



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

CEMP-SPD

APR 15 2012

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)
108 ARMY PENTAGON, WASHINGTON, DC 20310-0108

SUBJECT: San Clemente Shoreline Feasibility Study Orange County, CA – Final USACE
Response to Independent External Peer Review

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-209, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute. The IEPR panel consisted of five panel members with technical expertise in coastal design/construction cost engineering; civil works planning; the National Environmental Policy Act (NEPA)/biology; coastal engineering; and economics.
3. The final written responses to the IEPR are hereby approved. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR report. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the internet, as required in EC 1165-2-209.
4. If you have any questions on this matter, please contact me or have a member of your staff contact Mr. Bradd Schwichtenberg, Deputy Chief, South Pacific Division Regional Integration Team, at 202-761-1367.

Enclosure

MERDITH W.B. TEMPLE
Major General, USA
Acting Commander

**San Clemente Shoreline Feasibility Study
Feasibility Report and Environmental Impact Statement**

**FINAL
U.S. Army Corps of Engineers Response to
Independent External Peer Review
April 2012**

Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-209, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (2004).

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR of the San Clemente Shoreline Draft Feasibility Report (DFR) and Environmental Impact Statement (EIS).

The Battelle IEPR panel reviewed the DFR and the Draft EIS, as well as supporting documentation. The Final IEPR Battelle Report was issued in July 2010.

Overall, 24 comments were identified and documented. Of the 24 comments, 8 were identified as having high significance, 13 had medium significance, and 3 had low significance. The following discussions present the USACE Final Response to the 24 comments.

‘High’: Describes a fundamental problem with the project that could affect the recommendation or justification of the project.

‘Medium’: Affects the completeness or understanding of the reports/project

‘Low’: Affects the technical quality of the reports but will not affect the recommendation of the project.”

1. IEPR Comment – *High Significance*: The assumption that the existing beach is erosional is not supported by the data and analyses used to develop representative Future without Project conditions.

USACE Response: Not Adopted

Since the 1990's, the project area has experienced chronic, mild, long-term erosion. Shoreline retreat results from the decrease of fluvial sand supply resulting from the concreting of creeks and rivers, upstream dams, and urban development. Continued future shoreline retreat is expected to result in storm waves breaking directly upon the railroad ballast, which significantly threatens the operation of the rail corridor. Continued future shoreline retreat also will subject public facilities to storm wave-induced damages. These facilities, maintained by the City of San

Clemente, include the Marine Safety Building, public restroom facilities located on the beach, lifeguard stations, parking areas, and paving near the Pier. If no action is taken, public properties and structures are expected to be susceptible to damages caused by erosion (including land loss and undermining of structures), inundation (structures), and wave attack (structures, railroad).

It is recognized that the shoreline change data set used in the analysis has limitations, however, this was the best data available for this area at the time this analysis was conducted. The annual shoreline change signal is masked within the much larger envelope of seasonal changes. The seasonal variations are on order of 15 m and thus are two orders of magnitude larger than the mean annual long term signal. While an intensive data collection information could have been undertaken, USACE feels that the data available and analysis conducted are sufficient to provide an accurate view of the current conditions as well as provide a basis for the future conditions. The results are consistent with the overall shoreline change scenario in this region. The sediment budget indicates the shoreline is essentially in balance, neither accretional nor erosional. Inclusion of recent monitoring data results in a marginally erosive shoreline. A risk and uncertainty model was used to calculate the future without project and with project conditions.

While additional shoreline data was not collected or generated for this study, Section 3.1 of the Feasibility Report was amended to include a narrative which summarizes the sediment budget and erosion rates. This narrative discusses the larger littoral cell, the smaller project reach within, and their relationship to the measured sediment budget and erosion rates. This narrative also further emphasizes the marginally negative long-term erosion rate and the implications on observed and future damages.

2. IEPR Comment - *High Significance*: The sediment budget discussion needs to be updated and refined to include reach-specific information.

USACE Response: Adopted

Action Taken: Section 2.7 in the Feasibility Report was amended to include a narrative which summarizes the sediment budget and erosion rates. This narrative discusses the larger littoral cell, the smaller project reach within, and their relationship to the measured sediment budget and erosion rates. This narrative also further emphasizes the marginally negative long-term erosion rate and the implications on observed and future damages.

