North Carolina
Coastal Federation
Working Together for a Healthy Coast

October 13, 2015

Via Electronic Mail
Ms. Emily Hughes
U.S. Army Corps of Engineers
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Wilmington, NC 28403
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RE: SAW-2011-01914 Holden Beach East End Shore Protection Project

Dear Ms. Hughes:

Please accept the following comments on the proposed terminal groin project on Holden Beach on behalf of the N.C. Coastal Federation (federation). For the past 33 years the federation has been taking an active role in the protection of North Carolina's coastal water quality, habitat and public beach access. The federation actively supports the preservation and public use of our state's beautiful and productive beaches and inlets as public trust resources for everyone in North Carolina.

The U.S. Corps of Engineers (Corps) does not provide the public and decision-makers with a thorough and comparable analysis of reasonable alternatives, thus confining the public information to narrow, selective and targeted information that supports only the preferred alternative. The National Environmental Policy Act (NEPA) mandates that all alternatives be equally, rigorously evaluated, and that the Environmental Impact Statement (EIS) provides an objective analysis rather than a justification for already made decisions. The Corps does none.

1. Failure to Comply with NEPA

1.1. EIS fails to provide clear and concise information

40 CFR 1502.1. and 1502.2 (c) mandate that EIS be concise, clear and to the point, supported by evidence of analyses. The DEIS is overwhelmingly confusing because it provides data and analyses for different sets of alternatives modeled over different timelines, producing a number of different projections that are not relevant for the proposed project. The DEIS provides cost estimates that are disparately different throughout the document. Finally, the Corps' failure to provide clear information and enable public understanding of the proposed project is exemplified in its failure to disclose the baseline year it uses for the modeling simulations.

1.1.1. Failure to provide the baseline year used in the assessment and modeling of future shoreline changes

The Corps relies on modeling results to justify its choice of the preferred alternative. A range of modeling simulations, discussed further below, shows how the change in shoreline over a period of four years will drive the mean high water mark close to the structures on the east end of the island. Yet, nowhere in the document does the Corps identify the baseline year. Failure to provide this essential piece of information renders the entire document useless given that the reader cannot make any meaningful conclusions based upon the information presented in the document.

1.1.2. Failure to justify evaluation of a 30-year project over 4 years

The EIS states that "long term project performance was investigated using several suites of 4-year simulation runs under various alternatives."[1] This is an unacceptable time span for a project with a life of 30 years. It is clear that the 30-year project life is recognized because the DEIS provides cost and benefit analyses that are projected 30 years into the future, yet no simulations were run for this time span. Similarly, to allow for the equitable comparison and assessment, the Corps needs to model the effects and performance of the proposed project for a period of 30 years or at least use the same timeline it used for other terminal groin proposals. Alternatively, the Corps needs to provide a justification for using a 4-year period.

1.2. Failure to rigorously explore and objectively evaluate all alternatives

In describing the treatment of project alternatives as the heart of the EIS, 40 CFR 1502.14 requires agencies to: (1) rigorously explore and objectively evaluate all alternatives; (2) dedicate substantial treatment to each alternative to allow for evaluation of their comparative merits. The Corps fails to comply with both of these legal requirements.

To allow for the objective, equal and rigorous analysis of all the alternatives the Corps needs to establish objective and comparable set of baseline data, analyses and results for all alternatives. The Corps does none of this.

1.2.1. Contrasting and disparate cost analyses that prevent equitable comparison of alternatives are provided

The DEIS provides two completely different economic analyses that individually provide insufficient information and are at odds with each other. Further, the two analyses provide estimates for completely different sets of alternatives.

