, Burger 1991, Hoopes et al. 1992, Loegering 1992, Goldin 1993b), forcing them out of preferred habitats, decreasing available foraging time, and causing expenditure of energy.

Response #15: Refer to Response #3.

Center, Comment #16: These issues are not only relevant to determining the effects of the proposal, but also determining whether the proposal will comply with existing federal laws – specifically, the ESA’s statutory and regulatory provisions prohibiting take, harm, and harassment.

Response #16: Noted.

Center, Comment #17: There also are significant concerns about the adverse effects of motorized vehicle use; the FWS notes “[u]nrestricted use of motorized vehicles on beaches is a serious threat to piping plovers and their habitats” (FWS 1996: 40). Vehicles can crush eggs, crush chicks, and also “significantly degrade” piping plover habitat; vehicles “may harm or harass plovers by crushing wrack into the sand and making it unavailable as cover or a foraging substrate (Hoopes et al 1992, Goldin 1993b)...” (FWS 1996: 41). Issues are not limited to breeding birds; in his four year study of piping plover wintering use of barrier islands and bay areas in Texas, Zonick (2000: 155) noted:

"Piping Plovers primarily used beaches during periods when bayshore flats were flooded. The availability of high quality beach habitat to plovers during these periods may be critical to their survival. Human disturbance at beach habitat was identified by stepwise regression as the most important factor affecting the abundance of Piping Plovers at my sites. By itself, beach vehicle density explained 33% of the variability in Piping Plover abundance among my study sites."

Response #17: The Town recognizes these concerns and has addressed these issues in the Waterbird Management Plan. Refer to Response #3.

Center, Comment #18: In summary, management of these areas will play an important role in determining the effects of the proposal on PIPL and other shorebirds and waterbirds. Unfortunately, the DEIS does not adequately address these issues.

Response #18: Noted.

Center, Comment #19: Regarding the critical habitat unit, not only does this area have sand and mud flats, it also has sandy beach areas that, with appropriate management, would serve as roosting (resting) habitats.

Response #19: The Environmental Impact Statement was developed to address the needs of both the environment and the people. The beach communities within the designated Critical Habitat for Wintering Piping Plover are utilized by birds, as well as the boaters and beach goers. The Waterbird Management Plan was developed in recognition of this dual usage and attempts to protect the interests of both.

Center, Comment #20: We also note that the critical habitat designation is not static; as acknowledged in the rule, the designated area is specifically designed to shift in response to factors including erosion, accretion, and vegetative succession. Thus, while the initial designation may have been 356 acres, the existing amount could – and likely is – somewhat different.

Response #20: Noted. The U.S. Fish and Wildlife service has recognized the need to protect the primary constituent elements of the critical habitat for wintering piping plovers by designating geographic areas with a defined landward boundaries extending to the mean lower low water (MLLW) line. The designated area within Bogue Inlet is listed as Unit NC-10 (354 acres) in the Federal Register, Volume 66, No. 132, July 10, 2001. This unit includes "contiguous land south, west, and north of Bogue Court to MLLW line of Bogue Inlet on the western end of Bogue Banks. It includes the sandy shoals north and adjacent o Bogue Banks and the land on Atlantic Ocean side to MLLW. This unit also extends 1.3 km (0.8mi) west from MLLW of Bogue Inlet on the eastern portion of Bear Island." (USFWS, 2001)

The Town of Emerald Isle recognizes the non-static state of the critical habitat and has included annual adjustments in the bird management area. Refer to Response #3.

Center, Comment #21: 4.7.1 (47-48). "The intertidal shoals and sand flats provide protected and isolated habitat for roosting, as well as foraging." It is not clear what "protected" means in the context of this sentence. Our understanding is that intertidal feeding areas are not currently closed to access, so human disturbance of feeding shorebirds could occur, resulting in reduced feeding levels, avoidance or flight to less optimal habitats, and energy expenditure. In addition, with over 600 observations of PIPL at Cape Hatteras National Seashore and Pea Island National Wildlife Refuge in 2003, we have rarely observed PIPL roosting in intertidal areas; we suggest that they prefer drier, higher areas for roosting, with intertidal areas preferred for feeding. This sentence should be clarified.

Response #21: Noted. The use of the word "protected" in Section 4.7.1 was intended to mean sheltered from wind, waves, etc. This word has been changed to "sheltered".

Center, Comment #22: 5.3.2 (6-7) "The new circulation pattern would isolate the north end of the existing Bogue Banks sand spit which could result in this feature becoming an over-wash terrace rather than a dry beach area"; "Erosion of the east end of Bear Island will result in the loss of beach and dune habitat"; "erosion of Emerald Isle inlet shoreline is expected to continue and thus, the loss of beach and dune plants and their habitats may result. Erosion on the east end of Bear Island is also likely to continue. The loss of beach and dune plants and their habitat on the west end of Emerald Island and the east end of Bear Island could lead to negative cumulative impacts." These, and other statements in the DEIS, are biased, rather than objective: potential "adverse"

impacts are noted, but potential “positive” impacts that are the result of having a dynamic inlet system are not acknowledged.

Response #22: Section 5.3.2 presents the impacts of the without project conditions on beach and dune communities. The description of the possible changes for the without project conditions are consistent with changes that have occurred over the last 15 years.

Center, Comment #23: The FEIS should more clearly separate the discussion of impacts to people, and impacts to natural values, and acknowledge positive ecological impacts that are associated with inlet formation, movement, and closure. Dynamic inlet conditions may be inconsistent with people who voluntarily assumed the risk of building their structures or roads in locations that clearly are too close to the inlet. However, when describing biological impacts, the DEIS should be more neutral in content and tone, and specifically acknowledge potential positive impacts. Creation of overwash fans could benefit piping plovers by creating a preferred feeding habitat area, and “lost” dune habitat could be replaced with high value intertidal flats, which could be used by multiple shorebird species as a feeding area.

Response #23: The FEIS will treat natural changes in the existing inlet as not having any adverse impacts on the species.

Center, Comment #24: 5.3.2 (10) The prediction for what will happen in the future under alternative F should acknowledge any uncertainty associated with this prediction, and the role that strong storms, tropical or extra-tropical, could play in modifying these predictions.

Response #24: The impact of waves and currents from storms and hurricanes can have a major impact on inlets and drastically influence the movement of sediments in the nearshore zone. The angle and direction of impact, wind speed, tidal cycles, and time of year are just a few of the primary variables involved in predicting the level of impact from a storm or hurricane. An assessment of these predictions and the potential effects of these forces on Alternative F were not included in the Final EIS due to the high level of uncertainty associated with the outcome of these forces.

Center, Comment #25: “The accretion of the Bear Island shoreline, which could take 10 years, should result in the development of a much wider dune field along this section of the Bear Island shoreline.” In the event there is accretion as suggested in the DEIS, what will be the effect on intertidal shorebird feeding areas east of Bear Island?

Response #25: Response: While the projected accretion on the east end of Bear Island could result in the creation of additional upland habitat such as enlarged dune fields, the foreshore area, i.e., the area located seaward of the vegetation line, would continue to maintain characteristics consistent with the existing beach system including a comparable intertidal area.

Center, Comment #26: 5.3.2 (10-11) “The beach and dune system along the inlet shoreline will continue to develop over a period of at least 15 years or as long as the new channel remains in a position well west of its present location.” In the event the “dune system” continues to “develop,” what changes will occur in vegetation levels? Even assuming appropriate management of human disturbance and predation, will this area be stabilized to such an extent that vegetative succession will not allow this area to be used in the future as shorebird habitat? Dynamic geological processes maintain such habitat, but particularly in light of the rumors that some would like to permanently maintain the channel in the proposed location, the DEIS does not adequately address how “stabilizing” the inlet channel potentially will increase these impacts.

Response #26: The project being proposed by the Town of Emerald Isle is a one-time project; therefore, there are no long-term commitments on the part of the Town of Emerald Isle to maintain the channel in a fixed location. Once the channel is repositioned, the Corps of Engineers would resume maintenance of the authorized navigation channel which measures 8 feet deep at mean low water by 150 feet wide. The Corps of Engineers maintenance activity is limited to the naturally deepwater channel that exists at the time maintenance dredging is performed, i.e., the Corps does not maintain the channel in a fixed location. In this regard, during the period from the mid 1980’s to the present, when the channel was migrating rapidly to the east, the Corps of Engineers was continually performing maintenance dredging in the channel. Future attempts to maintain the Bogue Inlet channel in a fixed location could be a part of a sand management plan that would be developed by the Corps of Engineers as it evaluates various options for the long-term storm damage reduction project for all of Bogue Banks. If the Corps of Engineers proceeds along this line, the environmental consequences of maintaining the channel in a fixed location would have to be evaluated by the Corps in its NEPA document for the Bogue Banks project.

Center, Comment #27: The scope of the cumulative effects discussion in this section should be expanded; the limited discussion in this single paragraph does not accurately address the cumulative effects.

Response #27: Noted.

Center, Comment #28: 5.3.2 (11) “Alternative F would eventually result in the complete restoration of the 700 feet of inlet shoreline presently protected by the sandbag revetment and dune habitat....” We strongly object to the use of “protect” to describe the effect of sandbags on the “inlet shoreline.” The sandbags were placed to “protect” houses and roads by attempting to lock in place the eastern side of the inlet; not surprisingly, the sandbags have provided only limited protection. As the channel continues to migrate east, the beach area just west of the town has continued to erode, and has not been replaced by “new” beach. Thus, sandbags have, at best, degraded that shoreline.

Response #28: Noted. Semantics aside, the sandbags were installed to protect homes and infrastructure in the Pointe subdivision.