3. IEPR Comment - *High Significance*: Railroad Reach Conversion Criterion assumptions and values are not substantiated or consistent.

USACE Response: Adopted

Action Taken: A sensitivity analysis of plan economic justification varying the range from a minimum of 4-8 cells up to a maximum of 10 to 14 cells has been added as Attachment A to the Economics Appendix.

4. IEPR Comment - *High Significance*: There are significant uncertainties associated with the selected value of the Minimum Beach Criterion that are not considered in the project alternatives evaluation and plan formulation analyses.

USACE Response: Adopted

Action Taken: A sensitivity analysis of plan economic justification varying the range from a minimum of 4-8 cells up to a maximum of 10 to 14 cells has been added as Attachment A to the Economics Appendix.

5. IEPR Comment - *High Significance*: The use of the San Diego Association of Governments (SANDAG) project to predict the performance of the San Clemente project has not been justified.

USACE Response: Adopted

Action Taken: Additional information describing the SANDAG site conditions has been added as Section 2.5.11 in the Coastal Engineering Appendix.

6. IEPR Comment - *High Significance*: The values used to represent expected storm-induced cross-shore sand transport and beach change have not been verified to site-specific conditions.

USACE Response: Adopted

Action Taken: In order to respond to the multiple recommendations contained within this comment, several revisions were made to the Coastal Engineering Appendix. Section 2.5.5, which discusses cross-shore sediment movement, was revised to discuss more in-depth the beach width monitoring program at Linda Lane and T-Street. The data collected during this program was used to show cross-shore movement of sand throughout an 18-year time period. Figures 2-15 and 2-16 have been added to graphical show beach profiles at Linda Lane and T-Street. Section 2.5.7 has been revised to address the Los Angeles District's experience with the use of SBEACH. Section 2.5.11 was added to discuss site conditions that result in the shoreline of San Clemente residing in a sand-starved system. A sensitivity analysis of plan economic justification varying the range from a minimum of 4-8 cells up to a maximum of 10 to 14 cells has been added as Attachment A to the Economics Appendix.

7. IEPR Comment - *High Significance*: Details on sediment compatibility and relationship of depth to closure need to be added to the equilibrium beach profile, toe of fill, and rock coverage analyses.

USACE Response: Not Adopted

The estimation for toe of fill and resultant rock coverage was based on the profile translation method. The profile translation method was deemed better able to represent potential habitat burial impacts over a rigorous volumetric analysis.

In southern California typical depth of closure ranges between 8-15 m water depth. This range is applicable for beaches that have a full sand shoreface and are able to exchange sand cross-shore unrestricted. Recent repetitive profile surveys conducted at T Street indicate that the depth of closure is -4.9 m (-16 ft). This corresponds to the landward edge to middle portion of the offshore reef. The repetitive surveys suggest that all sand material on the beach is trapped between the foreshore and the offshore reef. Seaward of the reef is bedrock and the repetitive profiles indicate no changes.

The toe of fill in the present analysis was placed at 8 m depth. This toe of fill depth was chosen to represent possible extreme cross-shore transport mechanisms (i.e. severe storm). The toe of fill delineation was not volumetrically balanced with the fill volume. It is this evaluator's belief that this will result in a significant imbalance of volume (the volume will be greater in the profile translation). The profile translation method results in a very conservative estimate, erring on the side of over estimating the seaward extent of the beach fill, which translates to a potential over estimate of bottom coverage and possible habitat impacts. This decision was deliberate reasoning that a conservative large estimate (as opposed to an aggressive small estimate) was appropriate to highlight the potential impacts to bottom habitat.

The geotechnical analysis is clear that variations in grain size occur within the borrow sediments. The simplifying assumption was made that the fill will be comprised of a blended mix of sediments represented by the mean grain size of the borrow materials. Construction observations on other beach fills within the Los Angeles District indicate a large percentage of borrow material fines are winnowed immediately during placement operations. As borrow materials are placed, the typical high wave energy washes out fines very quickly resulting in the coarser fraction within the fill area. There is little reason to believe that San Clemente will behave differently. Although it is expected that this fill will be constructed by hopper dredge methods, it was not deemed feasible to describe the materials within the fill or the fill performance on a scow-by-scow basis.

