North Carolina
Coastal Federation
Working Together for a Healthy Coast

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Re: Comments on Final Environmental Impact Statement (FEIS) for the Installation of a Terminal Groin Structure at the Eastern End of Ocean Isle Beach, Extending Into the Atlantic Ocean, West of Shallotte Inlet (Brunswick County, NC) (SAW2011-01241)

Dear Mr. Crumbley:

Please accept the following comments on the proposed terminal groin project on Ocean Isle Beach Shorelines Management Project on behalf of the North Carolina Coastal Federation. For the past 34 years the federation has been taking an active role in the protection of North Carolina's coastal water quality, habitat and public beach access.

In response to the Draft Environmental Impact Statement (DEIS) submitted by the U.S. Army Corps of Engineers (Corps) in January 2015, the North Carolina Coastal Federation (federation) submitted extensive comments outlining questions and concerns regarding the analysis and written report on the proposal to install a terminal groin structure at the eastern end of Ocean Isle Beach (OIB), extending into the Atlantic Ocean, west of Shallotte Inlet. The Corps' responses to the federation's questions and concerns, which will be discussed in detail below, are unsatisfactory and evasive. The Corps' lack of meaningful responses to the previously submitted comments means that most of the federation's concerns about the DEIS have not been resolved.

The Final Environmental Impact Statement (FEIS) for the Town of Ocean Isle Beach (OIB) Shoreline Management Project still does not meet several of the standards and requirements for Environmental Impact Statements set by National Environmental Policy Act (NEPA) and the Council of Environmental Quality (CEQ). Of greatest concern are the failures of the FEIS to:

(1) Equally explore alternatives;
(2) Appropriately employ modeling tools;
(3) Accurately assess economic impacts;
(4) Meet EIS writing and development requirements of federal laws; and
(5) Fully elucidate all potential environmental effects of project alternatives.

The collective incompliance of the Corps through these failures leaves the FEIS still underdeveloped and inaccurate, rendering it inappropriate for its intended use of effectively and unbiasedly evaluating proposed actions for mitigating chronic erosion along Ocean Isle and indicating how these actions may impact the surrounding environment.

As such, the Corps must submit a Supplemental EIS, in which it fairly evaluates all alternatives for addressing the problem of erosion at OIB. Furthermore, the Corps must resolve the comments and concerns expressed in the DEIS that were not adequately addressed in the FEIS.

The Corps does not explore alternatives equally.

In an Environmental Impact Statement the Corps is required to thoroughly investigate each alternative in an unbiased manner, such that no special treatment is given to any one option. This way, any reviewer of the document is able to make their own observations and conclusions based on the information given. 40 CFR 1502.14 specifies this by stating that the DEIS must *(a) "rigorously explore and objectively evaluate all reasonable alternatives..."*; and *(b) "devote substantial treatment to each alternative examined in detail including the proposed action so that reviewers may evaluate their comparative merits."*

The Corps responds to this criticism by stating that it added a model specific to Alternative 4 in the FEIS in order to establish objectivity over all of the alternatives. However, this response makes the assumption that the lack of a model for Alternative 4 is the only instance in which substantial equal treatment was lacking.[1] In reality, there are numerous other places within the report where equal consideration is not given, clearly demonstrating that there is a bias towards the preferred alternative of the terminal groin.

Such favoritism was plainly expressed in the DEIS when the Corps described its purpose as to "refine the terminal groin's design and develop a recommended plan which includes groin construction and strategic placement of beach fill."[2] In a comment letter sent in reaction to the DEIS, the federation specifically mentioned this sentence.[3] Responding in the FEIS, the Corps alters the original statement,

[1] FEIS, Appendix G, Comment 226, p. 26
[2] DEIS, Appendix C, p. 2
[3] FEIS, Appendix G, Comment 227, p. 26

replacing it with the phrase, "The objective of the Engineering Report (Appendix B) is to disclose the methodology involved with developing all project alternatives."[4] However, changing the wording of one line does little to improve the overall character of the document. Rather than merely adjusting the stated purpose, the Corps needs to rework the entire document so that it gives objective and equal consideration to all alternatives.