Center, Comment #29: We also strongly question the use of the term “restoration” to describe the result of the proposed project; the natural functions and values of this inlet will not necessarily be “restored.” In addition, if the inlet continued to migrate east, as the DEIS predicts it will, houses will be lost to erosion, but the inlet would still exist.

Response #29: The use of the word “restoration” was in reference to the position of the inlet shoreline and is appropriate.

Center, Comment #30: More importantly, the DEIS does not acknowledge the beach habitats that could be created or maintained by that migration. Existing shoreline areas on the east of the inlet would move eastward – up to 600 feet of the existing inlet, according to the DEIS (5.3.2 (6)) – but still would exist in some location, and other areas would be water or intertidal areas. When the channel movement shifts and migrates west again, new areas of beach spit would be created, along with intertidal areas; these areas would provide the functions and values that currently do not exist due to these areas being occupied by houses and roads that were constructed in what historically was a dynamic coastal area covered with large overwash fans (e.g., Cleary and Marden (1999)) (showing 1938, 1959 and 1962 photographs).

Response #30: The EIS does not dispute the continued existence of the inlet in some location in the absence of the project. However, the stated goals and objectives of the project are to protect the town and county tax bases and infrastructure of the Pointe subdivision. Allowing the channel to continue to migrate to the east would not achieve any of the project goals or objectives.

Center, Comment #31: Due to the decision to stop the eastward migration of this inlet, using the Corps’ own numbers, up to 200 yards of new beach habitat will not be created, with all the adverse impacts that such a loss entails. The applicant has decided, henceforth, that the eastward migration of the inlet will be restricted to a certain spot; they are certainly free to request authorization to attempt to stop that movement. However, NEPA requires that the impacts of such a monumental request be fully and accurately disclosed.

Response #31: Refer to Response #26.

Center, Comment #32: 5.4.3.1 (24). “Alternatives A and B and to some extent Alternative C will result in the continued erosion of Emerald Isle inlet shoreline which could result in the loss of Critical Habitat for Wintering Piping Plovers.” Not addressed by this statement is the distinct possibility that as the channel migrates east, roosting and feeding habitats could be created on the west side of the inlet.

Response #32: Noted.

Center, Comment #33: In addition, the statement does not acknowledge that as the inlet migrates east, sands entering the inlet from the east side could create new intertidal areas on the east side of the inlet. Also not mentioned is how existing habitats, if not maintained by movement, overwash, or other dynamic coastal forces, could be lost to vegetative succession. Once again, the DEIS mentions possible negative impacts, while not including possible positive effects.

Response #33: Noted.

Center, Comment #34: 5.4.3.1 (26). "Inclusion of 3,000 feet of this affected shoreline in the Phase 3 beach nourishment project and the continued disposal of connecting channel maintenance material on the extreme west end of Emerald Isle should partially offset these erosive impacts." This statement assumes that artificially created habitats will not be lost to vegetative succession; our experience with multiple sites is that vegetative succession will cause the loss of PIPL habitat unless dynamic conditions that maintain the habitat are allowed to continue.

Response #34: The area in question has been undergoing natural accretion and associated dune development for the last 15 years as a result of the eastward migration of the inlet channel and ebb tide delta. The movement of the channel to a central location is predicted to cause some loss in the recently created dune fields. The continued disposal of navigation maintenance material on the extreme west end of Emerald Isle would only serve to lessen, not eliminate the loss the dunes.

Center, Comment #35: The DEIS also fails to acknowledge the critical role that disturbance plays in adversely modifying PIPL (and other shorebird/waterbird) behaviors. Without adequate management measures and strict enforcement of those measures, the artificially created habitats will be underutilized or not utilized by PIPL.

Response #35: Refer to Response #3. The management measures included in this plan are intended to provide the level of protection necessary to protect and monitor the PIPL and determine the effects of their relocated habitat.

Center, Comment #36: 5.4.3.1 (27) "Therefore, cumulative impacts resulting from this alternative are anticipated to be positive." One of the most serious deficiencies in chapter 5 of the DEIS is the discussion of cumulative effects. The discussion is not even consistent with the Council on Environmental Quality's definition – which is binding on the Corps – of "cumulative impact," which is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 C.F.R. § 1508.7). The DEIS does not contain sufficient data and analysis to properly conclude that the cumulative impacts will be positive; indeed, a stronger argument can be made that the cumulative effects will be negative.

Response #36: The Cumulative Effects Analysis presented in Appendix F of the Final EIS discusses in detail the environmental resources found within the vicinity of Bogue Inlet; the effects of past, present and reasonably foreseeable actions on these resources; and makes a determination on the type of effects each of these actions has or will have on the resource. This document was prepared in accordance with the Council on Environmental Quality's regulations (40 CFR §§1500 - 1508).

Center, Comment #37: 5.4.3.2 (29-30). "However, after the construction of the sand dike and the existing channel is filled, isolated inlet piping plover habitats will be more accessible and thus, be more susceptible to increases in predator and human effects. Cumulative impacts resulting from this alternative are still anticipated to be positive." This statement is one of the few in the DEIS that acknowledges the role of predation and disturbance, yet, the Corps goes on to conclude that cumulative impacts will be "positive." Apart from the problems with the cumulative effects analysis, assuming this statement is meant to address direct and indirect effects, sufficient data and analysis are not presented in the DEIS to substantiate the "positive" effects conclusion. As noted above, predation could cause significant impacts to breeding shorebirds/waterbirds, and human disturbance could eliminate or significantly reduce the use of these habitats. Until a detailed management plan is discussed in the EIS, the Corps will not sufficiently describe the effects of the proposal as required by NEPA.

Response #37: Noted. Refer to Response #3.

Center, Comment #38: 5.4.4 (34) "sand flats may eventually accrete to a point where they become emergent and transition to a supratidal resource with beach and dune characteristics that allow for the establishment of seabeach amaranth." We agree that in the short term, the project may allow for an increase in seabeach amaranth numbers. The question we have is whether this area will become stabilized and then heavily vegetated in a manner that prevents the long term use of the area by this species.

Response #38: Natural succession on the spit could initially support seabeach amaranth but over time, as is the case along most developing coast, the seabeach amaranth could be replaced by natural dune grasses.

Center, Comment #39: 5.12 (76-77). The recognition by the Corps of the more limited recreational access due to the sandbags/erosion on the east side of the inlet, and the acknowledgement that the proposed action will increase access to the inlet area ("provide greater recreational opportunities than presently exists which should also enhance future visitations and repeat visitors"), clearly places on the Corps a legal obligation under NEPA to address the adverse effects of that access on shorebirds and waterbirds (40 C.F.R. § 1508.8)("Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects

on air and water and other natural systems, including ecosystems.”). With this admission, the Corps cannot avoid this issue; increases in public use are foreseeable, and thus, the adverse environmental effects of that use must be fully acknowledged.

Response #39: Noted. The USACE recognizes the potential for an increase usage on the spit under Alternative F and has addressed this by limiting portions of the accreted spit to pedestrians and vehicle usage. These issues have been addressed in the Waterbird Management Plan.

Center, Comment #40: 5.25.2 (109). While we have not reviewed the referenced informal consultation, the Center objects in the strongest possible terms to the conclusion that the proposal “is not likely to adversely affect any listed species.” Given the low level for triggering formal consultation, the DEIS does not contain sufficient data and analysis to support that conclusion. Indeed, from the lack of detailed discussion of any management plan to prevent adverse effects from human disturbance, the admission of increased recreational access, apparent lack of predator control to prevent loss of chicks, likely loss of existing intertidal feeding and roosting habitats, and potential concerns about vegetative succession in newly created but stabilized habitat, the best available scientific and commercial information indicates that the proposal will adversely affect the PIPL. We also note that formal consultation is necessary to address whether the proposal will adversely modify or destroy critical habitat.

Response #40: The Draft EIS states that 'informal consultation' between the USFWS and the USACE has been ongoing since December 2002. The 'informal consultation' process involves strict review of the Biological Assessment developed for the Bogue Inlet Channel Erosion Response Project. This process does not eliminate any review of the project in terms of its effect on critical habitat.

Center, Comment #41: 5.2.6 (113-114). This section does not address the adverse effects noted in this letter.

Response #41: Disagree. Section 5.26 discusses the negative and positive impacts associated with the applicant’s preferred alternative.

Center, Comment #42: 5.27.2 (115). “Continuation of the erosion would result in the irretrievable loss of beach and upland resources on the west end of Emerald Isle.” Actually, while it may result in the loss of houses, it would not necessarily result in the “irretrievable” loss of beach. Rather, it could result in the increase in beach area, returning the area to the condition as seen in the 1930s.

Response #42: Noted. However, one of the primary objectives of the proposed project is to prevent the loss of homes and infrastructure.

Center, Comment #43: 5.28 (115). We strongly disagree with the conclusion that there are “no known conflicts or controversy,” for the reasons set forth in this letter.

Response #43: Section 2.0 of the Final EIS discusses the process and involvement of the public, State and Federal agencies and the comments, issues and concerns elicited by them during the development of the project. A Project Delivery Team (PDT) was assembled that included representatives from the public, State and Federal agencies that held a series of meetings with a main objective of bringing forth unknown project related concerns. Issues and concerns raised during PDT meetings and public scoping meetings were discussed and addressed during this process (see Section 2.0 and Appendix A).

