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August 1, 2016

Via U.S. and Electronic Mail

Mr. Mickey Sugg
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RE: Figure Eight Island Shoreline Management Project – SAW-2006-41158

Dear Mr. Sugg:

Please accept these comments on the Figure Eight Island Shoreline Management Project Final Environmental Impact Statement ("FEIS"). The Southern Environmental Law Center submits these comments on behalf of the North Carolina Coastal Federation and Audubon North Carolina. As described below, the process must be halted until the Figure Eight Homeowners' Association ("HOA") can demonstrate that it possesses the necessary property rights to construct its preferred alternative. If the HOA acquires those rights and the project is reinitiated, the FEIS must be revised to comply with the National Environmental Policy Act ("NEPA"), 42 U.S.C §§ 4321-4370(f), and certain alternatives cannot be permitted because they violate the Endangered Species Act ("ESA"), 16 §§ U.S.C 1531-1544, and/or the Clean Water Act ("CWA"), 33 U.S.C. §§ 1251-1387, and cannot be lawfully permitted.

I. THE CORPS HAS NOT PROPERLY EXERCISED ITS OVERSIGHT AUTHORITY.

As these comments describe in detail, the FEIS is littered with unsupported assumptions, inconsistencies, and contradictions that bias the analysis in favor of the Applicant's preferred alternative. The Corps' reliance on a document prepared by the HOA's hired consultants creates a conflict of interest that is apparent in the document and prohibited by regulation. 40 C.F.R. § 1506.5(c) ("It is the intent of these regulations that the contractor be chosen *solely* by the lead agency, or by the lead agency in cooperation with cooperating agencies, or where appropriate by a cooperating agency to avoid any conflict of interest.") (emphasis added). The Corps has failed to exercise adequate supervision and to "independently evaluate the statement prior to its approval and take responsibility for its scope and contents." *Id.* The result is a document that violates NEPA and cannot serve as the basis for the Corps' public interest review, compliance with the CWA, or compliance with the ESA.

II. THE FIGURE EIGHT HOA HAS NOT DEMONSTRATED THAT IT POSSESSES OR WILL POSSESS THE REQUIRE PROPERTY INTEREST TO BUILD THE GROIN.

In our comments on the DEIS, we noted that the HOA has neither the property rights necessary to build the groin nor the ability to compel property owners to grant the required easements. Nothing has changed. The Corps has now invested time and taxpayer dollars on three drafts of an environmental impact statement for a preferred alternative that the HOA proposes to build on property it does not own. In response to comments, the Corps stated that "[t]he process will be halted at the appropriate time, should easements not be obtained."[1] Despite having four years between the publishing of the DEIS and the FEIS, the HOA has not obtained the necessary easements. Now is the time to halt the process. It is required by regulation and is necessary should the Corps desire to maintain any semblance of neutrality on this project.

When a project is proposed to the Corps, the agency's regulations require the applicant to demonstrate "that the applicant possesses or will possess the requisite property interest to undertake the activity proposed in the application." 33 C.F.R. § 325.1(d)(8). It is undisputed that the HOA cannot make such a demonstration and does not have the authority to compel easements; therefore, the application must be returned.

Returning the application is essential if the Corps expects to maintain any claim of neutrality. The HOA has exerted significant pressure on landowners whose property would be truncated by the proposed terminal groin. Should the Corps grant the HOA a permit to build the terminal groin on land it does not own or have rights to develop, then the agency will be complicit in this harassment. The HOA has argued, and will continue to argue, that the Corps has selected the proposed terminal groin as the best alternative to provide long-term protection to the island. If the agency takes the extraordinary step of issuing a permit to build the groin as proposed, over the objections of the property owners whose land would be destroyed, it will join the HOA in the bullying of property owners who simply desire to maintain their oceanfront. The Corps must return or deny this application.

III. THE FEIS EVALUATES AN INLET THAT HAS NEVER EXISTED, DOES NOT EXIST, AND IS NOT LIKELY TO EVER EXIST.

As written, the FEIS is little more than an academic exercise evaluating a fictional inlet—one permanently locked into the alignment that existed in 2006. That assumption has no basis in long-term or recent history and must be discarded. As the Fourth Circuit has said, assuming conditions that do not represent actual baseline conditions is an "obvious and fundamental blunder" that violates NEPA. *Friends of Back Bay v. U.S. Army Corps of Engineers*, 681 F.3d 581, 588 (4th Cir. 2012) (citing *N.C. Wildlife Fed'n v. N.C. Dep't of Transp.*, 677 F.3d 596, 603 (4th Cir. 2012)).

[1] FEIS, Appendix I, Response 86.

A. The FEIS Assumes a Northeastern Alignment of the Inlet and Models Perpetual Erosion.

The FEIS assumes that the Rich Inlet will be perpetually aligned as it was in 2006. At that time, "the bar channel of Rich Inlet was oriented in the northeastern alignment or direction which caused substantial erosion along the north end of the island."[2] The northeastern alignment resulted in an eroded shoreline that represented the most severe period of erosion that has ever been recorded on Figure Eight Island.[3] The conditions that caused the erosion were then incorporated into the Delft3D model, which was calibrated based on erosive conditions observed between 2005 and 2008—extending the erosive conditions through the model run.[4] The 2006 shoreline was modeled to evaluate both environmental (for 5 years) and economic impacts (for 30 years).[5] Moreover, modeled erosion rates were used as the basis for calculating the required beach nourishment under each alternative (and the resulting costs)—thereby extending the extreme erosion rates for the full 30-year economic analysis. The economic analysis for Alternatives 1 and 2 extended those erosion rates directly—the responses to comments admit that erosion rates from a two to five year period between 1999 and 2007 "would be applicable over the 30-year evaluation period" in the economic analysis of those alternatives.[6]

B. The FEIS Relies on Two to Five Years of Erosion Data That Are Not Representative of Rich Inlet.

In the FEIS, the Corps continues to erroneously rely on a small subset of extreme erosion rates that is not representative of actual conditions on Figure Eight Island. The FEIS repeatedly relies on the erosion rates summarized in Table 6-1 of Appendix B.[7] The Corps asserts that these erosion rates are the sole basis for the economic analysis of Alternatives 1 and 2 in Appendix G.[8]

As summarized in the table, the erosion rates used by the Corps do not even reflect the overall rates between 1999 and 2007,[9] but rather the "worst case" rates between two shorter periods of time. The table lists rates from October 1999 to April 2005 and from April 2005 to April 2007.[10] It then isolates the worse erosion rates between those two time periods and selects that as the "1999-2007 Worst Case" erosion rate. As a result, the "worst case" rate from 1999 to 2007 used by the Corps[11] exceeds the actual rate observed from 1999 to 2007 in every instance.

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[2] *Id.* at 204.
[3] *Id.*, Appendix B, Sub-Appendix A at 17.
[4] FEIS at 29, 204; *see e.g.* Appendix B at 170 (admitting that "the model was calibrated during a period of erosion" and, therefore, "the model tends to estimate erosion along north of profile 77+50, rather than accretion").
[5] FEIS at 205.
[6] *Id.*, Appendix I, Response 118; *see* Response 117 ("All of the economic impact analyses for the alternatives were based on shoreline change rates between 1999 and 2007.")
[7] *See, e.g. id.* at 25, 32, 33, and 36 (citing erosion rates between 1999 and 2007).
[8] *See id.*, Appendix I, Response 117.
[9] To be clear, isolating eight years of the worst erosion experienced on the island and ignoring the history of accretion is also arbitrary and capricious.
[10] *See* FEIS, Appendix B at 27.
[11] *See, e.g.* FEIS at 213 (stating that erosion rates "for the period 199 to 2007 range from +4.9 feet/year . . . to -99.6 feet/year" based on the "worst case" rates, when actual rates from between 1999 and 2007 ranged from +12.9 to -64.9); Appendix I, Response 69 ("In this regard, the rate of shoreline change used in the assessment of impacts associated with both Alternatives 1 and 2 were based on the worst-case shoreline change rates used in the analyses provided in Tables 6.1 and 6.3 for Figure Eight Island and Hutaff Island, respectively.").

The "worst case" rates as described are as much as 250% of the actual 1999 to 2007 rates.[12] In numerous instances the erosion rate relied on by the Corps represents just two years of data—the longest period considered is just five and a half years.

The Corps' decision to exclude the shoreline change rates from 1993 to 1996 from Table 6-1 further demonstrates the open bias of the FEIS. The 1999 to 2007 "worst case" erosion rates exclude shoreline change rates included in the chart for 1993 to 1996 because those rates describe accretion on the northern half of the island. In other words, even the Table does not fit within the fictional story the FEIS seeks to tell.

We noted the Corps' reliance on such a small subset of erosion data in comments on the DEIS and SEIS. The agency's response is puzzling. In Response 119 the Corps states that "[t]here is no mention that the 1999 to 2007 shoreline erosion rates are used to 'predict the future' in the document."[13] Response 120 states that the EIS "does not rely on the assumption that erosion rates from 1999 to 2007 exist now and will continue." Yet Response 118 concedes that "the economic impacts for Alternatives 1 and 2 were based on the assumption that past shoreline change rates along the ocean shoreline would be applicable over the 30-year evaluation period." Response 117 makes clear that those "past shoreline change rates" are the worst-case erosion rates between 1999 and 2007. In consecutive responses, the Corps states both that the FEIS assumes the worst case rates from Table 6-1 will continue through the 30-year evaluation period and that the document does not make that assumption.