The lack of equal consideration is not the only problem in the FEIS. Perhaps more alarming is the selection of Alternative 5 as the preferred alternative, since the Corps provide little supportive reasoning behind their decision.[5] Analysis in the FEIS indicates that Alternative 4 rivals Alternative 5 in its effectiveness as the Corps states that Alternative 4 would result in "the buildup of material on the west side of Shallotte Inlet," protecting the eastern end of Ocean Isle and "resulting in accretion along the entire sand spit."[6] Thus, it is unclear why Alternatives 4 and 5 are not more closely compared and why Alternative 5 is overwhelmingly favored. This ambiguity speaks to the high degree of subjectivity in the analysis of the five alternatives and this subjectivity is only reinforced by the Corps' inappropriate use of the modeling analysis.

The Corps relies on inaccurate and defective modeling.

The Delft3D morphological modeling package was used to conduct the modeling of the OIB eastern shoreline bordering Shallotte Inlet. After the publication of the DEIS, there were concerns that the modeling tool was not only poorly suited to modeling processes as dynamic as sediment transport and shoreline erosion, but also that the parameters and assumptions in the model set-up were not representative of the area (as is evidenced by historical inaccuracies in previous modeling attempts of OIB and Holden Beach). Additionally in the DEIS, the Corps did not include in-depth models of every scenario, but rather initially and possibly intentionally excluded modeling of two of the alternatives (Alternatives 2 and 4).[7]

The Corps has not adequately addressed these concerns in the FEIS. While slight modifications have been made to include further analysis on the previously disregarded alternatives, a bias favoring the pre-determined preferred alternative very evidently still remains in the analysis.

[4] FEIS, Appendix C, p. 2
[5] DEIS, p. 124
[6] Ibid.
[7] DEIS, Appendix C

The Delft3D modeling tool is inappropriate for modeling shoreline dynamics on OIB.

As the federation expressed in previous comment letters, the Delft3D modeling is an inadequate tool for simulating shoreline changes, and should not be relied upon to make deterministic decisions on how to manage shoreline erosion in dynamic inlet systems.

The model's inadequacies can be observed in the model calibration runs shown in Appendix B. The FEIS cites three calibration runs, of which two were rejected (#43 and #43B) and one was accepted and selected as the final one (#43A).[8] This means that input parameters and assumptions used to calibrate the model for the calibration run #43A were used to perform the final three-year modeling simulation post terminal groin.

The method behind the choice of the final calibration still remains unclear. The relative differences between the observed volume changes (actual past shoreline positions) and those shown by the calibration run among the three runs are minimal. Furthermore, the numerical differences in calibrated versus observed volume changes among the three runs close to the inlets are negligible – spanning from none or only a few c.y./foot (i.e. OI_045 and OI_040 in #43A and #43B are the same) to about 10 c.y./foot (i.e. OI_025 in #43A and #43B; and HB__390, HB_385 and HB_380 in #43 and #43A) per transect.[9] Thus, the selected calibration run differs minimally from the two rejected.[10] Overall, all three calibration runs fail to replicate the observed shoreline positions.

The Delft3D calibration run fails to replicate past observed shoreline positions.

The Corps does not provide any support for why the final calibration run was selected over others. This exacerbates the federation's and other organizations' and governmental agencies' voiced concerns about the historical failures of the model and its inability in this study to replicate simple components of the nearshore system, such as net longshore transport.[11] In response to these comments, the Corps merely states that "the Delft3D model is not intended or is claimed to be a predictor of the future"[12] , which suggests that the Corps, itself, has little confidence in its model. The Corps reiterates this lack of confidence when it further states, "These tools were used to help assess and determine the differences between the alternatives and were not intended to represent predictions of what changes to expect in the future."[13] Yet, modeling results are the main argument for choosing the preferred alternative.