Center, Comment #44: 5.30.2 (118). The discussion of the “Bird Management Plan” is inadequate and does not comply with NEPA, due to the lack of discussion at a sufficient level of detail to ensure the environmental consequences of the proposal have been fairly evaluated. We do not know the critical points of the plan, and therefore whether, on paper, it will be sufficient to address critical issues such as predator control (feral and non-feral cats, dogs, raccoons) and control of human disturbance. We do not know whether there will be adequate funding for the plan, either in the short or long term, and thus, whether the plan will be implemented. For example, breeding and feeding areas will have to be posted with symbolic fencing. Not only will there be an expense for posting these areas, but these areas can shift over time due to vegetative succession, and posts can be lost to weather or vandalism. We do not know if the plan will be legally enforceable by the town or by third parties. Once the town gets its permits, the political winds could shift, and a decision could be made that feeding and resting areas will not be protected, or predator control will not be funded (as we have recently seen in another municipality). What happens then? Will there be a person on site to enforce the closure areas, and provide public education?

Response #44: Refer to Response #3.

Center, Comment #45: Also not addressed by this paragraph is the concern of certain state officials about the plan; this point alone is important. Even though the Supremacy Clause of the United States Constitution would prevent the state from requiring actions that conflict with federal law, in this case, the relevant legal provisions being sections 9 and 10 of the ESA, the failure to reach consensus on this issue, at this point in the process, raises significant concerns.

Response #45: Concerns of Federal and State agencies have been included in the formulation of this project through the public scoping meeting, PDT meeting, and the public hearing. In addition, state agencies have provided comments on the preliminary draft of the EIS and the Draft EIS and those concerns have been addressed in the final plan.

Center, Comment #46: Also not addressed is critical ownership issues; the statement that the Town “may pursue ownership of any new land that forms west of the existing property lines on the west end of Emerald Isle” raises more issue than it answers. Who is/are considered the current owner/s, and who is/are the owner/s if accretion occurs?

What happens if an owner says that he/she will not sell? Why should the Town – as opposed to the State or a recognized environmental group with land management experience – be the owner? Not only are these issues relevant to an evaluation of the environmental impacts, it also is relevant to the discussion of recreational and economic issues. A failure to address these issues in the FEIS would violate NEPA.

Response #46: The Town has obtained informal commitments from the affected property owners at the Pointe to provide a fee simple transfer of lands that accrete west of their historic property lines. The formal agreement is still being drawn but is expected to be completed prior to the issuance of State and Federal permits. The Town has also begun negotiations with the property owners of the spit to obtain similar commitments. Finally, the Town has made a formal request to the Honorable Jean R. Preston, NC House of Representatives, to introduce legislation allowing the Town of Emerald Isle to extend its boundaries to include the upland areas of the spit.

Center, Comment #47: 5.30.4 (127). “The method of mitigating erosion on Bear Island would be determined based on consultation with the NC Division of Parks and Recreation.” We object to the DEIS not including a detailed discussion of the specific mitigation method; such information is critical to understanding the effects of the proposal and required by NEPA.

Response: The type of mitigative response should the project negatively impact the shoreline on Hammocks Beach State Park would be determined following detailed discussion with representatives of the NC Division of Parks and Recreation, the Corps of Engineering, and the NC Division of Coastal Management.

Center, Comment #48: Cumulative Effects Assessment (“CEA”) This information should be incorporated into the text of the FEIS, rather than being a separate chapter, and inconsistencies between the two documents should be corrected.

Response #48: Disagree. The CEA is an appendix to the Draft EIS and is providing supporting information to the document.

Center, Comment #49: CEA 4.2.1.1 (5) “Burger (1994) states that piping plovers will move to areas not utilized by humans to forage, and he found that dune areas, where human access is restricted, contain higher numbers of foraging piping plovers compared to surrounding ocean and bay areas that are frequented by people.” Joanna Burger is a female, not a male. More importantly, the statement is partially misleading and misses the central point of the article. Burger (1994: 701) notes:

These results suggest that piping plovers that have a diversity of habitats [beach, dune, and backbay] available nearby can more easily cope with space competition from people and those nesting in places with only one or two of these habitats. Much of the beach-dune complex in coastal New Jersey is narrow with eroded dunes. Plovers

nesting in such areas have fewer habitats available to avoid competition with people. This could lead to lowered reproductive success, lower population levels, or abandonments. Eventually, these narrow beaches may no longer have breeding populations of piping plovers. Indeed, in New Jersey, almost half of the successful piping plover pairs nest at Holgate, Brigantine, and Corson's inlet, which are all sites that have complex habitats. These complex habitats may allow the plovers to exist with the presence of people, whereas they have been extirpated from many of the narrow beaches.

Response #49: Noted. The additional point supporting the diversity of habitats has been added to the CEA document.

Center, Comment #50: CEA 4.2.1.1 (6) "Shorebirds, such as the piping plover, are adaptable and accustomed to the changing nature of intertidal habitats, and will find suitable habitat if the sand flats in Bogue Inlet change." That will depend not only on the geology of those habitats and whether vegetation is at a sufficiently low level but also the management of those habitats; it can look like excellent habitat with high invertebrate levels, but if there are dozens of dogs running around off-leash all the time, it will not be used by PIPL.

Response #50: The Town of Emerald Isle currently has a leash law ordinance. Details of this ordinance are included in the Waterbird Management Plan. Refer to Response #3.

Center, Comment #51: CEA 4.2.1.1 (6). The project "will not result in long-term habitat loss." We disagree, for the reasons previously listed.

Response #51: Noted.

Center, Comment #52: "After the construction is finished, especially in the summer months when the inlet is heavily populated with active beach goers in boats and on foot, shorebirds must deal with the additional stress created by human activity in these normally secluded habitats." "Must deal"? How arrogant, and, depending on the level of disturbance, inaccurate. At a certain level, there will be tolerance of disturbance, with the potential adverse effects noted above, but after a certain level of disturbance is reached, the birds will abandon the area – not "deal" with it.

Response #52: Agree. The use of the phrase "must deal with..." will be deleted and replaced with "shorebirds would be negatively impacted by the additional stress..."

Center, Comment #53: CEA 7.3 (13-14). There are multiple incorrect statements in the discussion of maintenance dredging at Oregon Inlet; the Center suggests that the person preparing the CEA contact the Corps for correct information.

Response #53: A completely revised CEA will be included in the FEIS with corrections made regarding maintenance dredging in Oregon Inlet.

Center, Comment #54: CEA 7.5.2 (18). This statement does not accurately indicate the project area for the Dare Beaches (Bodie Island portion) project.

Response #54: The limits of the Dare County Beaches project have been corrected in the revised CEA.

Center, Comment #55: CEA 7.9.3 (25). While there has been accretion in the area immediately below the terminal groin, there has been disagreement regarding the effects of the terminal groin on areas to the south.

Response #55: The results of the monitoring studies conducted by NC State University for the NC Department of Transportation have not shown any negative groin related impacts on the shoreline south of Oregon Inlet to the Village of Rodanthe.

Center, Comment #56: CEA 7.10 and 7.10.2 (25-26). The paragraph on page 25 that begins with the statement “The NC 12 Dune Maintenance Project on Hatteras Island (December 2001) provided 56 miles of continuous dune habitat that is used by birds and seabeach amaranth” contains numerous errors. The first sentence and the remainder of the paragraph reflect such a fundamental misunderstanding of barrier island habitats in general and the conditions on Hatteras Island in particular that they throw into serious doubt the accuracy of the remainder of the CEA. The maintenance of the existing storm berm – it is not a natural dune – destroys shorebird habitat; indeed, the FWS specifically cites this berm in the Revised Recovery Plan for the Atlantic Coast Population of the Piping Plover (1996: 35) as an example of how stabilization *destroys* PIPL habitat. As to Seabeach Amaranth, there are only two, relatively small areas where small populations of seabeach amaranth are found on Hatteras Island (“the point” and Hatteras Inlet spit), and both locations are not on or near the berm. This berm does not provide “habitat for the growth of seabeach amaranth.”

Response #56: Noted. This project has been moved to Section 7.11 Other Actions and no longer includes reference to providing habitat for piping plovers.

Center, Comment #57: 7.11.1 While we do not question the statements regarding the effects of hurricanes, the list is incomplete, for it fails to include the positive ecological benefits that can occur from storms: the creation and maintenance of shorebird and waterbird habitats due to the removal of densely vegetated areas leaving open sand areas to nest and roost, creation of inlets, and creation of overwash fans.

Response #57: Noted.

Center, Comment #58: We strongly question the accuracy of the Resource Effect Assessment table, for the reasons outlined above.

Response #58: Noted. The CEA provides a description of the development of the Resource Effects Assessment Table and supplies reasoning as to how and why decisions were made in assigning a particular effect to each resource. Refer to Section 7.0, CEA Step 4.

Center, Comment #59: 8.1.1. This paragraph has many assumptions, some of which are valid. Others are not supported by data and analysis (e.g., shorebirds “are apparently accustomed to the presence of people in these areas.” – data suggest otherwise).

Response #59: Noted.

Center, Comment #60: 9.1.1 (40) “No long-term habitat loss or disturbance to critical habitat is expected to occur” and associated sentences. Strongly disagree, for reasons noted above.

Response #60: Noted.

Center, Comment #61: 9.1.1 (40). “Significant similar habitat is available on a local and statewide basis.” We disagree; the Corps should provide documentation for this claim.

Response #61: Agree. This sentence has been deleted. However, Bogue Inlet is not the only available habitat that provides and supports the primary constituent elements for Critical Habitat for Wintering Piping Plover in the state of North Carolina. There are eighteen unit areas in North Carolina that have been recognized by the USFWS as supporting these primary constituent elements (50 CFR, Part 17, §17.95). These habitat types include other inlets, shoals, islands, and beaches located along the east coast of North Carolina providing similar habitat for these and other shorebirds.

Center, Comment #62: 13.0 (49) These mitigation items need to be discussed in the FEIS in detail, with specific attention to what will – not “may” – be done. The issues discussed above should be addressed.