The cost assessment in the engineering report states that the cost table (Table 9-8) includes assessment of five alternatives, yet the table lists seven alternatives.[2] In addition, five of these seven alternatives are at odds with the six alternatives presented in the main DEIS document. Further, the DEIS states that this table is

[1] Appx. F, p. 7-16
[2] Appx. F, p. 9-21

based on a table 9-7.[3] Yet, in table 9-7 the DEIS only presents data for five alternatives omitting Alternative 1 and 2, failing to show how it arrived at an estimated 30-year cost for Alternative 2 of $121-166 million.[4] This same Alternative is estimated to cost $5.8 million in the main DEIS document.[5]

Finally the skewed financial analysis provided in the engineering report is demonstrated in the assessment of damages and losses due to the groin. The DEIS falsely states that these factors are not applicable to groins. Further, this analysis does not include the costs for long-term maintenance and monitoring of the groin, implementation of mitigation measures and eventual modification or removal of the groin, actions required by the GS §113A -115.1(e)(5).

The cost and benefit estimates provided in Chapter 5 of the document provide estimates for a different set of alternatives and factors and omit numeric estimates on reduction in tax base and transition costs, among others.

These two disparate and inconsistent, yet individually skewed and insufficient economic analyses illustrate the inadequacy of the DEIS document to provide meaningful and realistic data that would enable objective comparison of all alternatives.

1.2.2. Failure to provide comparable data

The DEIS provides a number of simulated conditions in the engineering report some of which are modeled for 190 days, some for one year, and some for four years, a period that the unjustifiably considered "long term". Yet, none of these conditions are consistently applied to all alternatives. The following is a list of all the simulation options provided in the engineering report, cited directly from the document:[6]

Set 1

Time period: June 2009 – December 2009
Modeling interval length: 190 days

- Baseline no action
- Short groin and 60,000 cy nourishment
- Long groin and 90,000 cy nourishment
- 60,000 cy nourishment
- 90,000 cy nourishment
- Short groin only
- Long groin only
- 1,310,000 cy central reach nourishment
- Outer channel relocation
- Short groin, 60,000 cy nourishment and outer channel relocation

[3] Appx. F, p. 9-18
[4] Appx. F, p. 9-21
[5] DEIS, p. 5-57
[6] Names of alternatives cited directly from the Appx. F

Set 2
Time period: 2004
Modeling interval length: 1 year

- No action
- Sg + Nr
- Sg+NR+INL+BRW

Set 3a
Time period: June 2009 – December 2009
Modeling interval length: 190 days
Location: Area 1&2

- 60,000 cy nourishment only
- Short groin only
- Groin and nourishment
- Channel relocation
- Central reach nourishment
- Groin nourishment channel relocation LWFIX borrow area

Set 3b
Time period: June 2009 – December 2009
Modeling interval length: 190 days
Location: Area 3&4

- 90,000 cy nourishment
- Long groin only
- Groin and nourishment
- Channel relocation
- Central reach nourishment

Set 4
Time period: Unknown
Baseline Bathymetry: 2004-2008
Modeling interval length: one year

- Short groin and 80,000 cy nourishment
- Short groin without a T head and 80,000 cy nourishment
- Short groin 80,000 cy nourishment, bend widener borrow area and outer channel relocation
- Dredged eastern channel
- Wide outer channel dredging and 120,000 cy nourishment

Set 5 - Long-term modeling
Time period: Unknown
Modeling interval length: 4 years

- No action
- Nourishment only
- Short groin and nourishment
- Long groin and nourishment
- Intermediate groin and nourishment

- Intermediate groin only
- Wide outer channel and nourishment

Set 6 - Long term shoreline change analysis
Time period: Unknown
Modeling interval length: 4 years
Modeling location: West, Middle and East Zone

- No action
- Nourishment only
- Short groin and nourishment
- Intermediate groin and nourishment
- Long groin and nourishment

Set 7 - current magnitudes to assess biological resources:
Time period: 2009
Modeling interval length: 190 days

- No action,
- Short groin/nourishment/LVFIX borrow area
- Long groin only

Different and unknown time periods and lengths of the simulations and the multitude of modeled alternatives without practical application prevent any meaningful comparison of the results and their application to the alternatives considered in the DEIS. This charade of simulated alternatives together with the disparate economic analyses epitomizes the futility of the modeling section.