C. The Fictional Scenario Analyzed in the FEIS Contradicts Recent and Long-Term History.

The error in the Corps' reliance on perpetual erosion that the model is designed to create and anomalous erosion that was recorded over a snippet of time in the 2000s is manifest: Figure Eight has never experienced such erosion over a 30-year timeframe. The inlet analyzed, one that constantly erodes Figure Eight Island, has never existed. The FEIS is premised on ignoring both (1) known recent accretion on the island and (2) historical inlet migration patterns. First, and most crippling, the FEIS analysis ignores the last nine years. As described in Chapter 5, although the document models the 2012 shoreline change, that analysis was not considered when comparing the environmental or economic impact of the alternatives.[14] In short, the Corps has excluded that data—and the consequences of it—from its alternatives analysis. As discussed in more detail below, the 2012 shoreline modeling analysis demonstrates that the proposed terminal groin cannot be permitted, even with the highly erosive conditions incorporated into the model itself. At a more basic level, however, the Corps' decision to assume that the island continued to erode from 2006 on—despite undisputed evidence to the contrary—cannot be sustained and is arbitrary and capricious.

The FEIS also ignores the historical data regarding Rich Inlet. The aerial photography and analysis done by Dr. Bill Cleary in Appendix B, Sub-Appendix A demonstrates that Rich

[12] *See, e.g.*, FEIS, Appendix B at 27 (describing worst case erosion rate for station 95+00 as 33.9 ft/yr when actual erosion rate was 13.1 ft/yr).
[13] *Id.*, Appendix I.
[14] FEIS at 204-05.

Inlet causes Figure Eight Island to have periods of accretion and erosion.[15] Over the time period analyzed, Dr. Cleary conceded that the general trend is one of accretion.[16] The most common position of the inlet was not the "northeastern alignment" assumed in the FEIS; "[o]ver the past 70 years the orientation of the seaward channel segment across the ebb platform . . . was generally aligned in an ESE to SSE orientation."[17] The FEIS concedes that with that southeastern alignment that has characterized the last 70 years, "the shoreline immediately south of the inlet tends to accrete."[18] During that time period, none of the erosive periods lasted more than 10 years.[19] Those periods have been surrounded by long periods of accretion. Of the erosive periods, the erosion experienced from 1999 to 2007 was an anomaly. It represented the most severe erosion that has ever been observed at Figure Eight Island.[20]

The FEIS's reliance on the 2006 data and modeling requires ignoring the historical data by assuming conditions leading to the 2006 shoreline would continue uninterrupted for the next 30 years. The fictional scenario forecast by the FEIS is one of erosion beginning in 1999 and continuing through 2036. A 37-year period of uninterrupted erosion would be a remarkable departure from the historical pattern of an inlet that the HOA's own expert concedes is "characterized" by accretion over "the past seven decades."[21] That departure is particularly apparent given the accretion observed over the last 9 years.

The Fourth Circuit Court of Appeals has made clear that "[w]ithout [accurate baseline] data, an agency cannot carefully consider information about significant environment impacts" and therefore the analysis will "result[] in an arbitrary and capricious decision." *N.C. Wildlife Fed'n* 677 F.3d at 603 (quoting *N. Plains Res. Council, Inc.* 668 F.3d at 1085). It is fundamental that baseline data for the analysis of environmental impacts represent reality. *See Friends of Back Bay v. U.S. Army Corps of Eng's*, 681 F.3d 581, 588 (4th Cir. 2012) ("A material misapprehension of the baseline conditions existing in advance of an agency action can lay the groundwork for an arbitrary and capricious decision."). Without an accurate assessment of baseline conditions, "the [impact statement] process cannot serve its larger informational role, and the public is deprived of [its] opportunity to play a role in the decision-making process." *N.C. Wildlife Fed'n*, 677 F.3d at 603 (quoting *N. Plains Res. Council*, 668 F.3d at 1085).

The Corps' decision to ignore the limited scope of the actual erosion problems at Figure Eight Island infects the entire FEIS. Failure to accurately assess the problem has led to alternatives that do not address the real need. The alternatives for addressing short-term, limited periods of erosion are vastly different in intensity and cost than alternatives for dealing with the fictional problem of 40 years of uninterrupted severe erosion, as demonstrated below in critiques of the FEIS analysis of Alternatives 1, 3, and 4. Because the FEIS fails to accurately identify the problem to be solved due to its assumption of an inlet that has never existed, it also fails to

[15] *See, e.g. id.*, Appendix B, Sub-Appendix A at 25-27.
[16] *Id.* at 56 ("Although the oceanfront along the northern portion of Figure Eight Island has experienced several periods of erosion since 1938, net progradation has characterized the past seven decades of oceanfront shoreline change.").
[17] *Id.* at 9.
[18] *Id.* at 6.
[19] *Id.* at 13-17 (describing three major erosion episodes including 1938-45, 1980-84, and 1999-2007).
[20] *Id.* at 17.
[21] *Id.* at 56.

adequately evaluate the full range of alternatives or take the required hard look at the actual inlet that exists in reality.

The ecological scenario that is the foundation of the FEIS simply does not exist and cannot, therefore, serve as the basis for a lawful NEPA analysis or any agency action. *Friends of Back Bay*, 681 F.3d at 588 ("An unjustified leap of logic or unwarranted assumption, however, can erode any pillar underpinning an agency action . . . ."). The assumptions that the island will continue to erode and that the model provides a reasonable prediction of future erosion are more than "unjustified leap[s] of logic or unwarranted assumption[s]," they are demonstrably false. Reliance on "demonstrably incorrect assumption[s]" violates NEPA. *Id.* at 589. Further, as demonstrated below, use of more accurate 2012 shoreline data demonstrates that the conclusions in the economic analysis are baseless and unwarranted.

It is indisputable that the Corps has collected a large volume of paper. Most of those analyses refute the very conclusions presented in the FEIS, as described below. But collecting studies is not the purpose of NEPA. *See* 40 C.F.R. § 1502.2(a) ("Environmental impact statements shall be analytic rather than encyclopedic."). This FEIS fails to incorporate the recent, substantial changes in Rich Inlet into its analyses in any meaningful way and fails to provide the "clear basis for choice among options by the decisionmaker and the public" because it fails to adequately address "the environmental impacts of the proposal and the alternatives." 40 C.F.R. § 1502.14. Therefore, the FEIS violates NEPA and must be rejected.

IV. THE FEIS MISREPRESENTS THE STATUS QUO.

The FEIS states that under Alternative 1, the HOA and property owners "would continue to respond to erosion threats in the same manner as in the past."[22] But the FEIS does not analyze either Alternative 1 or a "status quo" alternative. The analysis of Alternative 1 is incomplete and fails to evaluate the status quo or steps to maintain it.[23] That error undercuts the entire EIS, given that the Corps has identified Alternative 1 as the "no action" alternative of maintaining the status quo—an essential part of the EIS and requirement of NEPA. 40 C.F.R. §1502.14(c).

A. The Decision Not to Model Alternative 1 Has No Rational Basis.

Despite comments on the DEIS and SEIS that the Corps should model Alternative 1,[24] it has failed to do so. Instead, the FEIS relies on modeling of Alternative 2 as a stand-in for Alternative 1.[25] That reliance on Alternative 2 modeling is inexplicable because the alternatives differ in significant ways. Alternative 1 would maintain sandbags; Alternative 2 would not.[26] Alternative 1would include beach nourishment; Alternative 2 would not.[27] Alternative 1 would

[22] FEIS at 31.
[23] The status quo has both a natural component—the migration of the inlet—and a human response component—erosion control measures. The FEIS fails to evaluate Alternative 1 with respect to either the natural or human response components. As described above in Section III, the FEIS's analysis of inlet migration is arbitrary and capricious.
[24] *See Id.*, Appendix I, Response 67.
[25] FEIS at 213.
[26] *Id.* at 33, 36.
[27] *Id.*

allow other erosion control measures; Alternative 2 would not.[28] As the FEIS describes, Alternative 2 represents a scenario that "would not include the beach scraping/bulldozing or intermittent beach nourishment projects described above in Alternative 1."[29]

The only attempted explanation for the decision not to model Alternative 1 in the FEIS is that these activities would be unpredictable and, therefore, could not be accounted for. The FEIS states that "[t]he Delft3D model was not specifically run under Alternative 1 conditions due to the unscheduled nature of beach nourishment activities along the north end of the island."[30] That position is nonsense. The document provides cost estimates for both sandbag repair and beach nourishment for Alternative 1.[31] Under 2006 conditions, the FEIS projects that $1.2 million will be spent on temporary sandbag revetments and $29 million will be spent to fund 11 beach nourishment projects, scheduled to start at year 0 and reoccur every 3 years thereafter.[32] Under 2012 conditions, the FEIS projects that $1.2 million will be spent on temporary sandbag revetments and $21.1 million will be spent to fund 8 beach nourishment projects, scheduled to start at year 9 and reoccur every 3 years thereafter.[33] These estimates make clear that the Corps did, in fact, schedule when erosion control measures would be implemented and their costs.

Moreover, the cost projections demonstrate the error in relying on modeling of Alternative 2.[34] In the 7-year period modeled, Alternative 1 would include 3 beach nourishment events totaling approximately 900,000 cubic yards of sand.[35] Alternative 2 would not include any nourishment events. The significance of that difference is clear when looking at the model results for Alternative 2. Using the 2006 shoreline, the Delft3D model predicted a total erosion volume of 260,000 cubic yards over the 7-year model run.[36] That is less than the initial fill under Alternative 1 and less than a third of the total fill that would be deposited in the first 7 years.