The beach fill equilibration process is poorly quantified in southern California. A full understanding of equilibration requires high frequency (temporal) repetitive surveys to account for volumetrics and extensive sediment sampling and grain size analysis to understand sediment sorting and distribution. Due to environmental restrictions, all beach fills in southern California are constructed during the winter time. The usual constant high energy sea state significantly complicates data collection and therefore hinders the full understanding of fill equilibration.

8. IEPR Comment - *High Significance*: The volume-to-area relationship used to derive beach fill volume and expected fill performance is not supported and additional details are needed on specific beach profile characteristics and beach fill design parameters.

USACE Response: Adopted

Action Taken: Section 6.2.5 in the Coastal Engineering Appendix was revised to address concerns with the expected performance of the project. Information on performance of other

beachfill projects within the Los Angeles District has been added to support the performance expectations for this project.

9. IEPR Comment - *Medium Significance*: The significance of the loss of surfgrass and kelp bed communities should be defined.

USACE Response: Adopted

The report determined that a range of impacts between no burial of surfgrass on the larger rocks and partial burial on the smaller boulders may occur, but it is based on the conservative coastal engineering model, which tends to over estimate the seaward extend of sediment migration. The report indicates that surfgrass is adapted to partial sand burial, routinely survives seasonal sand burial of part of its blades, and can recover quickly via regrowth if the root system is intact and cited a study by CRM (2000) that suggested surfgrass could withstand temporary burial of up to 2/3 of its blade length. Analysis of burial was not based on observations of burial during the field survey, but rather an analysis of the substrate types (rocks/boulder sizes) and the depth by which the coastal analysis model predicted sand depth. The reason why the report does not clearly define the length of burial of surfgrass is because the analysis is based on a model that indicates the potential of no burial of surfgrass, but also potentially may cause some burial. The model is not absolute and is identified as such. That is why post-construction monitoring is proposed to determine if mitigation is required.

Action Taken: The Biological Resources Monitoring Plan was added to the Final EIS/R as Appendix B.

10. IEPR Comment - *Medium Significance*: The description of each planning reach should include information on the reach's economic, environmental, socio-demographic, and engineering characteristics, and the rationale for the elimination of specific reaches needs to be better described.

USACE Response: Adopted

Action Taken: ER 1105-2-100 states, "Geomorphic conditions, land uses and type or level of existing protection are criteria used in the designation of reaches." The PDT feels that the delineation of reaches was done in accordance with this guidance. Geomorphic conditions and land use are comparatively similar throughout the study area, with differences arising primarily from existing levels/types of shoreline protection present. Thus, levels of protection was the predominant factor in defining the reaches. Section 2.1.1 of the Feasibility Report has been revised to provide more detail on the reach selection process.

11. IEPR Comment - *Medium Significance*: Based on the information provided, it is not evident that a sufficient level of public involvement took place.

USACE Response: Adopted

Action Taken: Appendix F has been added to Volume 2 of the EIS/EIR which further documents agency coordination that has occurred throughout the study process. The key stakeholder in the project area is the Surfrider Foundation. The sponsor has conducted several meetings with this group to keep them updated on the progress of the study as well as the alternatives development. Most of these meetings were held without USACE present, however, the messages from Surfrider were relayed to the PDT. A recent meeting, in June 2010, was held between USACE, the city of San Clemente and Surfrider to discuss the tentatively recommended plan and to ask about their concerns. Additionally, this project has been presented at various city council meetings and to the city's Coastal Advisory Committee. Section 7 of the Feasibility Report and Chapter 9 of the FEIS were revised to reflect the additional information from Appendix F.

12. IEPR Comment - *Medium Significance*: Cost effectiveness and not cost should be used for screening the measures.

USACE Response: Adopted

Action Taken: Section 4.6.5 of the Feasibility Report was revised to include general cost estimates for the structural measures considered. Table 4-1 of the Feasibility Report provides Comparison of Evaluation criteria for initial screening of measures. Costs of the structural options was not the only reason they were dropped in the screening process, there were also issues with opposition from the California Coastal Commission, who upholds the Coastal Zone Management Act in California.