Response#62: The mitigation and management plans are currently being coordinated with both the State and Federal agencies. The Waterbird Management Plan developed for the project will be circulated through the Public Notice process when available.

Center, Comment #63: In summary, while we have heard through informal communications from various parties who are closely involved with the permitting process that action X or action Y will be done as part of the inlet channel relocation project, such statements are either not contained in the DEIS or not contained in sufficient detail in the DEIS to allow a reasonable evaluation, nor are the environmental consequences disclosed if the hypothetical actions are not implemented. As a result,

based on the information in the DEIS, we do not believe the project complies with NEPA or the ESA. Based on the lack of information regarding the effects of this project, the project should not be given authorization to proceed until these issues are fully addressed and resolved. We urge the Corps to issue a revised DEIS for public comment, and to formally consult with FWS regarding the effects of the proposal on the piping plover.

Response #63: Noted.

Submitted by: John Fussell, Local Biologist, February 23, 2004

Fussell, Comments #1: I realize that the deadline for commenting on the Bogue Inlet Relocation DEIS is past. However, I have spent many days studying the DEIS closely, and I have been surprised to see that several environmental concerns that were brought up at various PDT meetings (or as part of written correspondence) have not been adequately addressed in the DEIS. I had assumed that these various points would have been addressed. It is my understanding that an EIS is supposed to be a document that discloses all the impacts that might be expected to result from a proposed action. This DEIS simply does not do this. If my comments are too late to be considered as part of the DEIS, then I ask that they be considered in compilation of the FEIS.

Response #1: Despite the fact that the public commenting period officially closed on December 26, 2004, the Town recognizes the need to address the concerns of the public and has provided responses to these concerns.

Fussell, Comments #2: I should state that my concerns relate primarily to various terrestrial species—piping plover, Wilson's plover, and other shorebirds; nesting colonial waterbirds, i.e. terns and black skimmers; seabeach amaranth and seabeach knotweed (*Polygonum glaucum*) (another declining species found in habitats similar to the seabeach amaranth), and other declining plant species found in similar habitats.

I am a biologist and a life-long resident of the coastal area. I have been observing birds and recording bird observations within the coastal area (Carteret County) since elementary school. About 1970, when I was in college, I began compiling various types of systematic surveys of shorebirds and other bird species in Carteret County. I have made surveys of shorebird use at the Rachel Carson Reserve (Bird Shoal, Beaufort Inlet) as far back as 1971. In the summer of 1971, I carried out censuses of nesting waterbirds (Wilson's plovers, terns, and black skimmers) at the Reserve.

I have considerable interest and experience with the piping plover in North Carolina, both in the breeding season and in migration/winter. From 1970 to 1989, during various surveys, I discovered piping plovers breeding at several sites in the state where they were not known to breed previously. In 1983 and 1986, I censused—all by foot—the breeding population of piping plovers within that portion of Cape Lookout National Seashore lying between Ocracoke Inlet and Cape Lookout. In 1989, I conducted, for the NCWRC, a piping plover breeding census of the state's entire coastline. I also regularly take part in the international piping plover census, usually covering the Rachel Carson Reserve, although I have covered other areas as well.

I also have considerable experience with wintering piping plovers and the habitat in which they are found. I have conducted winter censuses of piping plovers at the Rachel Carson Reserve during many of the years from 1971 until 2003. As part of the Audubon Christmas Bird Count census, I have counted shorebirds, including piping plovers, at Oregon Inlet, (the former) New Inlet south of Fort Fisher, and along all of Masonboro

Island, including the south shore of Masonboro Inlet and the north shore of Carolina Beach Inlet. I have done this for most of the years from 1972 (1985 in the case of Fort Fisher) through 2003. In 1989-1990, I conducted a winter census of the entire North Carolina coast, for the NCWRC.

During my 1989 census of the North Carolina piping plover population, I also conducted censuses of breeding Wilson's plovers along most of the state's barrier islands. This is probably the most thorough census of breeding Wilson's plovers on the state's barrier islands (but not including dredged-material islands of the estuaries). During the piping plover and Wilson's plover censuses, I also recorded observations of other breeding waterbirds—least terns, common terns, gull-billed terns, black skimmers—at most locations.

On many of my various bird censuses and surveys, I have also recorded observations and submitted records (to the N.C. Natural Heritage Program) of two rare/declining plant species associated with inlets and accreting shorelines, i.e. the seabeach amaranth and the seabeach knotweed.

Because of my decades-long experience with the piping plover in coastal North Carolina, I believe I have gained an excellent understanding of the species habitat needs, for both nesting and overwintering birds, at least in North Carolina. I have also gained a deep appreciation of the transitory nature of piping plover habitat. For example, a site not having any suitable habitat for breeding piping plovers one year, may be excellent habitat the next year, as a result of severe overwash associated with a hurricane. Or, an inlet that does not provide any suitable loafing/roosting sites for wintering plovers (or breeding habitat) may, one or two years later, provide excellent habitat, as the result of an extensive newly formed spit. On the other hand, such an extensive sand spit may completely disappear within a year, due to erosion. Or—and this is perhaps a more likely scenario in North Carolina, the excellent habitat provided by an extensive spit may be lost as a result of dune development on the spit.

Because of my long experience with the piping plover in North Carolina, I also have a perspective on how engineering projects may affect the quality of piping plover habitat, particularly how engineering projects may result in long-term effects that are quite different from their short-term effects. For instance, the placement of dredge-spoil material adjacent to an inlet may temporarily create excellent nesting habitat for piping plovers (and good loafing/roosting habitat for wintering plovers), as has been the case in the past at Lockwood Folly Inlet (east side) and Tubbs Inlet (west side). However, such extensive deposits of spoil material may then develop into extensive dune systems, which not only are unsuitable as habitat for piping plovers, but may impede future overwashes of the area, reducing the likelihood that suitable habitat will be re-created. Indeed, in some cases the development of dune systems may allow residential development in areas where it could not have occurred before.

Regarding piping plover habitat, the bottom line is that the more that natural processes (overwash, inlet migration) are allowed to occur, the better. Quite obviously, an inlet

that is locked in place, i.e. not allowed to migrate at all, is the worst thing that can happen to piping plovers. Similarly, inlet shorelines that are not allowed to migrate as far as they would naturally, or not allowed to migrate as rapidly as they would under natural conditions, may not provide suitable habitat for piping plovers, or may provide habitat that is only of marginal quality. Based on my decades-long experience with piping plovers along the North Carolina coast, it is my opinion that overall habitat quality for piping plovers along the North Carolina coast is declining. Of course, our coastline is undergoing constant change, and it is easy to find various sites where habitat is improving at any one time. However, the overall trend is clearly downward.

Although my comments above refer specifically to piping plovers, they are, for the most part, applicable to Wilson's plovers, other nesting shorebirds and colonial waterbirds, and overwintering shorebirds. I believe they are also somewhat applicable to seabeach amaranth and similar plant species.

Based on my experience with piping plovers and related species, I have the following concerns about the DEIS. It should be repeated that these concerns relate primarily to the piping plover and other shorebirds, and, to a lesser extent, to colonial waterbirds and the seabeach amaranth.

Response #2: Noted.

Fussell, Comment #3: 1) A “big picture” concern that I have with the DEIS is that it ignores the possibility of negative ecological impacts resulting from the fact that the project intends to prevent the inlet from migrating within a portion of its natural inlet migration zone.

Based on the DEIS, the proposed action is intended to prevent the inlet from migrating within roughly 5% to 7 1/2% of the total width of the inlet migration zone (inlet hazard AEC). Thus, within this 5% to 7 1/2% (600' to 900'), the inlet will not be allowed to create or re-create those types of habitats on which piping plovers, Wilson's plovers, and related species are dependent. (A rough analogy would be a Forest Service plan for the Croatan National Forest that proposes restricting fire from 5% to 7 1/2% of the area of which it once naturally occurred and claiming that this would have no effect on fire dependent species found in the Croatan.) Will the loss of this 600' to 900' of potential habitat be enough to cause significant harm to piping plovers and related species within this inlet system? We do not know—the DEIS does not even acknowledge that this loss might be a potential problem.

Response #3: The DEIS disclosed in Appendix B (Engineering Report) and in Section 5.27.2 that at some time in the future, the Bogue Inlet channel could naturally reposition to a more central location between Bogue Banks and Emerald Isle. Therefore there is some level of uncertainty as to whether or not the channel would naturally migrate further to the east and "create or re-create those types of habitats on which piping plovers, Wilson's plovers and related species are dependent". Also, due to the housing and infrastructure that

currently exists in the path of the easterly migrating channel, the habitat that could be created after erosion may not sufficiently provide the appropriate habitat for these birds.

Fussell, Comment #4: Worse, apparently the Town of Emerald Isle and Coastal Planning and Engineering are planning that the inlet migration be restricted from an even larger percentage of the inlet migration zone than the 600' to 900' figure cited above (based on the Proposed Monitoring/Mitigation Plan of 1 December 2003 (see Issue No. 13 below). How much additional loss will this involve? Will this additional loss be enough to cause significant harm to piping plovers and related species within this inlet system? Again, we do not know—in this case, the DEIS does not even acknowledge this issue.