The error in the FEIS's analysis is further demonstrated by comparing the analysis of projected economic impacts under Alternatives 1 and 2. In Appendix G, the FEIS identifies 12 properties that would be relocated or destroyed in year 5 under either Alternative 1 or Alternative 2.[37] By year 5, those properties would have received a portion of 600,000 cubic yards of nourishment under Alternative 1, which is nearly half the amount of sand that has been placed on the north end of Figure Eight Island in the last 40 years.[38] Their sandbags, if any exist, would have been maintained or new sandbags would be installed if needed. With Alternative 2, no action at all would be taken. The modeling of the 2006 shoreline estimated that the total erosion

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[28] *Id.*
[29] *Id.* at 301.
[30] *Id.* at 213.
[31] *Id.* at 33.
[32] *Id.*
[33] *Id.* at 34.
[34] It should be noted that Appendix B does not provide a cost assessment for Alternative 1 despite providing a cost assessment for other alternatives, further demonstrating the Corps' failure to fully evaluate the alternative. The only assessment provided is in Appendix G.
[35] *See id.*, Appendix G at 9.
[36] *See id.*, Appendix B, Sub-Appendix B-1; SEIS, Appendix B, Sub-Appendix B-1 at 179. The FEIS does not include page numbers in Appendix B-1. The identical chart was produced with the SEIS and is cited here for clarity.
[37] *See id.*, Appendix G at 33.
[38] FEIS at 22-23.

for all of Figure Eight Island through year 5 under Alternative 1 (based on modeling of Alternative 2) would only be 332,000 cubic yards,[39] meaning that with nourishment there would be a net 268,000 cubic yards of sand on the beach. Yet the FEIS assumes, without any justification, that those properties would be lost despite the net 268,000 cubic yards of sand and continued sandbag maintenance or installation. It assumes, without any justification, that the two nourishment events and sandbag maintenance or installation would have absolutely no effect. Nothing in the FEIS supports such an assumption.

B. Alternative 1 Does Not Represent the Status Quo.

Even if the Corps had required CPE to model Alternative 1 as presented in the FEIS, it would not represent the status quo and could not satisfy the requirement of a "no action" alternative. Alternative 1 does not represent a continuation of past practice. A true "status quo" alternative should be modeled in addition to Alternative 1.

Alternative 1 as described in the FEIS does not represent a continuation of past beach nourishment. Importantly, the FEIS does not fully describe past beach nourishment activities that would be part of Alternative 1. Table 2.1 describes "Shoreline Protection Project History on Figure Eight Island" going back to 1977, but the FEIS does not adequately describe past nourishment activities within the area of concern. Table 2.1 identifies seven nourishment events that occurred exclusively on the North End.[40] In addition, it describes one "island-wide" nourishment event in 1998. Table 2.1 further identifies that three of those eight events were not strictly nourishment events, but were in relation to storm recovery or channel dredging. Although not described, it must be assumed that channel dredging is conducted (and paid for) by the Corps and any beach nourishment is incidental beneficial use.[41] Storm recovery events are beyond the scope of the FEIS analysis—the purpose of the proposed project is to deal with chronic erosion, and storm effects have not been evaluated in the FEIS.

As a result, only five of the nourishment events appear to be relevant to Alternative 1. Those five events occurred in 1983, 1993, 2001, 2005, and 2009[42] and deposited approximately 1.27 million cubic yards of sand on the beach, over the course of nearly 40 years. Therefore, continuation of past practice would involve beach nourishment of approximately 1.0 to 1.25 million cubic yards of sand over the next 30 years—far short of the 3.3 million cubic yards assumed for Alternative 1 under the 2006 shoreline scenario. At a rate of $6.80/cy as presented in Appendix B, the total cost of nourishment under a true "status quo" alternative would be approximately $6.8-8.5 million plus mobilization, engineering, and construction costs that would vary depending on the number of nourishment events.[43] Even with those additional expenses, maintaining the status quo is substantially cheaper than building the proposed terminal groin. Even using fill estimates included in Alternative 1, the 30-year cost is cheaper than either terminal groin alternative.

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[39] *See id.*, Appendix B, Sub-Appendix B-1; SEIS, Appendix B, Sub-Appendix B-1 at 179.
[40] FEIS at 22-23.
[41] To the extent that any portion of sand placement would be paid for by Figure Eight Island, it would be a limited portion.
[42] *Id.*
[43] *See id.*, Appendix B, Table 13-4a.

Critically, those expenditures would preclude the adverse impacts dreamed up in Appendix G, and meet the purpose and need. As described in the FEIS, "[u]nder Alternative 1, the shorelines on both islands would be expected to continue to behave as they have in the past."[44] In the past, the shoreline of Figure Eight has been characterized by accretion as discussed in Section III(C). As a result, no houses on Figure Eight Island have been demolished. Only one house has been relocated.[45] The FEIS admits that the proportion of houses relocated or demolished "cannot be determined with any degree of certainty for Figure Eight Island since there are no actual numbers for comparison purposes."[46]

The economic analysis of Alternative 1 also makes assumptions regarding sandbags that do not represent the status quo. In Appendix G, "[d]emolishing or removing the structure was assumed to occur 2 years after the installation of the sandbags."[47] Such an assumption does not stand up to reality—Appendix G also concedes that the existing "sandbag revetments have been in place for over 10 years."[48] As the FEIS acknowledges, many of the sandbags that currently exist at Figure Eight were initially installed in the 1990s or early 2000s. No sandbags have been removed. No properties have been demolished. Only one property remains imminently threatened, and that appears to be due, in large part, to the HOA's dredging of Nixon Channel adjacent to the threatened property.

For these reasons, the Corps has not accurately or lawfully evaluated Alternative 1 in a manner that allows meaningful comparison between alternatives. Nor has the Agency evaluated a true "status quo" alternative. Since the alternatives analysis is the "heart of the EIS", 40 C.F.R. § 1502.14, this fundamental flaw in failing to fully evaluate the "status quo" renders the entire FEIS unlawful under NEPA and precludes reliance on it for the public interest review or compliance with the CWA and ESA. A complete and accurate analysis of Alternative 1 is required to "rigorously explore and objectively evaluate all reasonable alternatives." *Id.* § 1502.14(a). Here, the Corps failed to meet that standard.

V. RELIANCE ON THE DELFT3D MODEL IS ARBITRARY AND CAPRICIOUS.

The Corps' reliance on the Delft3D model is perplexing. The Corps continues to ostensibly reject the model as providing any measure of future conditions, stating that "model results are by no means intended to represent future predictions."[49] The Corps' position, however, is contradicted by its own document—a document that has the central purpose of evaluating future predictions of the environmental consequences of the alternatives. *See* 40 C.F.R. § 1502.14. The FEIS is replete with examples of the Corps relying on the model to predict future conditions. Examples include the following.

- On page 36, the FEIS relies on the Delft3D model to predict when houses would be threatened under Alternative 2.

[44] FEIS at 213.
[45] *Id.*, Appendix G at 7.
[46] FEIS at 37.
[47] *Id.*, Appendix G at 8.
[48] *Id.* at 7.
[49] FEIS at 29.

- On page 39, the FEIS relies on the Delft3D model to predict the frequency with which channels in Green Channel and Nixon Channel would have to be maintained.
- On pages 51 and 52, the FEIS relies on the model to predict shoaling rates in Rich Inlet and the required frequency of channel maintenance.
- On page 53, the FEIS relies on the model to predict shoreline changes under Alternative 3 and corresponding beach fill volumes and frequency.
- On page 54, the FEIS relies on the model to conclude that under Alternative 3, "the new channels would probably have to be maintained approximately every five years regardless of the nourishment needs along Figure Eight Island."[50]
- On page 63, the FEIS relies on the model to predict required beach fill volume and frequency under Alternative 4.
- On page 95, the FEIS relies on the model's predicted performance of beach fill to justify the 1,500-foot terminal groin over a 1,300-foot alternative.
- On page 96, the FEIS relies on the model to predict beach fill volumes and frequency under Alternative 5D.
- On page 204, the FEIS states that the model was used to evaluate "changes associated with each alternative."
- On page 209, the FEIS relies on the model to predict "[a]nticipated impacts to habitats."
- On page 210, the FEIS describes the GENESIS model as providing a "second opinion" regarding expected shoreline changes.
- On pages 210 and 211, the FEIS describes using predicted shorelines as the basis for evaluating direct and indirect impacts to habitat.
- On pages 215-16, 223-24, 232, 233-34, 235, 243, 245-47, 251-52, 255-58, and 263-64, the FEIS relies on the model to predict expected responses under different alternatives for the purpose of comparing those alternatives.
- On pages 287-89, 292, 296, 299, 303, 305, 308-09, 311-12, 315, 317-18, 322, 325-26, 330-31, 335-36, 338-39, 344-46, 348-50, 354, 356-59, 368-69, 371-72, 374, 379, 382, 384, 387, 392, 400, 402, 404-09, 413, 416, 418, 422-23, 425-27, 430-31, 434, 437, 446-47,449, 451-52, 454, 455-56, 459, and 463, the FEIS relies on the model to evaluate the environmental effects of each alternative and compare the environmental impacts of the alternatives.