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[8] FEIS, Appendix B, p. 54-56
[9] Ibid.
[10] Ibid.
[11] FEIS, Appendix G, Comments 232-234, p. 27
[12] FEIS, Appendix G, Comment 174, p. 19
[13] FEIS, p. 23

As expressed in the federation's DEIS comments, the calibration run was unable to replicate the observed shoreline changes. For example, calibration #43A shows erosion between stations HB340 and HB300, whereas the island actually experienced accretion. The Corps responds, in the FEIS, that the relevant factor in the calibration is not the agreement of the model with the observed change but the *trends* on both sides of the inlet as obtained in calibration run #43A.[14] These trends are certainly not observed at station HB400, where the calibration shows erosion while the observed trend was accretion. The Corps' arguments in response to concerns are unsupported. To address this inadequacy, the Corps needs to provide a reasonable and supported argument for choosing one calibration run over others and for determining that the chosen calibration run adequately simulates future shoreline changes.

The Corps claims that in calibrating and simulating shorelines with Delft3D, achieving a correct shoreline trend outweighs achieving actual replication of the observed shoreline change. This claim proves that the model's numerical results of sand volume changes obtained by the model simulation should not be taken into consideration. However, the Corps relies on these numerical results of simulated sand volume change throughout the document, particularly when comparing the five alternatives.

The numerical simulations from the Delft3D model are largely inaccurate. The calibration runs show that the closer the measurements are to the inlet areas, the less accurate the model is in replicating shoreline volume changes. All three calibration runs overestimate erosion at the west end and underestimate erosion on the east end of Ocean Isle.

While scientific models are not meant to predict the future or replicate a system in its entirety, they are meant to explain or approximate targeted components of a system[15] -- in this case, shoreline erosion along OIB and the impact from the neighboring Shallotte Inlet. The Delft3D model does not get anywhere close to creating a picture of reality and the methods used promote the preferred alternative of the terminal groin, without properly analyzing the other possible alternatives.

Rather than modifying the analysis or providing sound reasoning for why the model failed to replicate erosion rates near inlets, the Corps instead provides the response in the FEIS that "exact replication is not necessary since numerical models such as Delft3D are used to develop relative differences in the response of a system to man-induced changes."[16] While "exact replication" of the OIB nearshore system is not necessary, the model did not even generally replicate the process of sediment

[14] DEIS, Appendix G, p. 20
[15] http://www.britannica.com/science/scientific-modeling
[16] FEIS, Appendix C, p. 60

transport. The model incorrectly determined the direction of sediment transport, which has a central effect on model results.

The Corps either needs to provide substantial evidence as to why its decision-making relies on modeling that is clearly faulty or it needs to utilize additional methods for evaluating the alternatives.

The Corps is contradictory in its statements: the Corps says the FEIS only relies on simulating the shoreline trend rather than the actual numerical data when referring to modeling simulation; yet, the Corps relies on the exact simulated numerical volume change results when comparing alternatives, with the goal of choosing the preferred terminal groin and assessing the economic costs. The Corps needs to make a decision as to whether the modeling tool is relied upon to approximate general trends or to calculate sand volume=]]]] changes, and apply that decision consistently. In the current FEIS, the Corps flip-flops between both sides, further illustrating the misuse and manipulation of the model results.

The three-year timeline used in the model simulation is unacceptable. Momentarily overlooking the systemic flaws of the Delft3D modeling, another issue present in the model is that it was only run for three years into the future. When we think about shoreline dynamics, we consider the timescale to be long-term. Thus, it is essentially useless to look at the impact of different erosion mitigation techniques over only three years. Shortening the timeline of the model underestimates the negative effects that certain alternatives -- namely the terminal groin -- might have in the long run.

The federation and Southern Environmental Law Center (SELC) expressed concerns about the three-year timeline used for the modeling simulation. In response, the Corps states that running the model for an extended period of time using the same input parameters, while possible, would not be relevant."[17] However, in addressing the lack of modeling simulation for Alternative 4, the FEIS ran the simulation for nine years, showing graphic results of only years four through six post groin, but including numerical results for all nine years.[18] This change in the modeling timeline renders the Alternative 4 incomparable to other alternatives thus preventing the objective comparison of all alternatives.

The Corps needs to issue a Supplemental EIS with modeling results for at least nine years for all alternatives and compare volume changes and costs of all alternatives in one easily understandable table. In addition, the Corps needs to provide tables that compare periodic nourishment needs and sand volume changes, expressed in the same units of time. Furthermore, an updated analysis needs to include clearly defined contours (i.e. -6 ft NAVD or -18 ft NAVD) for each alternative being compared.