Response #4: The construction of a sand dike, the anticipated formation of a sand spit, along with the beach nourishment activities are expected to mitigate for the loss of shorebird and waterbird habitat. Dredging of the new inlet channel will involve the loss of approximately 47.6 acres of shallow subtidal habitat in the ebb tide delta that will be dredged to subtidal habitat. Impacts to the shallow sub-tidal habitat of the ebb tide delta are anticipated to be offset by the addition of 127.5 acres of shallow subtidal and intertidal habitat that will reform over a period of 4 years. After analysis of historic inlet configurations, it is anticipated that approximately two acres of intertidal habitat, however, will become upland habitat at the Emerald Isle edge of the sand dike. Approximately 18 acres of shoreline will be lost along Emerald Isle and approximately 33 acres will be gained along Bear Island shoreline due to the new channel configuration in a position historically occupied by the inlet channel in the 1970's.

The combination of the above state activities are expected to provide a variety of usable habitats for the piping plover, Wilson's plover and other shorebirds and waterbirds. Burger (1994) states that "barrier beaches and coastal islands often have a variety of habitats that include tidal bays, marshes, dunes, and open beach. These areas are usually in close proximity, or are near enough for plovers to move among them. Burger goes on to say "...plovers are flexible in their habitat use..."

Fussell, Comment #5: 2) It is obvious that the writers of the DEIS have little understanding of the habitat requirements of birds and seabeach amaranth, especially as to how these habitat requirements are related to inlet migration and other natural barrier island processes. It is probably because of this lack of understanding that many of the predicted impacts from the various alternatives are of questionable validity.

In regard to these species, there are many statements in the DEIS that are questionable, or just simply wrong. A statement such as "Alternatives A and B and to some extent C will result in the continued erosion of Emerald Isle inlet shoreline which could result in the loss of Critical Habitat for Wintering Piping Plovers" (Environmental Consequences section) reflects a lack of understanding of piping plover habitat

requirements and the relationship of migrating inlet shorelines to the continued existence of plover habitat. Another example is “Alternative F could create suitable shallow water foraging habitat for piping plover” (Environmental Consequences section)—piping plovers do not feed in water. And, in Table 21, it is stated for “Other Waterbirds” that the no action alternative would result in “Negative cumulative impacts from the erosion of nesting, foraging, and roosting habitats on the Bogue Banks sand spit and Dudley Island”, even though most of these species considered to be “Other Waterbirds” do not nest or forage at either site. (Most of these are aquatic species that do not nest in the region.)

Response #5: Statements included in the EIS document reflect observations within the project area and include input from State and Federal agency personnel that have knowledge of the requirements of shorebirds and waterbirds. Section 4.7 of the EIS document describes "Other Waterbirds" that have been observed foraging on intertidal areas of Dudley Island and Bogue Banks, the beaches of Bogue Banks, and Bear Island and along the surf zones of Bear Island during the months of April, May, June, and September 2003.

Fussell, Comment #6: It is perhaps because of this lack of understanding of the various species' habitat requirements, especially as they relate to natural inlet migration processes, that the discussion of the expected impacts from the various alternatives tends to focus on various issues that are largely irrelevant—i.e. whether a particular shoal is likely to diminish or expand, whether the Bogue Banks shoreline well removed from the inlet vicinity is likely to accrete or erode, etc.—rather than focus on the various “big picture” issues (like Issue No. 1 above) that are truly important.

Response #6: The Town of Emerald Isle and its consultants (Coastal Planning & Engineering) have conducted extensive coordination with both the U.S. Fish and Wildlife Service and the North Carolina Wildlife Resource Commission to ensure that document accurately reflects the species found within the project area and their habitat requirements.

Fussell, Comment #7: 3) I question the accuracy of the evaluation that the proposed project (either alternative E or alternative F) will contribute to cumulative positive impacts on the piping plover.

First, the document would benefit from an improved discussion of the habitat requirements of the piping plover, especially as breeding/wintering birds in North Carolina, and to Bogue Inlet specifically. The discussion given is very superficial and generalized. For instance, if piping plovers were to breed at Bogue Inlet (and the lack of records is not strong evidence that they haven't), which areas provide the most likely nesting areas? In regard to wintering birds, are certain types of habitat (as for roosting) especially likely to be limiting? What are the major roosting/loafing areas for piping plovers in the project area, and would they vary according to conditions, such as weather, the height of the high tide, and human visitation pressures?

As noted in Issue No. 8 below, I think the baseline information gathered for this project, although certainly of some value, will nevertheless be of limited value given the transitory nature of inlet habitats.

Response #7: Appendix H provides the findings from the baseline monitoring efforts. These reports indicate the location of the surveyed area, the species observed, the habitat they are utilizing and their observed activity. The pre-construction bird monitoring report will provide project specific findings regarding piping plover habitat usage in the project area. Direct coordination between the USACE, USFWS, North Carolina Wildlife Resource Commission, the Town of Emerald Isle, and its consultants has been ongoing for the past year and a half to ensure that the EIS discloses all pertinent available information.

Fussell, Comment #8: Strictly, I believe that the cumulative impacts assessment given for piping plovers under the no action alternative, which is basically neutral—i.e. “not expected to have any cumulative negative impact on piping plover habitat”—is accurate (although the wording projects a bias). However, based on the standards used in evaluating alternatives E and F, i.e. that habitat created by engineering activity represents a positive cumulative impact, the no action alternative should also be rated as being a positive cumulative impact. Is it not true that habitat created by natural inlet processes is also valuable to the birds?

Response #8: Refer to Response #3.

Fussell, Comment #9: Most of the discussion given in the Environmental Consequences section is of little value in assessing the long-term impacts of this project on piping plovers. I think it is very likely that short term (up to few years after the project is completed) there is likely to be improved habitat for piping plovers in the project area. Indeed, given the large expanses of newly accreted, sparsely vegetated, flats that are likely to be present in the area post project, in combination with the increased protection of nesting areas resulting from the project commitments, I would not be surprised if piping plovers nested here. However, I am concerned about longer-term impacts of the project. Will this project ultimately lead to increased stability of the inlet shorelines such that overwash and accelerated plant succession lead to deterioration of plover habitat? I think this concern is particularly warranted given Issue No. 13 below.

Response #9: The EIS document on which the comments are provided was developed based on the Town of Emerald Isle's proposal for a single channel realignment project designed to address erosion along the western shoreline of Bogue Banks. Evaluation of future activities that have not yet been proposed to occur within the inlet complex is outside the scope of this analysis. It is unlikely that given the current prohibition on shoreline armoring in North Carolina, that "increased stability of the inlet shorelines" will be proposed or permitted by the State

Fussell, Comment #10: Further, will material from the Phase 3 deposition ultimately contribute to stability of the eastern Bogue Inlet shoreline, resulting in dune development and ultimate deterioration of plover habitat. Given that engineering projects have caused similar secondary impacts at numerous sites along the coast (see the Cumulative Impacts section), I think that these are the types of issues that need to be addressed in determining whether this project represents a positive or negative cumulative impact.

Response #10: Refer to Appendix F - Cumulative Effects Assessment which identifies the effects of similar projects on plover habitat.

Fussell, Comment #11: 4) For the same reasons given above, I question the validity of the determination that alternatives E and F represent a positive cumulative impact on the roseate tern.

I question the accuracy of considering the no action alternative to represent a negative cumulative impact on this species (Environmental Consequences, page 30).

In reality, none of the alternatives are likely to affect this species, which is very rare in the area, although perhaps individuals might rarely use the inlet's shoals or shorelines for resting.

It could be argued that the project might provide short-term benefits to the species. For a few years after the project is completed, the habitat for nesting colonial waterbirds will be improved, and thus the probability that a pair of roseate terns would nest here would also be higher, although still almost zero. However, even though habitat should be

improved over the short term, the DEIS does not address the various long term concerns stated under Issue No. 3 above. Thus, I do not see any justification for a positive cumulative impact rating for alternatives E and F.

Response #11: Refer to Response #4 and Response #9.

Fussell, Comment #12: 5) It is regrettable that the DEIS does not reflect a full understanding of the life history of the seabeach amaranth, especially the life history of the species as it relates to natural barrier island processes, such as inlet migration and overwash. Overwash flats at the accreting ends of barrier islands, adjacent to inlets, are known to be a major habitat for this species (Weakley, 1986), and have perhaps been the major habitat for this species during the sea level rise of recent centuries. Perhaps such areas are important as seedbanks for the species. Further, this species does occur, and is often common, along sections of receding barrier islands, i.e. where overwash is actively occurring, as evidenced by the situation within Cape Lookout National Seashore. It would seem very likely that seedbanking would occur in such overwash situations.

Response #12: A discussion of seabeach amaranth habitat and reportable findings as documented in the vicinity of Bogue Banks has been included in the EIS.

Fussell, Comment #13: As was the case with the piping plover, the DEIS contains numerous statements about the seabeach amaranth that are of questionable validity. Other statements are certainly inconsistent. For instance, on page 36 of the Cumulative Effects Assessment is stated: “The stability of the frontal dune communities is important for the survival of seabeach amaranth (*Amaranthus pumilus*).” However, on page 9 of the Cumulative Effects Assessment it is stated: “Randall (2002) found that the cyclical effects of hurricanes on seabeach amaranth to be positive by providing suitable habitat (blown-out dunes and overwash areas) for the plant.” Again, it should be pointed out that this species is often common along sections of Cape Lookout National Seashore where overwash is common and extensive and where stable frontal dune communities simply do not exist.

Response #13: Noted, refer to Response #12.