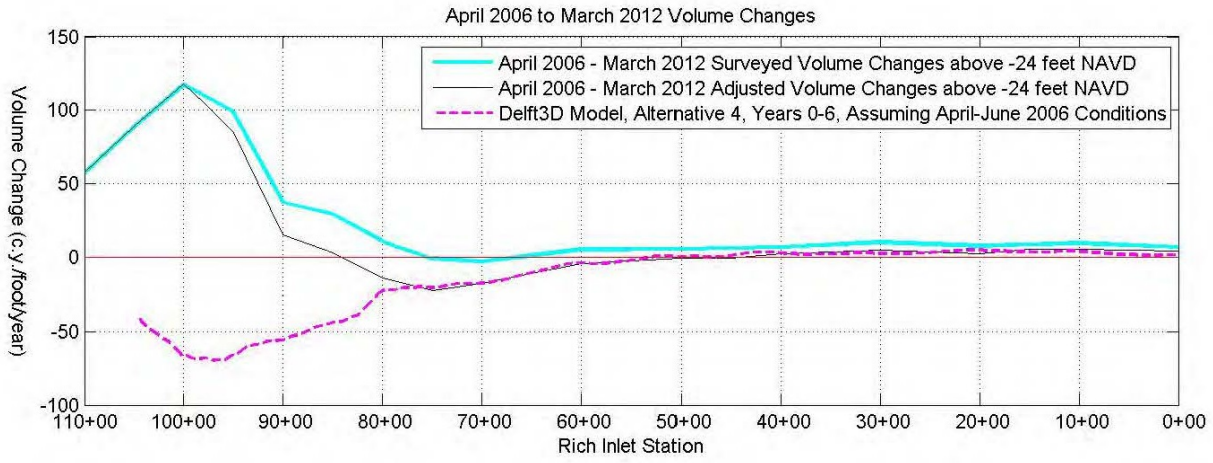
In short, the entire FEIS analysis hinges on the predictions provided by the Delft3D model. The Corps includes detailed projections about shoreline change, beach fill volumes, and costs based on the model results. It is irrelevant whether the FEIS calls them predictions or uses a synonym, such as infer,[51] indicate,[52] or suggest.[53]

Therefore, it is essential that the predictions provided by the Delft3D model are accurate. The basic purpose of an EIS is to "to help public officials make decisions that are based on understanding of environmental consequences, and that take actions that protect, restore, and enhance the environment." 40 C.F.R. § 1500.1(c). The alternatives analysis comparing environmental effects of projects is the "heart of the environmental impact statement." 40 C.F.R.

[50] It is important to note that this assumption is critical to the cost calculations for Alternative 3.
[51] *See*, *e.g. id.* at 210, 213, 219.
[52] *See*, *e.g. id.* at 287, 289, 292.
[53] *See*, *e.g. id.* at 289, 292, 303.

§ 1502.14. As demonstrated in previous comments, the real-world changes in the inlet that have occurred since 2006 demonstrate that the model predictions of shoreline change relied on by the Corps to conduct its economic and environmental analysis are not accurate. Therefore, authorization of construction of a terminal groin based on model predictions that the agency knows are inaccurate would clearly be arbitrary and capricious. *American Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1005 (D.C. Cir. 1997) (finding that an agency's use of a model is arbitrary "if the model bears no rational relationship to the reality it purports to represent.").

The analysis in the Engineering Report demonstrates the inaccuracy of the model. In Figure 11-62, reproduced below, the graph demonstrates that for focal part of the FEIS analysis (north of station 77+50), the model predicted erosion when in fact, the island accreted. The model errs by more than 150 cubic yards/foot/year in some locations.



That error is significant. Between station 92+50 and station 95+00 (250 feet of oceanfront), the model erred by more than 100 cy/ft/year. That amounts to approximately 25,000 cubic feet of erroneous erosion per year. The average annual erosion predicted by the model for Alternative 4 through year 6 was only 15,400 cubic yards.[54] Despite this known overestimation of erosion, the FEIS relies on the model to conclude that all fill would be lost under Alternative 4 between stations 60+00 and 105+00, thereby requiring nourishment to occur every 4 years.

As the D.C. Circuit stated in *Scientists' Institute for Public Information v. Atomic Energy Commission*:

> It must be remembered that the basic thrust of an agency's responsibilities under NEPA is to predict the environmental effects of proposed action before the action is taken and those effects fully known. Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as "crystal ball inquiry." "The statute must be construed in the light of reason if it is not to demand what is, fairly speaking, not meaningfully possible * * *." But implicit in this rule of reason is the overriding statutory duty of compliance with impact statement procedures to "the fullest extent possible."

[54] FEIS, Appendix B, Sub-Appendix B-1; SEIS, Appendix B, Sub-Appendix B-1 at 181.

481 F.2d 1079, 1092 (D.C. Cir. 1973); *see Northern Plains Resource Council v. Surface Transportation Board*, 668 F.3d 1067 (9th Cir. 2011); *Potomac Alliance v. U.S. Nuclear Regulatory Commission*, 682 F.2d 1030, 1033-34 (D.C. Cir. 1982).

"Accurate scientific analysis . . . [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b). Agencies have a duty to "insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements." *Id.* § 1502.24. The Corps' continued reliance on a model it acknowledges to be wholly inaccurate for the basic purpose of predicting environmental impacts (and therefore costs) fails to "satisfy the requirements of NEPA," and the FEIS "cannot provide the basis for an informed evaluation or a reasoned decision." *Sierra Club v. U.S. Army Corps of Eng'rs*, 701 F.2d 1011, 1030 (2d Cir. 1983).

VI. THE CORPS CANNOT RELY ON PROJECTIONS BASED ON THE 2006 SHORELINE.

The Corps cannot rely on model predictions from the 2006 shoreline. The FEIS attempts to justify ignoring the current state of the inlet and its long-term history by asserting that "the modeling results from the 2006 conditions were used to evaluate environmental and economic impacts and performances of each alternative, as this shoreline setting was indicative of erosive conditions along the north end of the island."[55] There are at least three critical reasons that the reliance on the 2006 shoreline cannot satisfy NEPA.

First, as discussed in more detail above, the 2006 shoreline does not represent the normal state of Figure Eight Island. Rich Inlet has oscillated over the last 80 years—2006 represented the erosive extreme of that oscillation with respect to Figure Eight Island.[56] 2006 was an outlier. The FEIS even refers to it as the "worst case."[57] Nothing in the FEIS supports the conclusion that Rich Inlet has ever behaved in such a manner to cause erosive conditions more severe than those that caused the 2006 shoreline—or that such erosion is remotely normal. Indeed, the FEIS indicates that between April 2005 and April 2007, erosion rates from station 66+00 to 105+00 were less than 2 feet/year.[58] That rate is inflated by extreme erosion of 77.3 and 99.6 feet per year at stations 107+50 and 110+00, respectively. Those stations are well north of any development.[59]

Second, focus on the eroded 2006 shoreline precludes the consideration of alternatives that would prevent a more normal shoreline from reaching 2006 conditions (such as maintaining the inlet in its current, favorable condition). As discussed elsewhere in these comments, accurate characterization of the temporary erosion issues on Figure Eight Island would allow for consideration of substantially less expensive alternatives. By focusing on the 2006 shoreline to the exclusion of normal conditions, the Corps has failed to evaluate a reasonable range of

[55] FEIS at 205.
[56] In addition, there were numerous storms between 2002 and 2007 that caused erosion on Figure Eight Island. *See id.*, Appendix B, Subpart A at 30.
[57] FEIS at 284, Appendix B at 148.
[58] FEIS, Appendix B at 27.
[59] *See id.* at 26.

alternatives—including a version of Alternative 3 that would simply maintain the existing channel location.

Third, none of the alternatives will be implemented on the 2006 shoreline. NEPA's central requirement is to ask what the environmental impact of undertaking an action would be today and into the future. If any one of the alternatives is implemented, it will be implemented on a shoreline that much more closely resembles the 2012 shoreline, not the 2006 shoreline. Therefore, the only relevant analysis is what effect implementing each of the alternatives would be under the conditions that would be present at the time of implementation. By limiting the FEIS analysis to the 2006 shoreline, the Corps has failed to take the required hard look at the alternatives as each would be implemented. *See N.C. Wildlife Fed'n*, 677 F.3d 596, 601 ("The NEPA process includes a range of 'action-forcing' procedures that require . . . agencies [to] take a hard look at environmental consequences [of a proposed action] and [to] provide for broad dissemination of relevant environmental information.").

VII. THE FEIS ECONOMIC ANALYSIS IS ARBITRARY AND CAPRICIOUS.

The FEIS economic analysis suffers numerous deficiencies that cause the FEIS to violate NEPA and preclude reliance on the analysis for the Corps' 404(b)(1) guidelines analysis. The analysis demonstrates a clear bias for the preferred alternative, inflates costs for other alternatives, and is contradicted by the Deflt3D model that the Corps relies upon.

A. The Economic Analysis Is Biased in Favor of the Preferred Alternative Because the Non-Groin Beach Fills Are Far More Extensive.