2. Application of inadequate modeling tools for an inadequate time period

To support its choice for the preferred alternative, the Corps relies on two modeling tools – Coastal Modeling System (CMS), Wave-Watch, with Genesis-T as a backup. Both tools are limited in their delivery and cannot be relied on for determining the effects of engineered structures on future shoreline positions and sand volume changes. Basing decisions solely on the results of these tools is a dangerous exercise that puts at risk public trust belonging to the people of North Carolina.

The major limitation with the use of these models is the inability of the modeler to account for "unknown timing, intensity, direction and sequencing of coastal storms".[7] Another limitation of the models is that they usually rely on linear representations of non-linear processes affected by complex and interrelated variables of coastal processes, resulting in unrealistic predictions.

The Corps prevents any meaningful analysis and comparison of data given the disparate timelines of the data used in the analysis:

[7] Pilkey et.al 2013 p. 143

- CMS Modeling configuration uses topographic data from 2009 and a Lockwood Folly River survey from 2008
- CMS Bathymetry of 2009 is shown on an aerial map of 2008
- CMS Net sediment transport is shown for 2004
- SWAN model includes wave data from 1999-2011
- GENESIS-T uses a timeline from 2000-2011

2.1. Insufficient sensitivity analysis and model calibration

The Sensitivity Analysis that is used to determine model configuration was based on thirteen different model runs that were performed for a 2-week interval of an unknown time period. These runs included only seven parameters. Yet, scientists have identified up to forty-two relevant parameters in coastal analyses and modeling, nine of which are always important and seventeen sometimes important.[8]

Similarly, the calibration was performed to water levels and conditions from 2008. A total of ten gauges were deployed for sixteen days, yet the Corps relies on and presents data only from two gauges, one of which resulted in partially incomplete data because it was moved.

Basing its decision on this information, the Corps concludes that "the model results are in good agreement with measured data."[9] The Corps cannot in good faith make this determination. Even if the model run has a successful calibration and verification and agrees with the known event used to calibrate it, the model certainly cannot predict the future. In other words, the results obtained by that specific model run, calibrated and verified for certain conditions of a known period are only *one of hundreds of possible results*. One could obtain all possible future results if one knew not only the intensity and timing of future weather events, but also the sequence of those events, among many other factors. The model results, as presented in the DEIS give users a false sense of confidence and are in fact unreliable in accurately assessing the risk of extraordinary events such as hurricanes.

Finally, the DEIS presents data from current profile surveys and concludes there is a "good correlation between the modeled and measured".[10] However, the data were only collected for two days at three locations. In addition, the three Figures (7-10 – 7-12) only show agreement with regard to direction of the current but not its speed.

GENESIS-T applies even fewer parameters in its application. The DEIS states the model was run for 12 years, yet it shows results only for only year 6 and only for a select number of alternatives. GENESIS-T also shows the success of the current

[8] Pilkey and Pilkey-Jarvis, 2007
[9] Appx. F, p 7-8
[10] Appx. F, p. 7-8

management strategy (Alternative 1) because it confirms the "overall accretional trend"[11] for most of the Holden Beach shoreline.

Furthermore, GENESIS-T assumes that wave-generated currents dominate longshore sediment transport. It ignores wind-dominated currents and tides that are common on the coast of North Carolina. Finally, as admitted by the Corps, this tool cannot model channel realignment. GENESIS has been critically reviewed as relying on poor assumptions and widespread use of smoothing averages (Young et al. 1995; Thieler et al. 2000). The Corps needs to reject the use of this tool in the DEIS because the tool cannot provide analysis for all the alternatives for the proposed project.

The models used to simulate the effects of the alternatives do not, and cannot, account for the dynamic nature of events of tides, currents, storms, and winds as well as of the order in which these occur. This issue is further compounded by the Corps' use of inadequate, incomplete and contrasting data when running simulations. The Corps needs to re-evaluate the modeling systems employed to compare alternatives, as well as the data used to calibrate and run simulations.