Fussell, Comment #15: The overriding philosophy of the DEIS seems to be that seabeach amaranth occurs along beaches and has been undergoing increases in population at sites following beach nourishment—and that is all we need to know to make decisions affecting the health of the species. However, it would seem desirable that, before we get into a situation in which seabeach amaranth occurs primarily in “artificial” habitats created by engineering activities, we consider the long-range implications of such. Questions that should be considered are: Where seabeach amaranth plants are showing up in large numbers following beach nourishment projects, such as during the recent Bogue Banks nourishment projects, where are the seeds coming from? Are areas like Cape Lookout National Seashore and un-stabilized inlet areas significant seed sources? *Could beach nourishment activities near inlets have indirect negative impacts on seabeach amaranth populations growing adjacent to inlets if they eventually contribute to the relative stability of inlet shorelines and extensive dune development (comparable to the secondary negative impacts on piping plover habitat by such projects)?* Are the seeds of seabeach amaranth growing on nourished beaches as likely to be transported to places where they will germinate as seeds from plants growing in other situations—accreting inlet shorelines for instance? If we evolve into a situation in which beach amaranth is virtually restricted to nourished beaches, and then beach nourishment is stopped because of funding or other reasons, is this not a concern?

Response #14: Refer to Response #12.

Fussell, Comment #15: Considering that overwash flats on the accreting ends of barrier islands are recognized as being a major habitat for the seabeach amaranth, and that such habitat is created by natural inlet migration processes, it seems bizarre that the no action alternative would be regarded as having a cumulatively negative impact on the species. The impact should be regarded at least as neutral, although, if one applies the same standards used in evaluating alternatives E and F, then the no action alternative should be regarded as being a positive cumulative impact for the species.

In regard to alternatives E and F, it is very likely that populations of seabeach amaranth will undergo increases in the vicinity of the inlet post project, because of the creation of large expanses of low (but above-tidal), sparsely vegetated flats. This population increase should be the case for up to five years or so. However, if the project (and the associated beach nourishment to the east) results in extensive dune development and disruption of overwash adjacent to the inlet, there are likely to be longer term negative impacts for populations of seabeach amaranth growing adjacent to the inlet. (Again, I think a valid concern is whether such inlet populations are of particular importance to the maintenance of a seedbank.)

Response #15: Monitoring of Bogue Banks and Bear Island may provide further insight into the long-term effects of nourishment activities on seabeach amaranth populations.

Fussell, Comment #16: In regard to the question of whether an engineering solution can be a good substitute for natural habitats, I think back to a particular forestry issue of the Croatan National Forest in the late 1960's/1970's. Conservationists were concerned that replacement of open longleaf pine savannas by rotations of dense loblolly pine plantations would be damaging to Venus flytraps and other rare/declining savanna plant species. Foresters pointed out that these savanna plant species were often abundant and individual plants robust after the initial clearcuts (that removed the native longleaf pine). They reasoned thus that such forestry was obviously beneficial to the savanna plants. (The foresters assumed that the savanna plants would be able to disperse from clearcut to clearcut, or remain viable from one clearcutting to the next (30 years or so.) Now, 30 years later, the verdict is in. The rotation plantation system did *not* maintain populations of the rare savanna plants. It was not an adequate replacement for the natural system.

I would also caution that an engineering replacement for a natural system might provide habitat for some species that occur in the natural system but not others. Another rare, declining species that occurs on accreting inlet shorelines is the seabeach knotweed (*Polygonum glaucum*). I do not recall seeing this species on a nourished beach.

Response #16: As noted previously, it is expected that there will be significant accretion along the shorelines adjacent to Bogue Inlet. This accretion should be beneficial to the seabeach knotweed cited above.

Fussell, Comment #17: 6) I question the accuracy of the evaluation that the proposed project (either alternative E or alternative F) will contribute to positive cumulative impacts on shorebirds.

The document would benefit from an improved discussion of the habitat requirements of shorebirds, especially as they relate to natural inlet processes, and especially in the case of nesting by Wilson's plover and American oystercatcher. This would help evaluate the accuracy of the predictions of the impacts of the various alternatives on shorebirds. The discussion about the baseline information about the Wilson's plover (Section 4, page 46) are ambiguous. Where does "along the beach of Bogue Banks refer to"? Does it refer to the inlet area? I would be surprised if this species nested along Bogue Banks ocean beaches.

Response #17: Refer to Section 6 of the Final EIS which contains the bird monitoring transect areas and the associated findings provided in Appendix H. Bogue Banks refers to Transect Area 1 in the dry beach zone.

Fussell, Comment #18: The "negative cumulative impacts" predicted for the no action alternative (see Table 21) are questionable. Why would the continuation of natural inlet processes, which provide habitat for shorebirds, be considered to have a negative impact on shorebird habitat?

Again, this project will probably create good habitat for nesting and roosting shorebirds for some number of years after the project is completed. I would predict that numbers of nesting Wilson's plovers and American oystercatchers will increase for a while after the project is completed (however, see Issue 14 below). However, in regard to the long term, the key question is whether the project (and related activities—see Issue 13 below) and the Phase 3 beach nourishment will combine to ultimately lead to the degradation of habitat for shorebirds. Unfortunately, information in the Environmental Consequences section and the Cumulative Effects Assessment is of little value in assessing the long-term impact of this project on shorebirds. Statements such as “The Bogue Inlet Relocation Project will not result in long-term habitat loss. The inlet is being returned to the natural historic location that shorebirds used in the mid-1970’s” do not address the potential for this project to cause long-term negative impacts.

Response #18: Noted. Erosion of a shoreline stabilized by housing and infrastructures is not expected to provide good habitat for shorebirds.

Fussell, Comment #19: 7) The evaluation of cumulative impact ratings for beach/dune and marsh communities among the various alternatives does not reflect an appreciation of the special types of habitats found in proximity to inlets.

The continued migration of Bogue Inlet (no action alternative) is considered to represent a negative cumulative impact on beach/dune communities and the proposed project (both alternative E and alternative F) are considered to represent a positive cumulative impact on these habitats. Is it not the case that the low, fragmented dune systems that one often finds adjacent to inlets represent a different type of habitat, with different environmental values, as compared to more extensive, stable dune systems often found along the main portion of a barrier island. And, is it not partly because of inlet migrations that such low, fragmented dune systems exist? Such a low, fragmented dune system provides habitat for certain plant species that are unlikely to be found along more stable dunes. The rare Ipswich subspecies of the savannah sparrow, a bird considered to occur primarily in “dune habitats”, is far more likely to occur in such fragmented dunes adjacent to inlets, than in better developed dune systems elsewhere, at least in North Carolina.

Response #19: The USACE, State of North Carolina and Project Delivery Team members discussed the various resources found within the project area, and determined that those presented in the EIS document represented the significant resources occurring within the zone of anticipated affect, both directly and cumulatively. Fragmented dune formations have not been specifically identified as an individual resource category, but have been included in the discussions as part of the inlet, beach, and dune resources presented throughout the EIS document.

Fussell, Comment #20: The continued migration of Bogue Inlet (no action alternative) is also considered to represent a negative cumulative impact on salt marsh communities and the proposed project (both alternative E and alternative F) are considered to

represent a positive cumulative impact on these habitats. To repeat, newly formed salt marshes adjacent to inlets may have different environmental values compared to older, more stable salt marshes. In Issue No. 8 below, I cite a discovery of numerous Wilson's plovers nesting on little hummocks created by new growths of saltmarsh cordgrass. And prime habitat for the (Ipswich) savannah sparrow, cited above, can be more fully described as low, fragmented dunes adjacent to sparse salt marsh vegetation.

Response #20: Noted.

Fussell, Comment #21: 8) The one-year of pre-project baseline data for birds will be of very limited value in evaluating the impacts of the proposed project.

The major reason that this is so because inlet habitats are changing constantly. Numbers of birds using inlet habitats may thus vary considerably from one year to the next. For instance, a sand spit that is not suitable nesting habitat one year may be very good habitat one year later. In 1989, during a survey for the NCWRC, I found a significantly high number of Wilson's plovers nesting on the spit at the western end of Emerald Isle. There were 10 territorial pairs of plovers and I observed six nests (although I was not searching for nests). A few years before, it is doubtful that any plovers were nesting here, based on aerial photography. The birds were nesting on a portion of the spit that had only recently formed; further, the birds were nesting on small hummocks of sand that were only a foot or so higher than the high tide level—these hummocks of sand had built up because of the presence of patches of saltmarsh cordgrass.

One year of data is thus a very brief sample for an environment that is constantly subject to change. Statistically, it is probably of no value whatsoever. Thus, there is a need to supplement this one year of monitoring data with whatever information can be acquired from the database and the literature. I will admit that finding such information may be difficult, and the amount of such information may be limited. However, considering the general inadequacy of the baseline data, I think such information should be acquired and added to the FEIS.

The fact that the baseline monitoring data will be inadequate to fully evaluate the effects of this project and the fact that additional information that might be found in the database and the literature is likely to be limited are further reasons that the FEIS should give more detailed life history information/habitat requirements for the various species of concern considered in the FEIS.

Response #21: Noted. With regards to the bird monitoring plan, this program was developed under direct consultation with the USFWS, NCWRC and all members of the Project Delivery Team during the scoping and project evaluation phase leading to development of the DEIS. The Project Delivery Team was supportive of the Town's commitment to a one-year pre-construction baseline monitoring program that collected data during the migratory, nesting, and wintering seasons of the birds. The program was developed to increase the

number of surveys to coincide with periods when more bird resources could be present. An extensive review of the available data for the project area has been conducted, and the results of that literature search is reflected in the FEIS. If additional scientifically verifiable and collected information is available from other researchers with specific knowledge of the area that would assist in evaluating project affects on birds and their habitat utilization, this additional information could provide additional opportunities on which to base projection on direct and cumulative project affects.

Fussell, Comment #22: 9) The two (or three) years of post project monitoring are very unlikely to address negative indirect (long-term) impacts that may result from this project.

It is my understanding that bird surveys will be conducted for two, or maybe three, years after the project is completed.

