CECW-PC

7 JUNE 2012

MEMORANDUM FOR CECW-MVD (ATTN: Beth Marlowe)

SUBJECT: Barrataria Basin Barrier Shoreline Ecosystem Restoration Project, Documentation of Review Findings for the Final Feasibility Report and Integrated Environmental Impact Statement.

1. This memorandum transmits the HQUSACE documentation of review findings for the subject project.

2. Questions may be directed to the review manager, Mark Matusiak, at (202) 761-4700.

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Chief, Office of Water Project Review
Planning and Policy Division
Directorate of Civil Works

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DOCUMENTATION OF REVIEW FINDINGS

BARATARIA BASIN BARRIER SHORELINE ECOSYSTEM RESTORATION

FINAL FEASIBILITY REPORT

AND

FINAL ENVIRONMENTAL IMPACT STATEMENT/FINAL ENVIRONMENTAL IMPACT REPORT

June 6, 2012

Table of Contents

1. Background **1**

2. HQUSACE Comments on the AFB report 2

A. General comments

1. LCA near-term plan 2
2. Identification of NER plan 19
3. Executive summary 22
4. Description of WRDA 2007 authorization 26
5. Actions for change 28
6. Consideration of sea level change 29
7. Cooperating agency status 32
8. OMRR&R responsibilities and WRDA 2007 authorization 33
9. Status of WVA model certification 37
10. Cost engineering 38

B. Plan formulation

1. Planning objectives 40
2. Discussion of problems 41
3. Longshore transport 41
4. Acres vs. habitat units in screening 43
5. CE/ICA 43
6. Empire jetties 44
7. Incremental justification of dune restoration 45
8. Shell Island optimzation 46
9. Clarification 46
10. Alternatives using hard structures eliminated 47
11. Modify Belle Pass jetties 49
12. Sustainability of selected plan 49
13. P&G criteria, completeness and effectiveness 50
14. Adaptive management and monitoring plan 55

C. Crediting, financial capability and real estate issues

1. Credit for sponsor work prior to selection of NER plan 62

2. Sponsor financial requirements and views 62

3. Cost-sharing of LERR 65

4. Perpetual easement and sustainability 65

5. Real estate plan 66

D. Report organization

1. Requested revision 70

2. Purpose and proposed action 70

3. History of investigation 70

4. Need for objectives for action 72

5. Needs 72

6. Standard naming convention recommended 73

3. HQUSACE Comments on the February draft report and EIS 2

A. General comments

1. Policy compliance of OMRR&R for Caminada Headland 74

2. Sustainability of Caminada alternative 5 not demonstrated 74

3. Sponsor letter of intent 78

4. Sponsor statement of financial capability 78

5. Public use and access 79

6. Local cooperation 80

7. Credit for work prior to construction agreement 80

8. Deepwater Horizon oil spill impacts 81

9. Figures missing, Chapter 4 82

B. Plan formulation

1. Sponsor's cost for O&M nourishments 82

2. Recommendations 83

3. Significance of ecological outputs 84

4. Consideration of sea level rise 84

C. Compliance

1. Water quality certification 86

2. Cultural resources 87

3. Cumulative impacts 87

4. Environmental justice 88

D. Real estate

1. Non-standard estates 89

2. Real estate issues paper 90

3.Exhibits 91

4. HQUSACE comments on the January 2012 final report and EIS

1. Adaptive management and monitoring 91

2. Use of NAVD88 vertical datum 92

3. Vegetative plantings 92

4. Sea level rise guidance 94

5. Effects of saltwater intrusion 94

6. Air quality 95

7. Project cost update 96

8. Miscellaneous 96

5. Civil Works Review Board 96

6. State and Agency Review comments 97

CECW-PC

6 June 2012

Louisiana Coastal Area
Barataria Basin Barrier Shoreline Ecosystem Restoration Study
Feasibility Report and Integrated Environmental Impact Statement
HQUSACE Project Guidance Memorandum

1. Background.

a. Study Area. The Barataria Basin Barrier Shoreline study area includes the Caminada Headland, located near Port Fourchon, Louisiana and the Shell Islands located southwest of Empire, Louisiana. The study area also incorporates the potential sediment borrow areas associated with the project, including Ship Shoal, Sandy Point, Quatre Bayou, Bayou LaFourche and the Mississippi River.