3. Failure to prove that the chosen preferred alternative is the most feasible

As discussed above, the DEIS provides two disparate sets of economic assessments. One is provided in the engineering report and the other in Chapter 5 of the DEIS. Neither of these two documents provides a sound economic analysis of the proposed project. In fact, they only support the notion that economically, the proposed project does not have any merit.

The economic analysis provided in Chapter 5 of the DEIS provides an insufficient cost and benefit analysis of the alternatives. Appendix F provides a completely different economic analysis. This analysis is based on an entirely different set of factors and provides cost estimates based on the costs of projects done in South Carolina.

Table 1 summarizes the cost of each Alternative as well as the number of structures and lots each is projected to protect at the end of four years, according to the DEIS.

[11] Appx .F, p. 7-71

Alternative	Total Cost* (millions)	# of Affected Properties (land only)	# of Affected Properties (structures only)	Total # of Affected Properties
1	$49.5	6	13	19
2	$5.8	9	19	28
3	$58.9	6	13	19
4	$58.7	6	13	19
5	$35.4	5	6	11
6	$36.6	5	11	16

Table 1: Costs and affected properties and structures for each alternative as presented in Chapter 5 of the DEIS

**Denotes sum of construction and maintenance, assessed tax value of affected parcels and infrastructure replacement costs as presented in Chapter 5 of the DEIS*

Table 2 shows comparison of Alternatives relative to Alternative 2. It stands that Alternative 6 would marginally protect only four structures and eight lots more than what would otherwise be affected under Alternative 2.

Alternative	Difference in Total Cost (millions)	# of Affected Properties (land only)	# of Affected Properties (structures only)	Total # of Affected Properties
1	$43.7	-3	-6	-9
2	n/a	n/a	n/a	n/a
3	$53.1	-3	-6	-9
4	$52.9	-3	-6	-9
5	$29.6	-4	-13	-17
6	$30.8	-4	-8	-12

Table 2: Costs and affected properties and structures relative to Alternative 2

The suggested protection would be marginal because as Figure 1 indicates, even if a groin is built, after four years the mean high water line mark (red line) would be in a similar location as it would be under Alternative 2 (Figure 2). Comparing these figures shows that the difference in position of the mean high water line between the two options is negligible.