13. IEPR Comment - *Medium Significance*: More thorough documentation and analysis is needed on management measures to justify the selection of the alternative.

USACE Response: Adopted

Action Taken: Section 4.7.4 of the Feasibility Report has been revised to clearly show the plan formulation and justification. The NED plan selection is based on maximizing the storm damage reduction benefits and justification was done using limited recreation (50%) benefits. The description of the structural measures in Section 4.6.5 of the Feasibility Report has been revised to tie in the environmental acceptability of some of the measures to conflicts with the Coastal Zone Management Act. Table 4-1 in the Feasibility Report and Table 3-1 in the FEIS have been revised for accuracy and consistency. A Model Appendix has been added to the report and is included in the Technical Appendices.

14. IEPR Comment - *Medium Significance*: More detailed examination of the impacts of future sea level rise on the project is warranted.

USACE Response: Adopted

Action Taken: This study evaluated sea level change in accordance with current USACE guidelines. The USACE considers potential relative sea level change in every feasibility study undertaken within the coastal zone. The latest USACE guidelines for sea level rise are defined

in Engineer Circular 1165-2-212. In establishing its current policy, the USACE has chosen to follow the recommendations of the National Research Council (NRC), as described in the publication *Responding to Changes in Sea Level: Engineering Implications*. This publication assumes three possible scenarios for eustatic sea level rise to the year 2100, where Curve 3 (the third scenario) is identified as the extreme sea level case which should be considered for feasibility studies. This requirement was followed explicitly in this analysis.

The IEPR recommendation mentions Executive Order S-13-08, which is a State of California governor proclamation that all coastal projects utilizing state funds shall incorporate sea level change. This executive order imposes no specific engineering requirements. The current analysis used in this study appears to not be in conflict with this executive order. USACE guidelines result in 70 cm rise by year 2060 and the California guidelines mandate a 40 cm rise by year 2050.

Section 4.8.2 of the Feasibility Report was revised to strengthen the analysis regarding plan performance to sea level change. This information can also be found in Chapter 10 of the Economics Appendix.

15. IEPR Comment - *Medium Significance*: Impacts of the project to the local community are not described in detail sufficient to provide a clear and accurate representation of the current conditions in the study area.

USACE Response: Not Adopted

This comment details the concern that the future projections of population, beach attendance, and land use are not portrayed as accurately as possible, recommending that more up-to-date numbers be used. An analysis of more spatially-specific socioeconomic and demographic information surrounding the proposed project site would substantially add to the evaluation of direct and indirect impacts. The surrounding residential community will benefit from the larger beach but the route of railroad tracks separates the residential community from any possible direct impacts due to the project. With increased recreation visitation, there would be benefits to the local community in terms of regional economic activity, for example. The demographic data presented is sufficiently up to date or otherwise updating it would not have a material impact on the results.

Expanding the economic analysis to include a more detailed analysis of impacts of construction activities on surrounding community would substantially add value to the report, however, this would not provide any more justification of the project or more validation of the possible impacts than is already detailed in the current economic appendix. Construction will take place on a public beach during the off-season. Beach use activities will be impacted in the immediate area of current fill activity, but given the off-season construction timeframe and the overall length of the beach a significant impact is not anticipated. More significant, in terms of local impacts, is the RED benefits relating to project construction which are detailed in the report.

A conservative approach in estimating the future beach attendance by using the population growth rate for the county instead of a higher growth rate has been used, resulting in a potential

under estimate of the growth rate. Some of the factors that may have contributed to higher growth rates in the past include the fact that attendance is derived not just from the county, but from outside the county. For example, the commuter train service provides transportation for users coming from outside the county. Identifying a specific market area for recreation was therefore difficult. Further complicating the analysis is that there are other beaches that offer substitute choices for recreation, including Doheny and San Onofre State Beaches. There does not seem to be a solid foundation for projecting continued growth rates in excess of county projections (which does provide most of the visitation in the project area), other than historical rates. Given this lack of foundation, utilizing the county population growth rate is a reasonable, although admittedly conservative approach.