[17] FEIS, Appendix G, Comment 185, p. 21
[18] FEIS, Appendix B, p. 59-60

The U.S. Fish and Wildlife Service (USFWS) and U.S. Department of the Interior (USDOI) also questioned the validity of a model that only forecasts three years into the future, especially considering the fact that the terminal groin has a 30-year timeline with a five-year maintenance schedule. The Corps' response to these comments only notes that the three-year simulation was "sufficient to develop relative differences in the response of the area"[19] among the different alternatives. However, this response is insufficient. The Corps needs to (1) provide reasoning for how the relative differences in the model make it a valid way of analyzing alternatives and (2) re-do the analysis to forecast much further than three years into the future.

The Corps does not accurately assess economic impacts of the alternatives.

Despite the many comments submitted concerning recurring problems in the economic analysis within the DEIS (see Appendix G of FEIS), few meaningful changes have been made in the FEIS. The analysis provided in the FEIS follows questionable estimates based off the faulty Delft3D modeling system, as discussed in the section above, and similarly unfairly compares the alternatives.

The modeling simulation and economic analysis utilizes disparate timescales.

A comparison of the DEIS and FEIS indicates that many inconsistencies remain between the economic analysis and the modeling for each alternative. This is especially true when applying the results of a three-year model to conducting a 30-year cost analysis. The federation[20] and the SELC[21] raised concerns regarding the discrepancy between these timescales. The Corps defends the model by stating that it "is not used to 'predict' future changes since predictions of climatic conditions far into the future are not possible."[22] However, this response does not adequately answer the concerns raised.

The concerns specifically questioned the reliability and validity of only modeling for a three-year time period. It was noted that the three-year modeling reduced the ability to see the future benefits of regular beach nourishment, and that the short three-year time span does not allow for the compounding benefits of regular nourishment to be seen.

The Corps' response provided in the FEIS did not satisfactorily address the issues of the use of modeling in regard to cost estimation. If the Corps cannot use the Delft3D model to accurately predict more than three years in advance, as concluded in the

[19] FEIS, p. 117
[20] FEIS, Appendix G, Comment 236, p. 27
[21] FEIS, Appendix G, Comment 185, p. 21
[22] Ibid.

above section, then its ability to reliably measure the economic impacts of erosion thirty years into the future is highly questionable. The Corps needs to execute an economic analysis that does not rely on an unreliable model with a much shorter timescale.

The project area and affected properties are unclear.

Disregarding the inconsistency in time scales used for analysis, the Corps continues to be vague regarding the parcels included in its financial analysis. In response to the federation's concern regarding the parcels used in the DEIS, the Corps amends the number of parcels included in its analysis in the FEIS to be parcels of land valued at $2,000 or above.[23] This decreased the total number of parcels from 238 (as assessed in the DEIS) to 155 (as newly assessed in the FEIS). However, the location of these parcels is still unclear.[24]

The Corps fails to explicitly state in its responses to comments whether the parcels used in the analysis and model simulations include submerged lots. Instead, the Corps reports in the FEIS that it has modified the parcel estimate in accordance with the Brunswick County GIS, which shows no developable parcels to the east of station 0+00, as further evidence of addressing concerns over parcels estimates. The Corps needs to provide a list of addresses for the 155 parcels (including the 45 structures) used in the assessment in order to provide transparency in its analysis and support cost assessments attributed to parcel damages.

The cost analyses of the alternatives are biased.

In addition to the inconsistencies in the economic analysis timeline and the disparity in the parcels used for the modeling, there is a disproportionate level of detail in the cost analyses of each of the alternatives. Costs of Alternatives 1 and 2 are overestimated, because the Corps adds the costs that would be shared by the federal government (in regards to renourishment) to the overall cost for these alternatives. In the FEIS, the Corps maintains this action, explaining that "other alternatives could increase periodic nourishment costs while others would actually reduce nourishment costs."[25] However, including these costs shared by the federal government is inconsistent and shows a skewed perception of costs that would impact the Town of Ocean Isle Beach. These additional costs inflate the actual costs of Alternative 1 and 2 by 43.19 million dollars. Moreover, it is unclear in Alternative 3 whether or not the federal share of the costs is included. The Corps' inconsistent inclusion of federal shares of the costs renders its comparison of the costs across alternatives useless.