As I stated earlier, I feel it is very likely that short term impacts of this project will be positive for piping plovers, Wilson's plovers, and other shorebirds and colonial waterbirds, and seabeach amaranth. For up to a few years after the project is completed, there will be extensive areas of newly formed, sparsely vegetated, above-tidal flats. These areas will provide good roosting/resting areas for shorebirds as well as good nesting habitat for shorebirds and colonial waterbirds. Perhaps, piping plovers may nest here. The habitat should also be good for seabeach amaranth.

However, at some time in the future, habitat for all of the above species is likely to decline in quality. Perhaps much of the newly formed areas on both sides of the inlet will be wide enough and stable enough that extensive dunes form and vegetation succession is accelerated, with the result being degraded habitat for the above species. Beach nourishment on the nearby Emerald Isle shoreline may eventually contribute to this overall deterioration of inlet habitats, by making dune development more likely. As noted elsewhere in this letter, the Piping Plover Atlantic Coast Population Recovery Plan (USF&WS, 1995) points out examples in which inlet stabilization projects and beach nourishment projects may create good piping plover habitat in the short term (for a few years), but may ultimately be harmful to plover habitat because of their interference with natural inlet processes. I have observed the same pattern in North Carolina—for instance at the west end of Long Beach.

If the Bogue Inlet relocation project and associated beach nourishment were to cause long term negative habitat impacts, how long might it take for this to be the case? The DEIS predicts that “Effects from the proposed channel relocation and associated activities (including beach nourishment and sand dike construction) are expected to equilibrate within three years after construction” (Cumulative Effects Assessment, page 53). It seems unlikely that extensive dune development or significant development of dune grasses would take place within three years of the completion of the project—perhaps five years is a more likely approximation. Thus, it may well be the case that

any indirect negative impacts associated with this project will not become manifest until three to five years, or more, after the project is completed.

In summary, the two (or three) year post project monitoring is likely to cover the period when short term positive impacts are likely, but unlikely to cover the period when long term negative impacts are likely to become manifest.

Response #22: A bird management plan is being developed in coordination with the USACE, USFWS, and NCWRC that reflects the research and monitoring needs of the area. A long-term bird monitoring program may be continued by the NCWRC after the Town of Emerald Isle has fulfilled it's obligation to monitor the project area.

Fussell, Comment #23: 10) The Cumulative Effects Assessment is extremely poor, at least as related to birds.

This assessment reflects an extremely poor understanding and appreciation of species like the piping plover and other shorebirds, the habitat needs of these species, and how these species are impacted by coastal engineering projects. A definitive example of just how poor this section is demonstrated by the discussion regarding the closing, by the Army Corps of Engineers, of Moore Inlet at Wrightsville Beach in 1965. According to the assessment (page 12), "The Moore Inlet project did, however, create additional beach habitat, which was available to foraging, nesting, and roosting birds..." (And, in Table 7.1, the Moore Inlet closure is indicated as representing a positive cumulative impact for birds.) According to local birders, Moore's Inlet harbored migrating/wintering piping plovers before it was closed. Now the site of this former inlet supports a Holiday Inn! Does the assessment really regard a Holiday Inn as better habitat for piping plovers and other shorebirds than an inlet is?

This section does include a very thorough listing (although two recent inlet closures have been omitted—see below) of coastal projects having the potential to impact piping plovers/shorebirds/colonial waterbirds and other coastal resources, but I was disappointed that under the individual projects there was very limited discussion (or none at all) that would have justified the various rankings given in Table 7.1. In many cases, I am baffled as to how the rankings given under Birds in this table were arrived at. Apparently, these rankings (for birds) were based on one and only one underlying assumption, i.e. any construction of a berm/beach represents a positive cumulative impact for birds, and that such beach construction offsets any other impacts from a project.

Although I question the correctness of the rankings given for birds for many of the projects listed in Table 7.1, some stand out as being especially dubious. In addition to the Moore's Inlet project, cited above, these are:

a. (New) Drum Inlet Opening and Dredging. This project is said to represent a *negative* cumulative impact on shorebirds/waterbirds. Why is it not positive? Because of the

presence of the inlet, this site is a major nesting area for piping plovers and a major aggregation point during migrations. The species also overwinters here. Wilson's plovers breed here annually and colonial waterbirds nest during at least some years.

b. Carolina Beach Inlet Opening. This project is said to represent a *negative* cumulative impact on shorebirds/waterbirds. Why is it not positive? This site sometimes harbors overwintering piping plovers, which rest/roost on the spits on either side of the inlet during high tides. It is highly unlikely that wintering piping plovers would occur here if the inlet were not present. Use of the area by Wilson's plovers is also enhanced by the presence of the inlet.

c. NC 12 Dune Maintenance—Hatteras Island. This project is said to represent a *positive* cumulative impact on shorebirds/waterbirds. Actually, no other single project in North Carolina is probably as *negative* for shorebirds/waterbirds as this project is. Because of this project and the associated maintenance of NC 12, natural processes such as overwash that provide habitat for piping plovers and other shorebirds are largely prevented from occurring. And, when natural processes do occasionally create suitable habitat, as during hurricanes and severe storms, this habitat is usually destroyed literally within hours by N.C. DOT.

Interestingly, the Piping Plover Atlantic Population Recovery Plan (USF&WS, 1995) points out the *damaging effects* of the NC 12 artificial dune line maintenance on piping plover habitat (page 34).

Incidentally, on page 25 of the Cumulative Effects Assessment is a statement that seems to justify that the artificial dune line maintained along NC 12 is good habitat for piping plovers/shorebirds/waterbirds: "Burger (1994) stated that birds will utilize dune habitat to forage since it is secluded from human activity." This statement is a careless misrepresentation of the results of that study.

d. Relative Stabilization of Beaufort Inlet. This action is not identified as such, but should be reflected in the assessments of "Beaufort Inlet Dredging" and "Fort Macon Jetty and Groins". The "Beaufort Inlet Dredging" is considered to have no cumulative impact on shorebirds/waterbirds, and the "Fort Macon Jetty and Groins" is considered to have a *positive* impact. Thus, one must assume that the relative stabilization of Beaufort Inlet would be considered in this assessment to represent a *positive* impact on shorebirds/waterbirds. Why is it not negative? The shorelines of Beaufort Inlet have been relatively stable for many years. They certainly have not moved fast enough to create expansive, sparsely vegetated spits and flats needed by piping plovers and other shorebirds. Piping plovers, which nested on the Shackelford Banks side of Beaufort Inlet from 1970 to 1980, have not been found nesting there since. And, the wintering population of piping plovers associated with Beaufort Inlet, which was as high as 70 to 100 birds in the early 1970's, has averaged only about 20 birds in recent years (based on *Chat*, Audubon Christmas Bird Count data, and my own unpublished data).

e. Bogue Inlet Relocation. As stated earlier, I question the validity of a determination that this project will represent a positive cumulative impact for birds.

f. Fort Fisher Revetment. This action, which involves beach hardening, is considered to represent a *positive* cumulative impact on shorebirds. Why? Justification for such a determination should have been included in the text.

g. Beach Nourishment Projects (all). All beach nourishment projects are considered to have *negative* direct impacts and all are considered to have *positive* cumulative impacts. Interesting, none are considered to have any indirect impacts, positive or negative. Beach nourishment projects definitely decrease the amount of food available for at least certain species of shorebirds for at least a short period of time following a project, and thus represent a short-term negative impact. For most of the shorebird issues considered to be of major importance in this document—i.e. protection of piping plovers and their critical habitat, Wilson's plover habitat, etc.—many beach nourishment projects are actually rather neutral in their impact, in that they occur in the middle portions of islands, far from the inlets, and generally adjacent to densely developed communities where there is no need to consider natural processes like overwash as part of the overall equation. Where nourishment projects occur next to inlets, however, they can have very positive short-term impacts, in that they may create very good nesting habitat for piping plovers, Wilson's plovers, and colonial waterbirds. On the other hand, when these nourished areas next to inlets consequently develop extensive dunes which prevent overwash, and/or if the project (and additional ones) results in shorelines that are relatively stable and thus less likely to form extensive, sparsely vegetated, above-tidal flats, then an indirect impact (or longer term impact) of a project may actually be negative, for both nesting and overwintering birds. [Negative indirect impacts resulting from beach nourishment projects are discussed in the Piping Plover Atlantic Coast Population Recovery Plan (USF&WS, 1995)]. Further, nourishment projects in some cases have contributed to higher levels of human access. I do not believe that the *positive* cumulative impacts rating is appropriate for any of the beach nourishment projects.

h. Sandbags Project (all). Elsewhere in the DEIS, sandbags are considered to have negative impacts on natural resources, and their removal (in the case of the Bogue Inlet relocation project) is thus considered to be desirable (see Section 5). To be consistent, their effects should *not* be considered unknown in this section.

i. Oregon Inlet Terminal Groin. This project is considered to represent a *positive* cumulative impact for birds. The construction of this groin about 1990 has certainly resulted in an accreted area that has since provided nesting habitat for piping plovers and colonial waterbirds. The presence of a shallow pool area on the landward side of the area has probably contributed to the presence of nesting piping plovers. However, with the shoreline locked in place, this area is likely to gradually fill in with dunes and vegetation and become unsuitable nesting habitat, unless the USF&WS takes steps to artificially maintain it. Further, with the shoreline locked in place, there is no potential for new habitat—nesting or resting/roosting—to be created. [The Piping Plover Atlantic

Coast Population Recovery Plan (USF&WS, 1995) cites examples of suitable piping plover habitat being formed on the updrift side of jetties and groins, but cautions that such areas may cease to be suitable habitat in the long term, as a result of the interruption of overwash/other natural processes and accelerated plant succession.]

j. Cape Lookout Jetty. Considering its location, it is difficult to understand how this jetty could be considered as having any significant impact, either positive or negative, to the shorebirds/waterbirds considered of significance in this document. There should be some sort of justification for the *positive* cumulative impacts rating.

k. Masonboro Inlet Jetties and Dredging. This project is considered to represent a *positive* cumulative impact for birds. For several years after the south jetty was constructed about 1980, the area of accreted land provided good nesting habitat for Wilson's plovers and colonial waterbirds. However, this habitat has inevitably deteriorated because the shoreline has been locked in place. Although a few piping plovers continue to overwinter at this site, it should nevertheless be considered a *definitive example of the degradation of habitat* for piping plovers. There is now an almost total lack of suitable high tide resting/roosting habitat. This project should actually be considered a *negative* impact for birds.

l. Other inlet closures. In addition to the above projects, all of which were addressed in the assessment, I know of two recent inlet closures. These inlet closures are:

Closure of New Inlet (south of Fort Fisher). About 2000, this inlet closed in. New Inlet has been a regular wintering/migration site for piping plovers and this species may have nested here on one or two occasions as well. Wilson's plovers also nest here. Although wintering piping plovers are still occurring here (as of winter 2003-2004), habitat for this species will undoubtedly deteriorate because of the inlet closure. The closure of this inlet represents a *negative* cumulative impact for piping plovers and shorebirds/waterbirds.