Identification of specific parcels and households affected by the proposed project is not required for this analysis. The residential community is located on a bluff that is 100 feet above the beach and the community is separated by the railroad corridor. These parcels are not threatened by coastal storm damages nor would they require changes in land use.

The community cohesion section in the report is limited and brief, but any additional information on community cohesion will only marginally increase the justification for the project and is not considered a key benefit category, relative to NED and RED, for example.

Action Taken: Section 13.8 of the Economics Appendix was renamed "Project Impacts and Connectivity of the Community" rather than "Community Cohesion".

16. IEPR Comment - *Medium Significance*: The cost analysis assumptions are reasonable; however, the mobilization/demobilization costs and the estimate of contingencies should be revised to reflect equipment availability, travel times, and production capacity.

USACE Response: Adopted

Action Taken: A Project Cost and Schedule Risk Analysis was conducted and is included in the Cost Engineering Appendix. The Cost & Schedule Risk Assessment establishes the project contingency by identifying and measuring the cost and schedule impact of project uncertainties with respect to the estimated total project cost. The key cost risk drivers identified were fuel prices, uncertainty with the condition of the beach prior to each renourishment, and impact of different dredging equipment being used than that included in the cost estimate. The key schedule risk drivers identified were delays in project authorization that would delay the schedule, and impacts of new and additional regulatory requirements that could be imposed if there is a significant delay in project implementation.

17. IEPR Comment - *Medium Significance*: It is not clear whether Borrow Area 2A can satisfy the project's 50-year needs.

USACE Response: Adopted

Action Taken: Section 8 of Geotechnical Appendix explains that Borrow Area 2A, a subarea within Borrow Area 2, should be dredged first, then if additional material is needed, dredge

within Borrow Area 2. Overall, Borrow Area 2 contains enough compatible material to satisfy project needs as stated in Section 7. Table 11 of the Geotechnical Appendix explains the Overfill Factor analysis further, showing that the Entire Project Overfill Factor decreases as depth increases. This decrease is shown in the table as RA ranging from 1.12 to 1.00 for borrow material below 1 meter depth. This deeper larger size sandy borrow material is of better quality and as the Entire Project Overfill Factor range indicates, it is more compatible with the native beach reaches than the finer borrow material found at a shallower depth of approximately 1 meter. Section 5.6.3 of the Geotechnical Appendix was revised to more clearly define the amount of fill volume needed for the project.

18. IEPR Comment - *Medium Significance*: Since the coastal storm damage model does not appear to have been certified, then the model itself and particularly the key random variables need to be described in considerably more detail, and evidence of model certification should be provided.

USACE Response: Adopted

Action Taken: The coastal storm damage model used for this study was approved for use by HQUSACE on 31 January 2011. A Model Appendix has been added to the Technical Appendices. This appendix describes the economic and engineering processes and assumptions used in the model, a risk and uncertainty analysis, and the operation of the model.

19. IEPR Comment - *Medium Significance*: It is not clear how the effects of loose rock and cobble in the San Clemente beach profile affect beach dynamics and expected project performance.

USACE Response: Adopted

Action Taken: Section 2.5.9 in Appendix D of the Final EIS/R has been modified to address this comment. It is recognized that the presence of significant loose rock and/or cobbles could influence beach profile dynamics. However, there is little if any loose rock within the project area. The San Clemente offshore regime is primarily hard bottom (bed rock) covered in some places by shallow pockets or a thin veneer of sediment. The beach is a relatively narrow ribbon of sand trapped against the coastal bluffs; the small amount of sediment within the littoral system is worked by waves to the upper limit of the profile. Geotechnical explorations indicate no presence of loose rock or cobble that would influence profile dynamics.

20. IEPR Comment - *Medium Significance*: Some elements of project monitoring are missing and an adaptive management plan needs to be developed.

USACE Response: Adopted

Action Taken: A Biological Resources Monitoring Plan had been added as Appendix B of the FEIS. This plan complies with the PGN guidance on mitigation planning as well as the Implementing Guidance for F&W mitigation from Section 2036(a) of WRDA 2007 dated 31 August 2009.