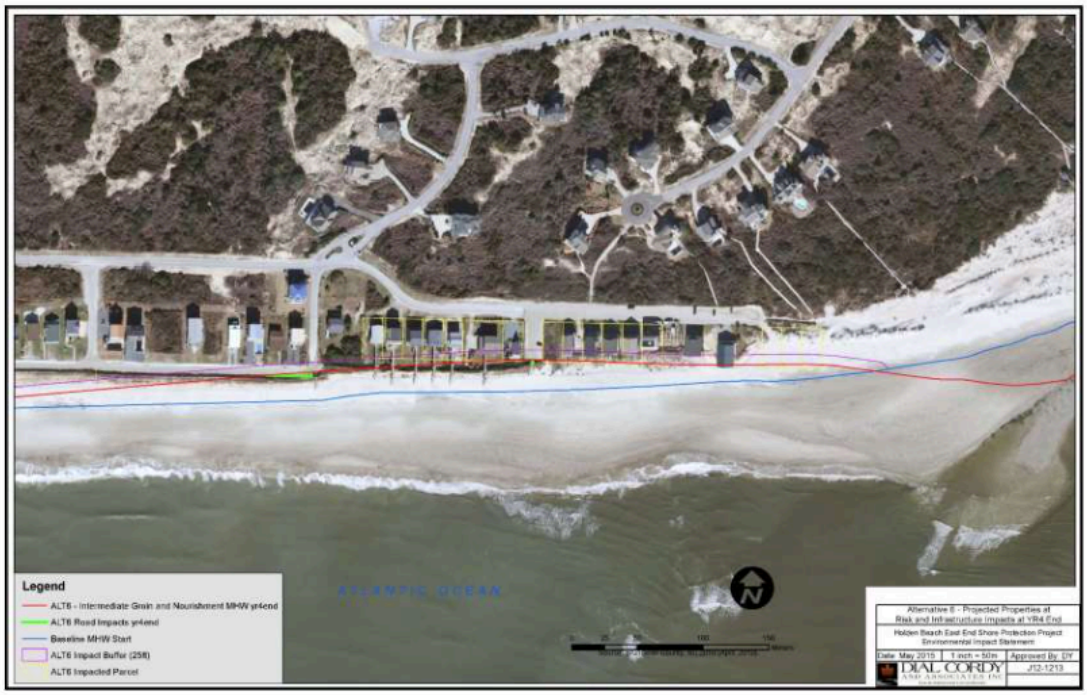

Figure 1: Projected properties at risk and infrastructure impacts at year four end under Alternative 6[12]

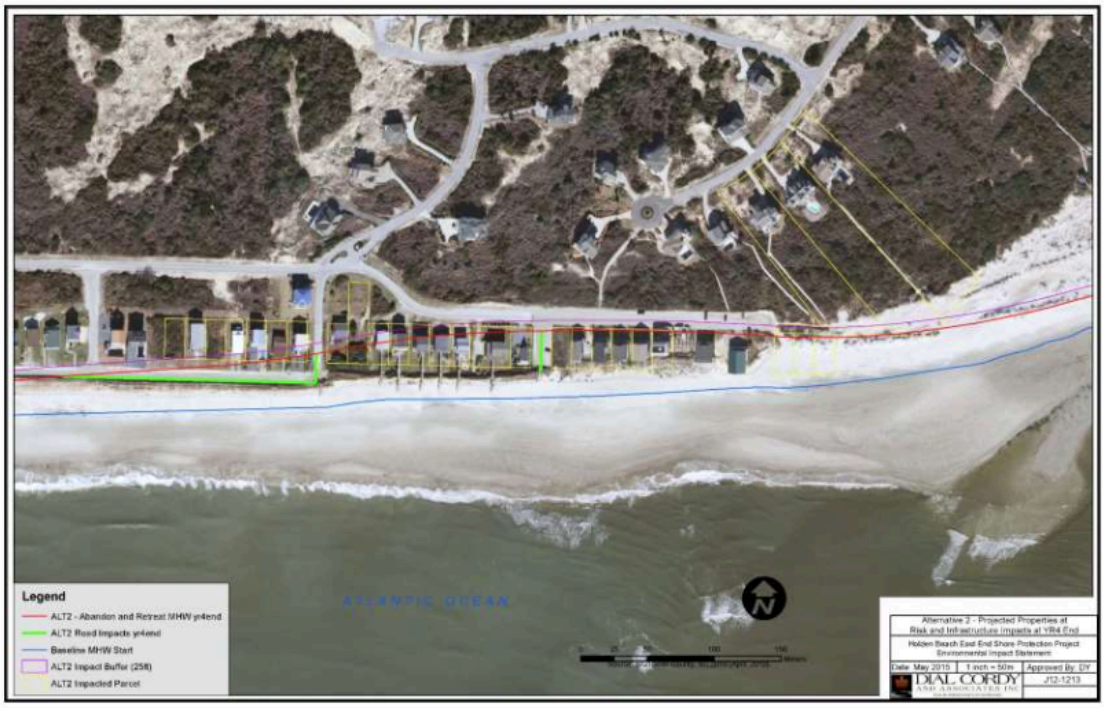

Figure 2: Projected properties at risk and infrastructure impacts at year four end under Alternative 2[13]

[12] DEIS, p. 5-157
[13] DEIS, p. 5-65

Given that exact locations and sizes of the properties "saved" under Alternative 6 were not identified in the DEIS it was not possible to determine their exact value. For comparison purposes using the assessed value of properties under Alternative 2 (28 properties are valued at $5.18 million[14]) renders that the approximate value of the 12 properties (4 land and 8 structure) that Alternative 6 could only marginally protect is $2.2 million.