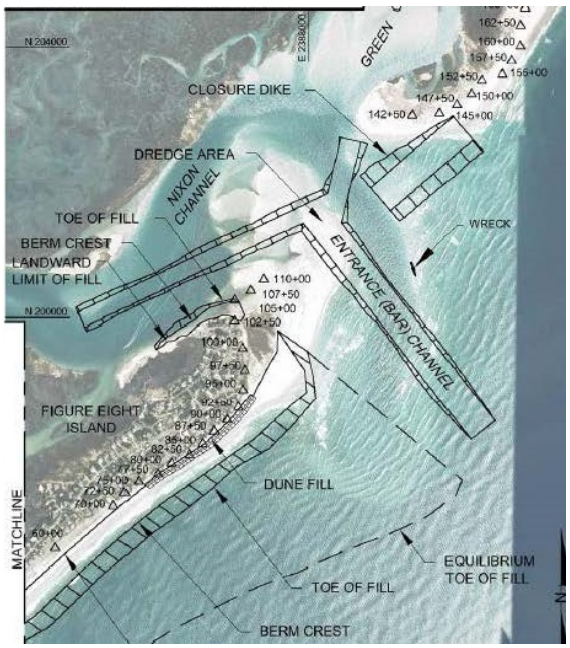
Comparison of the alternatives reveals a basic bias in favor of the preferred alternative. Alternative 5D only includes nourishment from station 60+00 to approximately 100+00. Alternatives 3 and 4 include beach nourishment from F90+00 to 105+00—8,000 feet of shoreline more than Alternative 5D. That is despite modeling, which the Corps has relied on, that shows that such nourishment is not necessary. In fact, the Corps uses modeling of Alternative 3 and 4 to conclude that nourishment between stations F90+00 and 60+00 is unnecessary for Alternative 5D.[60] If that modeling is sufficient to conclude that such nourishment is unnecessary for the preferred alternative, it certainly demonstrates that the nourishment is unnecessary for Alternatives 3 and 4. Moreover, the FEIS provides no explanation as to why additional fill is required to create a dune in front of sandbagged houses under Alternatives 3[61] and 4,[62] but not in Alternative 5D.[63] This substantial disparity in treatment of alternatives—with no apparent rational basis, violates NEPA. *See* 40 C.F.R. § 1502.14(a).

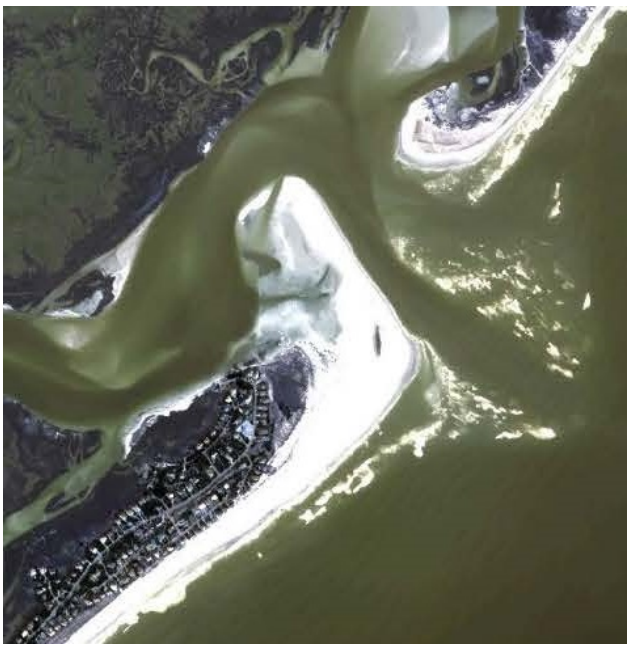
B. The Analysis of Alternative 3 Overestimates the Cost.

The FEIS substantially overestimates the costs associated with implementing Alternative 3. That alternative consists of realigning the inlet to a preferred location and maintaining that

[60] FEIS at 262.
[61] *Id.* at 42.
[62] *Id.* at 55.
[63] *See id.* at 94 (describing initial fill without dune creation).

location so as to promote accretion on Figure Eight Island.[64] That realignment is exactly what has happened over the last nine years without any cost to the HOA. The FEIS concedes that "[a]s long as the ocean bar channel continues to occupy a position and alignment favorable to the north end of Figure Eight Island, implementation of a project involving the establishment and maintenance of a channel along in a preferred position would not be needed."[65] As demonstrated in the aerial photographs included in the FEIS, the current channel location very closely resembles the "optimal" channel location in Alternative 3.[66]





Nonetheless, the economic analysis for Alternative 3 assumes a $17.1 million dollar cost for initial construction. That cost has been eliminated. There is no need to create a new channel or implement an initial beach fill—no houses on the Figure Eight beachfront are in any danger from erosion.[67] The HOA could simply develop a plan to maintain the existing channel location. Such a plan would be a fraction of the cost of Alternative 3. Moreover, because the channel has historically maintained a "southeasterly direction"[68]—which is the optimal alignment—maintenance would likely be much less frequent than every five years as predicted. Finally, beach fill is likely to last much longer than predicted by the model, which is based on the worst erosion rates ever recorded and is known to dramatically overestimate erosion on the northern 3,000 feet of the island. The FEIS concedes this point, recognizing that under Alternative 3 dredging and beach nourishment would be "up to once every five (5) years."[69] Over the "30-year review period, this *could* include *up to* six separate channel maintenance events."[70]

[64] *Id.* at 38.
[65] *Id.* at 39.
[66] *See id.* at 21, 47.
[67] *Id.* at 25.
[68] *Id.*, Appendix B at 21.
[69] *Id.* at 323.
[70] *Id.*

Yet the Corps does not provide any estimate of less frequent maintenance requirements. That is particularly arbitrary and capricious because the Corps and CPE did just that in the recently completed Ocean Isle Final Environmental Impact Statement. There, the Corps and CPE stated that with channel realignment: "[o]ver time, the inlet should respond to the new 'permanent' channel position and alignment with a wholesale shift in the ebb tide delta."[71] As a result, there would be "a gradual reduction in the periodic nourishment requirements."[72] The same rationale applies in Rich Inlet—particularly since the "optimal" channel location corresponds to the southeastern alignment that has been the normal position over the last 80 years. Therefore, it cannot be assumed that channel maintenance and subsequent nourishment would continue in perpetuity.

The Corps' failure to reevaluate Alternative 3 in light of existing conditions results in higher costs than would actually be required to provide the desired protection to oceanfront property on Figure Eight Island. Nothing in the FEIS explains why the existing channel—which has, in real life, resulted in significant accretion at no cost—is not the optimal channel. In fact, the document admits that it provides the protection necessary to meet the purpose and need by acknowledging that no action is necessary so long as the channel maintains its existing position. The Corps must reassess Alternative 3 based on these existing conditions.

Even the existing analysis vastly overstates the cost of Alternative 3. As described above, Alternative 5D is limited to nourishment from station 60+00 to approximately 100+00—4,000 feet of shoreline. Alternative 3 must be evaluated under the same circumstances. According to the FEIS, the fill from Station 60+00 to 100+00 would be approximately 143.6 cubic yard/linear foot ("lf").[73] That nourishment (574,400 cubic yards) would be provided at a cost of $7.03/cubic yard,[74] resulting in a total expense of $4,038,032—a $7,000,000 reduction compared to the costs estimated under 2006 conditions for Alternative 3. Periodic nourishment should also be significantly reduced. Under the 2006 modeling conditions relied on by the Corps in its analysis, 25% of the beach fill between stations 60+00 and 105+00 would remain after 5 years,[75] meaning that periodic nourishment should be 430,800 cubic yards at a cost of $3,028,524 per event—more than $1,500,000 cheaper than projected in the FEIS.[76]

C. The Analysis of Alternative 4 Overestimates the Cost.

The FEIS analysis of Alternative 4 is inconsistent, assumes excessive erosion, and overestimates costs. First, the FEIS is inconsistent. Projected nourishment volumes in the FEIS text and Appendix B are not consistent. In the FEIS text, Alternative 4 based on the 2006 shoreline would have an initial fill of 864,300 cubic yards.[77] In Appendix B, Alternative 4 that initial fill would be 921,300 cubic yards.[78] Surprisingly, and without support, both the FEIS and

[71] U.S. Army Corps of Engineers, Final Environmental Impact Statement: Town of Ocean Isle Beach Shoreline Management Project at 34 (Apr. 2016) (http://www.saw.usace.army.mil/Portals/59/docs/regulatory/regdocs/Projects/OIB/DEIS/2015-01-23_DEIS_Main_Body.pdf).
[72] *Id.* at 33.
[73] FEIS at 42.
[74] *Id.*, Appendix B, Table 13-1a.
[75] FEIS at 224.
[76] *Id.*, Appendix B, Table 13-1a (Dredging Entrance Channel and Beach Fill).
[77] FEIS at 55.
[78] *Id.*, Appendix B at Table 13-2a.

Appendix B estimate that the 2012 shoreline (which has a larger beach), would require a greater initial fill than the 2006 shoreline—911,300 cubic yards in the FEIS[79] and 968,300 cubic yards in Appendix B.[80] Similarly, the periodic nourishment cited for the 2012 shoreline in the FEIS (544,000 cubic yard)[81] and Appendix B (788,000 cubic yard)[82] are significantly different. Moreover, the FEIS estimates for periodic nourishment are inconsistent, describing different periodic nourishment amounts on pages 60 and 63. Despite differing by more than 240,000 cubic yards, the estimated costs for periodic nourishment in the FEIS[83] and Appendix B[84] are identical ($7.8M). These inconsistencies prevent any meaningful analysis of Alternative 4.