Closure of Mad Inlet (Sunset Beach). A few years ago, this inlet also closed in. This is another site where piping plovers were of regular occurrence in winter and during the migrations. I have not seen this site in a few years, and do not know what the habitat is currently like. However, habitat here will undoubtedly deteriorate because of the inlet closure. The closure of this inlet represents a *negative* cumulative impact for piping plovers and shorebirds/waterbirds.

The two inlet closures should have also been included within the cumulative effects assessment. In the cases of the two inlets, their possible relationship to coastal projects should be discussed. For instance, is the closure of each a completely natural event?

In summary, I think that the overall positive assessment of the cumulative impacts of engineering projects on piping plovers and other shorebirds (see Cumulative Effects Determination in Table 7.1) is very questionable. One can't help but wonder why piping plovers and other shorebirds/colonial waterbirds considered of concern in the DEIS are

doing so poorly in North Carolina, given that these engineering projects are considered to be having so positive an impact on them.

Response #23: The listing of projects was provided initially by the USFWS (Appendix A, Subpart 2 - Letter from USFWS dated November 22, 2002) and was reduced by the USACE (M. Sugg, pers. comm.). The history and discussion of the projects (Appendix F - CEA Section 7.0) was based on research and known history of the project. The reasoning for the assessment made regarding the effects of the project are described for each of the projects.

Fussell, Comment #23: 11) Although my above comments refer to piping plovers and other shorebirds, I also question the validity of the overall cumulative effects assessment on seabeach amaranth.

As I stated earlier, I feel it is regrettable that the DEIS does not reflect a full understanding of the life history of this species, especially the life history of the plant as it relates to natural barrier island processes, such as inlet migration and overwash. Again, the philosophy of the DEIS seems to be that seabeach amaranth occurs on wide berms/beaches and has been undergoing increases in population at sites following beach nourishment—and that is all we need to know to make decisions. In Table 7.1, it is surprising that the opening of (New) Drum Inlet would be regarded as *negative* for beach amaranth. Un-stabilized inlet shorelines are very good habitat for this species, and the species has been found on both sides of this inlet. [According to the Maintenance of Drum Inlet Environmental Assessment, 1995, a 1994 survey for seabeach amaranth along all of Core Banks, which is about 20 miles long, found that 76% of all plants found were located within one mile of Drum Inlet.] Why would the overall stabilization of Beaufort Inlet (as reflected by “Beaufort Inlet Dredging” and “Fort Macon Jetty and Groins”) be considered as a *positive* cumulative effect for this species. The inlet shorelines are now largely stabilized. How can this be good for this species? How is the existence of the Fort Fisher Revetment, beach hardening, beneficial for beach amaranth? How does the Cape Lookout Jetty contribute to a *positive* cumulative impact for beach amaranth? How will the recent closures of New Inlet and Mad Inlet contribute to cumulative effects for beach amaranth? How does the maintenance of the artificial dune line associated with NC 12 contribute to *positive* cumulative impacts for beach amaranth? Do any of the beach nourishment projects have *negative* indirect impacts as a result of the interfering with overwash and natural processes at inlets?

In summary, I think that the overall positive assessment of the cumulative impacts of engineering projects on seabeach amaranth (see Cumulative Effects Determination in Table 7.1) is very questionable and does not reflect an understanding of the habitat in which the species occurs.

Response #24: Refer to Response #13.

Fussell, Comment #25: 12) I feel very strongly that there should be a conservation easement (for the existing spit and any other lands that accrete at the western end of Bogue Banks) with the National Audubon Society or some other conservation organization.

First, let me say that I do not say this based on any mistrust of the current administration of Emerald Isle. Indeed, I have been *very* positively impressed with their attitude, energy, and obvious intention to address environmental concerns. However, administrations and regulations change. I can remember numerous examples in which local coastal governments have adopted environmentally protective regulations for various reasons, only to quietly reverse those regulations at a future date. For instance, numerous local coastal governments adopted relatively strict regulations for development within maritime forests in the early 1990's, largely to convince the CRC that state regulations were unnecessary. Within a few years, many of these regulations were nullified.

Response #25: The Town of Emerald Isle is currently in discussions with the adjacent property owners along the western shoreline of Bogue Inlet. The focus of the discussions is the establishment of 'fixed' property lines within the inlet complex. The Town has recognized the importance of protecting and preserving the newly accreted shorelines as public property that can not be developed. The State of North Carolina regulations which govern newly accreted shorelines specifically states that all accreted property shall be the responsibility of the adjacent upland landowner. The Town of Emerald Isle is proactively implementing a protection program aimed at preserving the newly accreted lands on the western end of the island within the public domain.

Fussell, Comment #26: 13) It was disturbing to read in the Proposed Monitoring/Mitigation Plan (December 1, 2003) that the town of Emerald Isle and Coastal Planning and Engineering plan future actions that will contribute to the stabilization (or relative stabilization) of Bogue Inlet.

Under "Future Stabilization of Bogue Inlet Channel", there are listed three methods by which the town and CPE intend to at least partially stabilize Bogue Inlet in the future. These are: "a. Work closely with Corps of Engineers' Navigation Branch to limit potential for future easterly and westerly migration; tweak sidecast dredging practices to encourage stabilization as much as practical; b. Include Bogue Inlet shoals as a sand source for 50-year Shore Protection Project; pipeline dredge would be used to dredge sand and stabilize channel position every 5-10 years; c. Potential request to secure authorization for pipeline dredge to be used for annual navigation project." (see Attachment 1). Although these actions would probably not lead to a complete stabilization of the inlet, they may well lead to the diminishment of natural processes to the degree that important components of habitat for piping plovers, other shorebirds, nesting colonial waterbirds, and species such as seabeach amaranth will be degraded significantly. I believe that this planned stabilization of the inlet is what is called an

“indirect action” or a “connected action”. In that these proposed actions are part of the written record, I think they should be included and addressed in the FEIS.

Response #26: In the event that the Town of Emerald Isle and the USACE pursue a cooperative agreement to stabilize Bogue Inlet channel, this proposal will likely be provided to the public for comment.

Fussell, Comment #27: 14) There is a possibility that very good habitat for nesting birds will be created by the proposed project, and that this habitat will attract many birds, but that the birds will have poor nesting success because 1) many people are attracted to the site, and 2) predation may be especially severe on the Emerald Isle side of the inlet.

The first issue has been discussed at various PDT meetings. However, in regard to the second issue, it is my understanding that various feral cat colonies are being maintained within the town of Emerald Isle and that the town thus has a very large population of feral cats. The presence of feral cats can be extremely destructive to ground-nesting waterbirds.

Response #27: Noted. Refer to Response #22.

Fussell, Comment #28: In closing, I want to stress that I do think some good is likely to result from this project, at least over the short term. I have been very impressed by the commitments of the town of Emerald Isle and acknowledge that a positive benefit that will result from the proposed project is that it will lead to the town and resources agencies (USF&WS, NCWRC) working together to protect nesting bird habitat at the inlet. Further, I think the project is likely to contribute to the education of the public about birds that use the inlet area.

However, I still have serious concerns about the quality of the DEIS, especially in regard to its assessment of expected impacts resulting from the various alternatives. It appears to be a biased document intended to promote the preferred alternative rather than a thoughtful, objective, full analysis of all of the impacts that might be expected to occur as a result of the various alternatives. I do not think that the document promotes full disclosure and understanding of the impacts, especially long term, which might be anticipated to result from the proposed project.

I find it disturbing that the writers of the DEIS apparently have only a superficial understanding of the habitat requirements of the various bird species that might be impacted by the project. Particularly bothersome is the fact that the document does not reflect any appreciation of the relationship of habitat required by the various species to natural inlet migration and other processes.

I would hate to think that this DEIS will become a standard for environmental impact statements about similar projects in the future, especially considering that so many of these type projects are being considered now.

The Cumulative Effects Assessment is an especially biased part of the document. It reflects an especially poor understanding of the habitat needs and population trends of the various species, the relationship of these species to natural barrier island processes, and of the fact that indirect (long term) impacts of engineering projects may be very different from short term impacts. (I assume that the resource agencies simply did not have time to review this section.)

Response #28: Noted. Where appropriate the Town of Emerald Isle and their consultants, in coordination with State and Federal agency personnel have revised the Final EIS to address the comments presented on the DEIS.