Furthermore, the FEIS includes not only costs attributed to the town of Ocean Isle, but also costs that would be borne by private stakeholders - specifically parcel

[23] FEIS, Appendix G, Comment 237, p. 28
[24] Ibid.
[25] Ibid.

owners and developers. The costs for Alternatives 1 and 2 not only include damages and related repairs to roads and utilities, but also costs associated with relocating, demolishing or repairing affected structures (such as beach homes).[26] Such costs would be borne by property owners and not by the town. The Corps defends this action by explaining that each alternative was equally evaluated in every aspect in accordance with federal storm damage reduction projects.[27] Yet, Alternatives 3, 4, and 5 are modeled to show no damage due to erosion.[28] Therefore, the costs attributed to Alternatives 1 and 2 are overestimated in comparison to Alternatives 3, 4, and 5, which only include costs that the Town of Ocean Isle would be responsible for. The lack of consistency over cost distribution renders cost comparisons across alternatives invalid and questionable.

Adding to cost inconsistencies is the grossly underestimated cost of Alternative 5. In the FEIS, the Corps estimates the groin's annual structural maintenance to be $13,000/yr for a 500ft terminal groin.[29] This differs significantly from the price estimate developed in the 2010 Coastal Resources Commission's (CRC) terminal groin study, which provides some base cost estimates for terminal groins. This study approximated the annual structural maintenance for a 450ft groin, not including associated costs such as beach nourishment, to be around $125,000/year.[30] The large disparity between the two estimates is concerning as it indicates that the gross underestimation of annual costs for terminal groin maintenance has lead to incorrect assumptions of the fiscal viability of this alternative. The Corps needs to correct the maintenance cost for the preferred alternative in its analysis.

Overall, the cost estimates and economic analysis provided in the FEIS are unclear and inconsistent. The responses to the federation's concerns in the FEIS lack clarity and are often unsatisfactory and incomplete. Without clear and consistent financial estimates, there is no reliable way to compare costs across alternatives and no way to find the alternative that is best both environmentally and fiscally.

The Corps should include an in-depth and accurate economic analysis that critically and objectively looks at the costs of each alternative in a Supplemental EIS.

The Corps does not follow federal regulations.

Scoping Requirements under NEPA have not been met.

Despite feedback that the DEIS failed to comply with NEPA, the Corps made little effort in the FEIS to address these breaches in federal law. In response to the comments that outlined the DEIS' failure to follow scoping requirements of NEPA,

[26] FEIS, Appendix B, p. 30
[27] FEIS, Appendix G ,Comment 235, p. 27
[28] FEIS, Appendix B, Table 5.4, p. 82
[29] FEIS, Table 3.7, p. 43
[30] NCDEQ Terminal Groin Study, Table VI-10

the Corps merely replies that the requirements were "satisfied".[31] The response does not address the concern that the single scoping meeting held by the Corps did not satisfy the requisite scoping that should have occurred throughout the planning and early stages of EIS preparation. 43 CFR § 46.235 refers to the scoping process as to be conducted through "meetings", plural, as well as through "newsletters and other communication methods appropriate to scoping."

Not only did the Corps fail to hold more than one meeting, it also did not incorporate other methods of communication into the scoping. This lack of communication resulted in a lack of public involvement in the EIS process and a failure to keep the public informed through the different stages of development. These examples demonstrate the negligence exhibited with regards to the Corps' noncompliance with NEPA.

The FEIS is not written in a clear manner.

The federation also noted that the Corps did not employ plain language and readily understandable and appropriate graphics in the EIS.[32] The Corps does not improve upon this in the updated EIS. Like the DEIS, the FEIS fails to standardize its references to the project area, and instead uses numerous different combinations of street names, distances, and station numbers as reference. Additionally, the FEIS alternates between the words "structure", "building", and "dwelling" when discussing construction on the parcels, never clearly defining what these are and whether they differ from each other. This inability to streamline writing choices leaves the reader confused and makes it challenging to follow the document's logic.