Second, the costs associated with beach nourishment under Alternative 4 are much higher than projected for greater volumes of nourishment under Alternative 5C. As described in Appendix B, Alternative 5C includes initial beach nourishment of 994,400-1,077,000 cubic yards at a cost of $7.65 per cubic yard.[85] Alternative 4 includes initial beach nourishment of 921,300-968,300 at costs up to $13.30 per cubic yard.[86] Nothing in the EIS explains why the sand sources available under Alternative 5C would not also be available under Alternative 4. Applying the lower rate, the initial cost of Alternative 4 would be reduced by approximately $2.9 million even if the full volume were deposited. The cost of periodic nourishment would be reduced by approximately $1.7 to $1.9 million for each event—even using the excessive volume included in the FEIS. Thus, overall costs would be reduced by approximately $14.5 million under 2006 conditions and $16 million under 2012 conditions.

Even those costs substantially overestimate the cost of Alternative 4. To be compared to Alternative 5D on an objective basis, nourishment must be reduced to between stations 60+00 and 100+00. Over that portion of the beach, nourishment would be approximately 560,000 cubic yard.[87] At a rate of $7.65 per cubic yard, the initial fill would be approximately $4.3 million, less than half the projected cost.[88]

Finally, the FEIS incorrectly describes past nourishment events in order to support the model's excessive erosion. It states:

> The simulated performance of the fill between 60+00 and 105+00 for both conditions mimics what has been observed following six (6) previous beach nourishment attempts on the north end of Figure Eight Island. . . . While the six (6) previous beach fills were relatively small (less than 300,000 cy) compared to the beach fill volume simulated for Alternative 4, *all of the fill material included*

[79] FEIS at 55
[80] *Id.*, Appendix B at Table 13-2b.
[81] FEIS at 63.
[82] *Id.*, Appendix B at Table 13-2b.
[83] FEIS at 64.
[84] *Id.*, Appendix B at Table 13-2b.
[85] *Id.* at Table 13-3a, Table 13-3b.
[86] *Id.* at Table 13-2a, Table 13-2b.
[87] *See* FEIS at 232 (chart showing beach fill volume and length).
[88] *See id.*, Appendix B Table 13-2a, Table 13-2b.

in these six (6) beach fills was lost from the area fronting the sandbag revetments within a matter of months following placement.[89]

The FEIS cites Dr. Cleary's report for the statement that all of the beach fill from those nourishment events was lost within a matter of months. But review of Dr. Cleary's report shows that the FEIS misrepresents what is in the report. With respect to the 1983 nourishment event, the report states that the placement of beach fill "masked the effect of the erosion episode."[90] In other words, it counteracted the erosion. Similarly, the 1993 nourishment event occurred at a time in which "the ebb channel was highly skewed toward [Figure Eight Island and] resulted in natural accretion."[91] Far from eroding, the nourishment contributed to "higher rates of progradation."[92] Nourishment events in 1997 and 1998 contributed to "[a]ccretion rates for the period."[93] To be sure, the nourishment events between March 1993 and February 1998 contributed to accretion at T1-T19, with limited exceptions in which these events mitigated erosion.[94]

The broad statement covering all nourishment events appears to be based solely on the observation of the 2001 nourishment event depicted on page 24 of the FEIS. It is the only nourishment event that Cleary's report states had "minimal" longevity.[95] The report does not say anything about the longevity of nourishment events in 2006, 2009, or 2011.

The Corps cannot isolate a single event—erosion of nourishment in 2001—and assume it represents conditions on Figure Eight at all times. It is not true that all of the beach fills were lost within a matter of months. Here again, the Corps has failed to exercise proper oversight and has presented a biased alternatives analysis.

D. The Delft3D Model Contradicts the Economic Costs Predicted Under Alternative 2.

As discussed above, the FEIS arbitrarily and capriciously asserts that the worst erosion rates ever recorded at Figure Eight Island will continue, uninterrupted, for the next 30 years.[96] This assumption is baseless given the historical net accretion on the island discussed above and is further undone by the Deflt3D modeling.[97]

Under the Delft3D model, as applied to the 2012 shoreline,[98] none of the houses predicted to be demolished or relocated in the first five years will be lost. It bears repeating that the Delft3D model is designed to substantially overestimate erosion—by as much as 150

[89] FEIS at 235 (emphasis added).
[90] *Id.*, Appendix B, Sub-Appendix A at 28.
[91] *Id.*
[92] *Id.*
[93] *Id.* at 29.
[94] *See* FEIS at 498-502.
[95] *Id.*, Appendix B, Sub-Appendix A at 30.
[96] *Id.* at 30 ("[T]he economic assessment assumed the shoreline would erode into the existing development at rates comparable to those measured between 1999 and 2007.")
[97] We do not agree that the Delft3D modeling is adequate as discussed in Section V.
[98] As discussed in Section VI, the model results based on the 2006 shoreline are irrelevant and cannot serve as the basis for any rational decision.

cy/lf/year.[99] Even overestimating erosion, at the end of the 5-year model run, the beach in front of nearly every identified house is projected to accrete, not erode. The disparity between the economic analysis and the Delft3D model results is substantial. For example, Dr. Schuhmann predicts that the house at 5 Surf Court will be demolished or removed in year 5, but the model predicts that after 5 years nearly 19,000 cubic yards of sand will have accreted on the 250-foot segment of beach that includes the house, as demonstrated in the table included on the following page.

Although there is minor erosion at certain locations, it is significantly less than would be experienced under the preferred alternative as relied on in the Corps' analysis—and well below the error in the model conceded in Appendix B. Under modeling of the 2006 shoreline, erosion into the pre-fill shoreline between stations 87+50 to 95+00 with the proposed terminal groin would be approximately 55,000 cubic yards compared to the 26,000 cubic yards identified above.[100]

The GENESIS model similarly predicts that no houses will be lost within the first 10 years.[101] The economic analysis predicting massive loss of property is, therefore, baseless. The FEIS concedes that "none of the oceanfront structures located between Surf Court and Rich Inlet . . . are in imminently threatened status."[102] The accretion predicted by the Delft3D model will not threaten these structures. None of the houses are or will be in imminent danger based on the materials provided in the FEIS. Far from it, the majority will be buffered by more beach than currently exists. Therefore, the cost of Alternative 2 is $0, and the cost of Alternative 1 is limited to maintenance and permitting of sandbags, should the owners of non-threatened houses be allowed to retain them.

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[99] *Id.*, Appendix B at 169.
[100] FEIS, Appendix B, Sub-Appendix B-1; Appendix B, Sub-Appendix B-1 at 178.
[101] *See id.*, Appendix B, Sub-Appendix C, Alt. 2 Results with August 2012 Aerial Photography-year 10 (showing minimal erosion at the inlet and no erosion south of station 80+00).
[102] FEIS at 32.

Address	Station Estimate[103]	Station Applied[104]	Estimated Demolition or Removal Alt. 2[105]	5-year Change in Sand Volume
3 Comber Rd	88+20	87+50 to 90+00		-7,000
4 Comber Rd	89+10	87+50 to 90+00		-7,000
5 Comber Rd	76+40	75+00 to 77+50	5	19,000
6 Comber Rd	77+30	75+00 to 77+50	5	19,000
8 Comber Rd	79+10	77+50 to 80+00	5	21,000
9 Comber Rd	80+00	80+00 to 82+50	5	19,000
10 Comber Rd	81+00	80+00 to 82+50	5	19,000
11 Comber Rd	81+90	80+00 to 82+50	5	19,000
12 Comber Rd	82+80	82+50 to 85+00	5	16,000
13 Comber Rd	83+70	82+50 to 85+00	5	16,000
14 Comber Rd	84+60	82+50 to 85+00	5	16,000
15 Comber Rd	85+50	85+00 to 87+50	5	7,000
16 Comber Rd	86+40	85+00 to 87+50	5	7,000
17 Comber Rd	87+30	85+00 to 87+50	5	7,000
3 Inlet Hook Rd	88+20	87+50 to 90+00	5	-7,000
4 Inlet Hook Rd	89+10	87+50 to 90+00	5	-7,000
5 Inlet Hook Rd	90+00	90+00 to 92+50	5	-6,000
6 Inlet Hook Rd	91+00	90+00 to 92+50	5	-6,000
7 Inlet Hook Rd	92+00	90+00 to 92+50	8	-6,000
8 Inlet Hook Rd	93+00	92+50 to 95+00	8	-13,000
9 Inlet Hook Rd	94+00	92+50 to 95+00	11	-13,000
1 Surf Court	66+40	60+00 to 70+00	12	45,000
2 Surf Court	67+30	60+00 to 70+00	11	45,000
3 Surf Court	68+20	60+00 to 70+00	11	45,000
4 Surf Court	69+10	60+00 to 70+00	5	45,000
5 Surf Court	76+40	75+00 to 77+50	5	19,000
6 Surf Court	77+30	75+00 to 77+50		19,000
7 Surf Court	71+00	70+00 to 72+50	5	14,000
8 Surf Court	71+90	70+00 to 72+50	5	14,000
9 Surf Court	72+80	72+50 to 75+00	5	17,000
11 Surf Court	74+60	72+50 to 75+00	7	17,000
302 Beach Rd N	50+00	50+00 to 60+00	23	49,000
304 Beach Rd N	51+00	50+00 to 60+00	23	49,000
308 Beach Rd N	53+00	50+00 to 60+00	25	49,000
310 Beach Rd N	54+00	50+00 to 60+00	24	49,000
312 Beach Rd N	55+00	50+00 to 60+00	22	49,000
314 Beach Rd N	56+00	50+00 to 60+00	21	49,000
316 Beach Rd N	57+00	50+00 to 60+00	22	49,000
318 Beach Rd N	58+00	50+00 to 60+00	22	49,000
324 Beach Rd N	61+00	60+00 to 70+00	14	45,000
326 Beach Rd N	61+90	60+00 to 70+00	15	45,000
328 Beach Rd N	62+80	60+00 to 70+00	13	45,000
330 Beach Rd N	63+70	60+00 to 70+00	13	45,000
332 Beach Rd N	64+60	60+00 to 70+00	13	45,000

[103] *Id.*, Appendix G at 33.
[104] *Id.*, Appendix B, Sub-Appendix B; SEIS, Appendix B, Sub-Appendix B at 138.
[105] FEIS, Appendix G at 33-34.