Changes to the project that might be required during successive nourishment cycles have not been defined. Due to the range of issues that could be encountered, it would seem to be more prudent to address those issues when and if they arise. Each of the successive nourishment cycles will require a new set of plans and specs as well as a supplemental environmental document and adaptive management would be addressed at that time.

21. IEPR Comment - *Medium Significance*: The effects of borrow area sediment quality variation on water quality, project constructability, and project performance could be different than those discussed in the report.

USACE Response: Adopted

Action Taken: Section 5.4.1 of the Feasibility Report and 5.3.2 of the FEIS have been revised to further discuss that variations in sediment quality occur within the borrow sediments. It is further recognized that variations in sediment quality will result in variations in water quality, project constructability, and project performance. It is expected that this fill will be constructed by hopper dredge methods over hydraulic cutter head methods. Hopper dredge methods result in shallow excavations as opposed to excavating the borrow area as a unit that can be achieved by hydraulic cutter head. The simplifying assumption was made that the fill will be comprised of a blended mix of sediments represented by the mean grain size of the borrow materials. Construction observations on other beach fills within the Los Angeles District indicate a significant percentage of borrow material fines are winnowed immediately during placement operations. Higher fines content from the upper layer of the borrow area would be expected to result in greater turbidity impacts than deeper, coarser portions of the borrow area. Long term project performance, however, is substantially more difficult to definitively, conclusively delineate the impacts due to variations in sediment quality within the borrow area.

22. IEPR Comment - *Low Significance*: The calibration of railroad damage functions is not clear.

USACE Response: Adopted

Action Taken: A sensitivity analysis of the railroad damage function was added as Attachment A of the Economics Appendix. The railroad damage function calibration was based on matching known existing annual damages to predicted future annual damages. Information provided by SCRRA indicates that annual damages are approximately \$100,000 per year to the ballast type railroad. The % damage values were iteratively adjusted in the model so that the total economic damages in year 1 of the life cycle equaled the existing damages. In other words, the % damage values were adjusted so that the model predicted \$100,000 of damage in year 1 which would equal the \$100,000 actual damages reported by SCRRA.

The damages to the railroad due to runup are a very small percentage of the total project damages. This analysis was conducted during the early stages of the project analysis when the belief was that these damages were significant. Subsequently, it has been learned that these

damages are inconsequential to the overall study economics; however, this description was allowed to remain for technical completeness.

23. IEPR Comment - *Low Significance*: There are omissions in the Environmental Impact Statement's section on Biological Resources (including unclear figures, missing information on surfgrass fauna, and incomplete discussions on shorebirds and sea turtles) that need to be addressed.

USACE Response: Not Adopted

No changes were made to the report in response to this comment since most of the information specified was contained in the original document, as confirmed in subsequent discussions with the IEPR Panel. Section 4.4.2.1 of the FEIS identifies the importance of surfgrass communities as well as identifying the invertebrate community common to the project area. Shorebirds anticipated in the project area are identified in Section 4.4.2.6. Sufficient analysis of impacts by the proposed project to these species is identified in Section 5.4.2 in Impact BR-50-4.

Description of the offshore artificial reef is included in Section 6.1.2 as a cumulative project. No further description is required. There is a less than 5% chance of encountering sea turtles in the project area and therefore discussion of this species will not be included.

24. IEPR Comment - *Low Significance*: Recreational benefits must be treated as incidental benefits of the project.

USACE Response: Adopted

Action Taken: ER 1165-2-130 restricts incidental recreation benefits to an equal amount of coastal storm damage reduction benefits when the project's storm damage reduction benefits on their own do not justify the project. The alternatives analyzed do not possess a B/C ratio greater than 1 on coastal storm damage reduction benefits alone. Therefore, each alternative has a restricted recreational benefit equal to the amount of coastal storm damage reduction benefits for the alternative. NED plan selection calls for the alternative with the greatest amount of net NED benefits, based on storm damage reduction benefits only, to be designated as the NED plan. This was the process used in this study and is described in section 4.7.4 of the Final Feasibility Report.