In conclusion, the Corps maintains that the best alternative for the proposed project is to spend $30.8 million more in order to protect land and structures valued at $2.2 million. This is unacceptable.

Further relative comparison of alternatives indicates that it would take about $10 million more to implement alternatives 3 and 4 than it would to continue with the currently employed management strategy (Table 3). Yet all three alternatives would render the same number of affected properties – six lots and thirteen structures.

Alternative	Difference in Total Cost (millions)	# of Affected Properties (land only)	# of Affected Properties (structures only)	Total # of Affected Properties
1	n/a	n/a	n/a	n/a
3	$53.1	0	0	0
4	$52.9	0	0	0

Table 3: Comparison of costs and affected properties and structures of Alternatives 3 & 4 relative to Alternative 1.

The negligible difference among the projected modeled alternatives is also shown in the relative comparison of the preferred Alternative 6 and the strategies currently employed by the applicant (Alternative 1). This comparison indicates that the proposed preferred alternative would only marginally protect one property and two houses more than what the current strategies are doing.

Drawing from these relative comparisons it stands that the best and the most financially practicable alternative is for the applicant to allow the natural inlet process to occur and if necessary relocate existing structures. Alternatively, if the applicant is not ready to take this step, the next best solution for the Applicant is to continue with the current strategies explained under Alternative 1.

[14] DEIS, p. 5-67

4. Failure to comply with the federally required Section 7 of the Endangered Species Act

The DEIS fails to fulfill the basic legal requirements to provide a multilateral assessment of the effects on the environment. The proposed project would affect fourteen federally listed species and their critical habitat hence it requires the Corps to consult with expert agencies U.S. Fish and Wildlife Service (USFWS) and National Marine Fishery Service (NMFS). These agencies need to issue Biological Opinion stating their assessment of the effect of the proposed project on the species and their habitat.

50 CFR §402.10 requires Federal agencies to confer with the Service on actions that are likely to jeopardize the continued existence of any proposed species or result in destruction of their habitat at *early stages* in the planning process so that potential conflicts can be identified and resolved. Further, 50 CFR §402.11 describes that the "early consultation is designed to reduce likelihood of conflicts between listed species or critical habitat and proposed action" of Federal agency. Finally, 50 CFR §402.14 requires the Federal agency "to review its actions at an *earliest possible time"* [emphasis added] to determine any possible effects of its proposed action to the enlisted species and their habitat.

The DEIS fails to provide documents to show that the any type of consultation has occurred with the expert agencies. The DEIS also fails to supply the Biological Opinion of expert agencies. Without the Biological Opinion, the public cannot know what the response of the expert agencies to the effects of the proposed project to these species.

The Section 7 Consultation provision was put in place in the ESA so that opinions of all relevant parties are taken into consideration before the public can comment on the project. The Corps needs to comply with the ESA and consult with the USFWS and NMFS to receive their Biological Opinion on the effects of the project on the listed species of Lockwoods Folly Inlet. Without it, the DEIS is incomplete.

Conclusion

For the reasons described above, the Corps cannot issue a Final Environmental Impact Statement for this project. The Corps has failed to comply with the requirements established by NEPA and with other federal laws. The DEIS is replete with deficiencies that must be addressed. Based on the data presented in the DEIS it stands that the most economic option for the town of Holden Beach is Alternative 2. The Corps cannot justify its choice of the preferred alternative. These deficiencies must be fully explained in a supplemental EIS and released for public review and comment.

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
Program and Policy Analyst

Cc:

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Walker Golder, North Carolina Audubon
Braxton Davis, N.C. Division of Coastal Management

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