E. The Economic Analysis Includes Impacts That the Corps Cannot Consider as Costs Under the 404(B)(1) Guidelines.

The FEIS's assessment of broad "economic impacts" cannot serve as the basis for the Corps determination of practicability under the 404(b)(1) guidelines. Under those guidelines "[t]he term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes." 40 C.F.R. § 230.3(i). If an alternative is practicable based on cost, then other economic impacts are irrelevant. The only costs that can be considered during the Corps' Clean Water Act analysis are those borne by the HOA in pursuing the alternative—i.e. nourishment and groin expenses. The HOA does not own the houses that would be affected, would not pay to relocate or destroy them, does not collect taxes on their value,[106] would not pay for sandbags if needed, and will not rebuild infrastructure that is lost. Therefore, the economic impacts in these areas predicted under Alternatives 1 and 2 cannot be considered in determining practicability. For Alternative 1, the costs that can be considered for the practicability analysis are, at most, Response/Construction costs projected to be $1,201,000 annually for the 2012 shoreline analysis.[107] As noted above, those costs are significantly overestimated. For Alternative 2, the costs that can be considered for the practicability analysis are, at most, the Response/Construction cost estimated to be $165,000 annually for the 2012 shoreline.[108]

Moreover, the modeling of the 2012 shoreline clearly demonstrates that Alternative 2 is practicable. Over the five year period analyzed, no houses would be lost, none would be relocated. The overall cost of Alternative 2, as modeled, should be $0.

VIII. THE CORPS CANNOT ISSUE A PERMIT FOR THE PREFERRED ALTERNATIVE.

Setting aside that the owners of the land where the groin would be built have not requested a permit and that the HOA has no authority to build the proposed terminal groin, the FEIS cannot support issuance of a Section 404 permit for the preferred alternative. The FEIS does not "consider[] the alternatives in sufficient detail to respond to the requirements of these Guidelines" discussed below, and it is "necessary to supplement these NEPA documents with this additional information." 40 C.F.R. § 230.10(a)(4).

The most fundamental error in the FEIS's environmental analysis is its reliance on the 2006 shoreline.[109] Although Chapter 4 has been amended to include habitat mapping of both the

[106] The HOA cannot end-run the cost analysis by including in its purpose and need maintaining a certain tax value. First, the HOA does not collect taxes, so the tax value is irrelevant. Second, if such a rationale were accepted by the Corps it would be akin to a corporation specifying a certain level of profit (made by a third party) that must be maintained. The Corps would then be required to evaluate an acceptable level of profit. Here, that would mean determining what level of decreased tax value would be acceptable in light of the overall tax value and specifically evaluate the impacts to other properties' tax values—such as those that would lose beach access due to the proposed groin. The FEIS specifically declines to make that determination. It is apparent, however, that the minute potential impact to the island's overall tax value means that all alternatives meet that aspect of the purpose and need.
[107] FEIS at 99.
[108] *Id.* at 315.
[109] *Id.* at 205.

2006 and 2012 shorelines,[110] the environmental analysis in Chapter 5 is limited to evaluating the habitat as it existed in 2006.[111] The figures included in Chapter 4 demonstrate the error in that approach—the 2012 shoreline has significantly more habitat north of the proposed groin location. By focusing exclusively on the 2006 habitat conditions, the FEIS omits any analysis of changes to habitat that currently exist on Figure Eight Island.

That omission is important because the new habitat is both exceptional for threatened and endangered species and vulnerable to being destroyed by the terminal groin. As the U.S. Fish and Wildlife Service ("FWS") noted in comments, it "has concerns for the potential losses of nesting and foraging habitat due to both direct and indirect impacts, particularly within the [piping plover] Critical Habitat Unit."[112] The FWS identified adverse indirect effects including erosion of habitat downdrift of the groin as well as vegetation growth updrift of the groin.[113] Because of these and other impacts, the FWS recommended denial of the proposed project and opined that Alternatives 3 and 4 would have less environmental impact.[114]

It is well-established that terminal groins destroy inlet habitat that is essential for shorebirds, waterbirds, and other species adapted to those dynamic environments. The N.C. Coastal Resources Commission's ("CRC") Final Terminal Groin Study recognized that terminal groins modify inlet processes in such a way that they substantially eliminate existing habitat.

As the CRC described in its 2010 Terminal Groin Study, "the barrier islands and associated inlets on which many waterbirds depend are being severely altered by attempts to stabilize beaches and dunes. Habitats associated with inlets are particularly valuable to coastal birds (Harrington 2008) and as such, should be afforded extra protection."[115] The CRC has recognized what is well-known, that early successional birds such as terns (Larida spp.), black skimmers (*Rhychops niger*), Wilson's plovers (*Chadrius wilsonia*), piping plovers, and American oystercatchers depend on inlet habitats for survival.[116] Piping plovers, in particular, "depend on the natural barrier island and inlet processes that create and maintain broad flats and intertidal areas, overwash zones, and maintain early successional habitat."[117]

One of the primary threats to these species is loss of inlet habitat through shoreline hardening. The Terminal Groin Study found that "[s]tabilization of inlets is considered a serious threat to piping plovers because it can lead to a net loss of suitable habitat."[118] "The construction of a terminal groin, beach nourishment, and dune construction prevents overwash and contributes to a loss of habitat for breeding and non-breeding waterbirds, including piping plovers."[119]

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[110] *See id.* at 103-104.
[111] *See id.* at 212.
[112] *Id.*, Appendix H, Letter from P. Benjamin, FWS, to M. Sugg, USACE, at 4 (Sept. 9, 2015).
[113] *Id.*
[114] *Id.* at 6.
[115] N.C. Coastal Resources Commission, Terminal Groin Study: Final Report at III-8.
[116] *Id.* at III-9.
[117] *Id.* at III-12.
[118] *Id.* at III-13.
[119] *Id.* at III-19.

The Recovery Plan for the critically endangered Great Lakes piping plover population states that "[i]nlet dredging and artificial structures, such as breakwalls and groins, can eliminate breeding and wintering areas and alter sedimentation patterns leading to the loss of nearby habitat."[120] The 5-year Status Review for Piping Plover states: "The three recovery plans state that shoreline development throughout the wintering range poses a threat to all populations of piping plovers. The plans further state that beach maintenance and nourishment, inlet dredging, and artificial structures, such as jetties and groins, can eliminate wintering areas and alter sedimentation patterns leading to the loss of nearby habitat."[121] The Status Review concludes: "Habitat loss and degradation on winter and migration grounds from shoreline and inlet stabilization efforts, both within and outside of designated critical habitat, remain a serious threat to all piping plover populations."[122]

The piping plover status report discusses the impacts of groins and inlet stabilization on these key elements:

> Inlet stabilization with rock jetties and associated channel dredging for navigation alter the dynamics of longshore sediment transport and affect the location and movement rate of barrier islands (Camfield and Holmes 1995), typically causing downdrift erosion. Sediment is then dredged and added back to islands which subsequently widen. Once the island becomes stabilized, vegetation encroaches on the bayside habitat, thereby diminishing and eventually destroying its value to piping plovers. Accelerated erosion may compound future habitat loss, depending on the degree of sea-level rise. Unstabilized inlets naturally migrate, re-forming important habitat components, whereas jetties often trap sand and cause significant erosion of the downdrift shoreline. These combined actions affect the availability of piping plover habitat (Cohen et al. 2008).[123]

That degradation of habitat has been observed at North Carolina terminal groins. The Terminal Groin Study recognized that "the Pea Island Fillet is rapidly evolving which jeopardizes the overall nesting habitats for many of the species."[124] At Fort Macon, the shoreline "does not appear to be suitable for either colonial nesters or shorebirds based on preliminary analysis of historical aerial photographs and available historical shorebird and colonial waterbird data."[125]

Those adverse impacts are heightened in shallow-draft inlets such as Rich Inlet. The CRC's study concluded that "[t]he relative impact of these structures on adjacent areas is likely increased when sited next to natural or minimally managed shallow-draft inlets."[126]

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[120] U.S. Fish & Wildlife Service, Recovery Plan for the Great Lakes Piping Plover (Charadrius melodus) (September 2003) at 23.
[121] U.S. Fish & Wildlife Service, Piping Plover (Charadrius melodus) 5-Year Status Review: Summary and Evaluation (2009) at 31.
[122] *Id.* at 39.
[123] *Id.*
[124] Terminal Groin Study at III-34.
[125] *Id.* at III-58.
[126] *Id.* VII-5.