This challenge is only compounded by the disorganized nature of the FEIS. Recommendations that the structure and organization of the DEIS be simplified went unheeded and no changes were made in the FEIS. The labyrinth-like arrangement of the FEIS requires large amounts of bouncing back and forth between the main body of the FEIS document and its appendices. These poor methods of organization confuse the reader and diminish the intent of the document. Therefore, the FEIS continues to be in noncompliance with 40 CFR §1502.8. The Corps must reorganize and simplify the document so that the NEPA purposes of transparency and true public involvement are satisfied.

The Corps does not fully scrutinize potential environmental effects.

The FEIS does not address the full range of impacts that this project will have on the environment -- direct, indirect, and cumulative. It uses Alternative 1 as the unequivocal standard of all that will come to be if a different approach is not employed. However, as is mentioned above, the Delft3D modeling system used for

[31] FEIS, Appendix G, Comment 243, p. 28
[32] Ibid.

Alternative 1 in the FEIS is unreliable. Using the model to make whole host of other assumptions is not good science and does not result in an accurate analysis.

The federation made this point that the DEIS analysis did not encompass all of the potential environmental impacts of the terminal groin.[33] In its response, the FEIS states that numerical models were the only way to evaluate the potential impacts, as these geographic areas are extremely dynamic and ever-changing. The Corps needs to submit evidence supporting its conclusions on the potential environmental effects of the terminal groin.

Conclusion

Under the Clean Water Act (CWA), the Corps is *only* allowed to permit the least environmentally damaging, practicable alternative (LEDPA) when evaluating an EIS. The analysis within the FEIS does not fairly or equally evaluate the five alternatives and is biased toward Alternative 5. Responses to the overwhelming field of comments, questions, and concerns from the federation and other organizations and governmental agencies were avoidant, ambiguous, and often irrelevant. Questions and concerns were dodged, few changes were made, and the FEIS' improvements from the prior document were minimal.

Without fully addressing these comments and concerns, the FEIS fails to comply with the basic tenets of the NEPA and other federal laws. In the FEIS, the Corps (1) does not equally evaluate the five alternatives, (2) employs inappropriate numerical modeling, (3) inaccurately assesses the economic impacts of the alternatives, (4) fails to comply with the requirements of NEPA and the ESA, and (5) does not fully examine environmental impacts. Because of the biased, inaccurate, and inconclusive analysis of the alternatives presented, there is no solid ground on which to claim that Alternative 5 is the optimal alternative for the issue of erosion on OIB.

The unavoidable fact remains that terminal groins, seawalls, and other hard erosion control structures were banned in North Carolina in 1985 for a reason. This ban followed a study by the CRC, which concluded that "the potential negative effects of such structures could cause irreversible damage to North Carolina's beaches."[34]

Terminal groins are unnatural and outdated methods of preventing shoreline erosion and the construction of these hardened structures should not be permitted on our coastlines. They are expensive, permanent methods of shoreline erosion prevention that have hugely detrimental impacts on the shoreline, ecosystem, and surrounding coastal communities. In addition, they are dangerous and require a lot of maintenance. While these structural alternatives were common in the past, they are exactly that - *a thing of the past*.

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[33] FEIS, Appendix G, Comment 243, p. 28

[34] http://deq.nc.gov/about/divisions/coastal-management/coastal-resources-commission/2010-crc-terminal-groin-study/terminal-groin-study-final-report

The federation stands by its previous conclusion that Alternative 4 for the Realignment of Shallotte Inlet Ocean Bar Channel (including Federal Project) is the preferred and best alternative for addressing the issue of erosion on the East end of Ocean Isle Beach. The flawed and highly subjective analysis in the FEIS does not do this option justice, but instead slants the analysis -- both quantitative and qualitative - in favor of the terminal groin. Therefore, it is critical that the Corps conduct further analysis and submit a Supplemental EIS that objectively finds a method for mitigating erosion on Ocean Isle Beach. Until then, no further action should be made in the decision-making and approval process.

Thank you for considering these comments. Please contact me at (252) 393-8185 or anaz@nccoast.org if you have any questions regarding their content.

Sincerely,

Ana Zivanovic-Nenadovic
Senior Policy Analyst

Cc:
Todd Miller, North Carolina Coastal Federation
Derb Carter, Southern Environmental Law Center