Given these substantial risks, it is imperative that the Corps conduct a robust analysis of indirect effects. Yet by limiting the analysis to five years of data based on the 2006 shoreline, the Corps has not adequately evaluated indirect effects of the proposed terminal groin. Indirect effects are those that "are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. § 1508.8. The entire purpose of the proposed terminal groin is to disrupt natural sand transport mechanisms such that it has the effect of slowing erosion. The adverse indirect effects of the proposed terminal groin—due to the disruption of inlet processes—are the key environmental effects that must be analyzed. It is those inlet processes, specifically the formation and existence of dynamic intertidal shoals and flats, which are critical to the wildlife naturally found in the inlet system. Limiting the analysis of indirect effects to five years, even if the Corps used 2012 shoreline data, fails to adequately assess indirect environmental effects of the proposed terminal groin alternatives. *See, N.C. Wildlife Fed'n v. N.C. Dep't of Transp.*, 677 F.3d at 602 ("As part of [the alternatives] analysis, agencies *must* measure the indirect and cumulative environmental effects of proposed actions.") (emphasis in original).

Moreover, the Corps has violated NEPA's requirement that it respond to comments. In our previous comment letters we commented, as we have here, that the Corps has failed to evaluate 25 of the 30 years assessed in the economic analysis.[127] The Corps' response to that comment simply states that, in fact, the environmental analysis was limited to a 5-year model run.[128] It does not provide any rationale for excluding any analysis of the 25 years in question or provide any other explanation that would satisfy 40 C.F.R. § 1503.4.

IX. THE CORPS HAS NOT MET ITS OBLIGATIONS UNDER THE ENDANGERED SPECIES ACT.

Under the ESA, "[e]ach Federal agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded or carried out by such agency is not likely to . . . result in the destruction or adverse modification of [critical] habitat." 16 U.S.C. § 1536(a)(2). Section 7 of the ESA "requires federal agencies to ensure that none of their activities, including the granting of licenses and permits, will … adversely modify a species' critical habitat." *Karuk Tribe of Cal. v. United States Forest Serv.*, 681 F.3d 1006, 1020 (9th Cir. June 1, 2012) (citing *Babbitt v. Sweet Home Chapter*, 515 U.S. 687, 692 (1995)). The Corps also has "an independent duty under section 7(a)(2) to ensure that its [action] … [is] not likely … to adversely modify [critical] habitat." *Defenders of Wildlife v. United States EPA*, 420 F.3d 946, 976 (9th Cir. 2005). (Agency reliance on a faulty Biological Opinion violates its duty under Section 7(a)2) of the ESA).[129]

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[127] *See* Letter from G. Gisler, SELC, to M. Sugg, USACE, at 5 (Sept. 14, 2015).

[128] FEIS, Appendix I, Response 118.

[129] Further, "it is unlawful for any person subject to the jurisdiction of the United States to . . . take any species," which is defined to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3. The prohibition on take includes agencies authorizing activities carried out by others that result in take of a listed species. *Strahan v. Coxe*, 127 F.3d 155, 163 (1st Cir. 1997). (State of Massachusetts was found to have exacted a taking of endangered Northern Right Whales through its licensing and permitting of certain fishing practices that exacted a taking of the species); *Sierra Club v. Yuetter*, 926 F.2d 429, 438-39 (5th Cir. 1991)(finding Forest Service caused take of endangered red-cockaded woodpecker by permitting logging practices near nesting colonies); *Defenders of Wildlife v. Administrator, Envtl. Protection Agency*, 882 F.2d 1294, 1300-01 (8th

The regulatory definition of "adverse modification" is found in 50 C.F.R. § 402.02. It states:

> Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.

As outlined in our DEIS comments with respect to Alternatives 5A and 5B, which were not responded to by the Corps, building a terminal groin as proposed in Alternative 5D would destroy critical habitat in Rich Inlet. The inescapable effects of terminal groins as described above, would eliminate those physical features that are essential for piping plover.

FWS designated critical habitat for the wintering populations of piping plovers on July 10, 2001. 66 Fed. Reg. 36,038 (July 10, 2001). The habitat designated "is essential to the conservation of this species." 66 Fed. Reg. at 36,041. Areas containing primary constituent elements that constitute critical habitat were designated in eight states, including 18 units on the North Carolina coast. Unit NC-11: Topsail includes Rich Inlet and the project area:

> This unit extends southwest from 1.0 km (0.65 mi) northeast of MLLW of New Topsail Inlet on Topsail Island to 0.53 km (0.33 mi) southwest of MLLW of Rich Inlet on Figure Eight Island. It includes both Rich Inlet and New Topsail Inlet and the former Old Topsail Inlet. All land, including emergent sandbars, from MLLW on Atlantic Ocean and sound side to where densely vegetated habitat, not used by the piping plover, begins and where the constituent elements no longer occur. In Topsail Sound, the unit stops as the entrance to tidal creeks become narrow and channelized.

Id. at 36,087.

Designated critical habitat within critical habitat Unit NC-11: Topsail includes those primary constituent elements present in the area as described in the regulation:

> The primary constituent elements essential for the conservation of wintering piping plovers are those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. The primary constituent elements include intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide. Important components of intertidal flats include sand and/or mud flats with no or very sparse emergent vegetation. In some cases, these flats may be covered or partially

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Cir.1989)(finding EPA caused take of endangered species through its registration of pesticides for use by others); *Loggerhead Turtle v. County Council of Volusia County*, 896 F. Supp.1170, 1180-1181 (M.D. Fla. 1995)(holding Volusia County caused take of endangered sea turtles through its authorization of vehicular beach access during turtle mating season).

> covered by a mat of blue-green algae. Adjacent non-or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers, and are primary constituent elements of piping plover wintering habitat. Such sites may have debris, detritus (decaying organic matter), or micro-topographic relief (less than 50 cm above substrate surface) offering refuge from high winds and cold weather. Important components of the beach/dune ecosystem include surfcast algae, sparsely vegetated backbeach and salterns (beach area above mean high tide seaward of the permanent dune line, or in cases where no dunes exist, seaward of a delineating feature such as a vegetation line, structure, or road), spits, and washover areas. Washover areas are broad, unvegetated zones, with little or no topographic relief, that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action.

Id. at 36,086.

In designating critical habitat, FWS identified factors that may affect piping plover survival or use of the area:

> Overall winter habitat loss is difficult to document; however, a variety of human-caused disturbance factors have been noted that may affect plover survival or utilization of wintering habitat (Nicholls and Baldassarre 1990a, Haig and Plissner 1993). These factors include recreational activities (motorized and pedestrian), *inlet and shoreline stabilization, dredging of inlets that can affect spit (a small point of land, especially sand, running into water) formation, beach maintenance and renourishment (renourishing the beach with sand that has been lost to erosion)*, and pollution (e.g., oil spills) (USFWS 1996). The peer-reviewed, revised recovery plan for the Atlantic piping plover population recognizes the need to protect wintering habitat from direct and indirect impacts of shoreline stabilization, navigation projects, and development. (emphasis added).

Id. at 36,039.

The Recovery Plan for the critically endangered Great Lakes piping plover population states that "[i]nlet dredging and artificial structures, such as breakwalls and groins, can eliminate breeding and wintering areas and alter sedimentation patterns leading to the loss of nearby habitat."[130] The 5-year Status Review for Piping Plover states: "The three recovery plans state that shoreline development throughout the wintering range poses a threat to all populations of piping plovers. The plans further state that beach maintenance and nourishment, inlet dredging, and artificial structures, such as jetties and groins, can eliminate wintering areas and alter sedimentation patterns leading to the loss of nearby habitat."[131] The Status Review concludes: "Habitat loss and degradation on winter and migration grounds from shoreline and inlet

[130] U.S. Fish & Wildlife Service, Recovery Plan for the Great Lakes Piping Plover (Charadrius melodus) (September 2003) at 23.
[131] U.S. Fish & Wildlife Service, Piping Plover (Charadrius melodus) 5-Year Status Review: Summary and Evaluation (2009) at 31.

stabilization efforts, both within and outside of designated critical habitat, remain a serious threat to all piping plover populations."[132]

Alternative 5D proposes a terminal groin and related activities to attempt to stabilize Rich Inlet that are specifically identified by FWS and other experts as factors leading to the decline of piping plovers. If authorized at Rich Inlet within critical habitat Unit NC-11, this alternative would destroy and adversely modify primary constituent elements of plover habitat, permanently alter natural processes that maintain these essential components of plover habitat, and undermine and appreciably reduce the likelihood of recovery of the species.

X. CONCLUSION: THE CORPS CANNOT APPROVE THE PROPOSED GROIN.

As discussed above, the FEIS does not adequately analyze or properly disclose the potential impacts of the proposed alternatives for mitigating the temporary erosion that Figure Eight Island experiences under certain circumstances. Therefore, the FEIS does not comply with NEPA and cannot be the basis for a permitting decision under the Clean Water Act. We respectfully request that the Corps either conduct the analyses requested in these comments or deny the application for the preferred alternative. Less damaging alternatives clearly meet the purpose and need at a lower cost.

I request to be notified of the Corps' permitting decision in this matter at the address on this letter or by electronic mail to ggisler@selcnc.org. Thank you for your consideration of these comments.

Sincerely,

Geoffrey R. Gisler
Senior Attorney

GRG/rgd

Cc: (via email)
Todd Miller, NCCF
Greg Andeck, Audubon NC
Pete Benjamin, USFWS
Chris Militscher, US EPA

[132] *Id.* at 39.