b. Problem. The ecological resources of the study area have been degraded by land subsidence, habitat switching, saltwater intrusion, lack of sediment inputs and erosion. Some of these factors, such as saltwater intrusion, have been exacerbated by historic human activities associated with oil and gas exploration and navigation.

c. Study Authority. The study authority for the project is provided by two resolutions of the U.S. House of representatives dated April 19, 1967 and October 19, 1967. In addition, Section 7006(c) (1) (C) of WRDA 2007 authorizes construction of the Barataria project in accordance with the Louisiana Coastal Area Chief's Report dated January 31, 2005, contingent upon completion of a feasibility report documenting any modifications to the Chief's Report, approval of the Secretary of the Army, and submission of the report to the House Transportation and Infrastructure Committee and the Senate Environmental and Public Works Committee for approval.

d. Non-Federal Sponsor. The non-Federal sponsor for the project is the State of Louisiana, as represented by the Louisiana Coastal Protection and Restoration Authority.

e. NER plan . The NER plan is the combination of Caminada Alternative 5 and Shell Island Alternative 5.

The Caminada 5 Alternative includes:

- Construction of 880 acres of dune and beach;
- Construction of 1,186 acres of marsh on the landward side of the dune;
- OMRR&R of Headland through placement of dredged material along shoreline between MHW and -10 feet. Approximately 3.9 mcy of material would be placed in every 10 year period;
- Installation of 71,500 feet of sand fencing.

The Shell Island 5 Alternative includes:

- Joining the two pieces of Shell Island through construction of 317 acres of beach and dune;
- Construction of about 466 acres of marsh landward of the constructed dune;
- Placement of 10 years advanced nourishment;
- OMRR&R to rebuild the constructed template of the dune and marsh at TY 20 and TY 40.

f. Project Costs. The cost of the NER plan is approximately $421,000,000 (October 2010). The Caminada Headland element of the NER plan is $220,000,000 and the cost of the Shell Island element is $200,000,000. The authorized project cost as found in Section 7006(c) (1) (C) of WRDA 2007 is $242, 600,000, and the maximum authorized cost consistent with Section 7006(c) (4) of WRDA 2007 is $363,900,000. The cost of the tentatively selected NER plan exceeds the maximum authorized cost.

g. Recommended Increment of Construction. Given that the cost of the NER plan (Caminada and Shell Islands) exceeds the maximum authorized cost found in Section 7006(c) (4) of WRDA 2007, the Caminada Headland Alternative 5, an implementable and separable element of the NER plan, is recommended for construction because it is within the cost and scope of the current authorization.

h. Cost Apportionment. The costs for the project would be shared 65 percent Federal ($271,000,000) and 35 percent non-Federal ($147,000,000). OMRR&R would be a 100 percent non-Federal cost.

2. HQUSACE Comments on the AFB report.

A. General comments.

1. LCA Near-Term Plan. This study is being prepared as a result of the authorization of the Louisiana Coastal Area Near-Term Plan. The following information should be included for each element:

- A section should be included for each of the study areas that describes the element as documented in the LCA Ecosystem Restoration Study with Addendum dated December 2004, and included the subsequent Chief's Report dated January 2005. This description should include the features that are described in the reports that lead to the authorized costs. This plan should then be included as an alternative in each formulation analysis.
- A section should be included that summarizes the problems, needs, and opportunities described in the Near-Term Plan as well as the goals of the plan. This should then be linked to the more specific detailed information that is included in the FSM for each element.

Response: Concur. A new Section 3.8.5 compares the Recommended Plan to the LCA 2004 plan. Caminada Alternative 5 and Shell Island Alternative 1 were identified as those most like the LCA 2004 plan. The below verbiage was added to the report:

"3.8.5 Comparison of the Recommended Plan to LCA 2004 Plan

The 2004 LCA report identified the Barataria Basin Barrier Shoreline restoration study as a critical near-term restoration project. According to the LCA report, the BBBS restoration feature is to address the critical ecological needs and sustain essential geomorphic features for the protection of Louisiana's coastal wetlands and coastal infrastructure. The overall goal is to maintain the headland reach and prevent intrusion of the Gulf of Mexico into the interior bays and marshes (LCA Study, 2004, Attachment 5). The project would also help restore natural sand transport along the coast, supporting the adjacent regional shorelines and various shoreline habitats.

The 2004 plan proposed the creation of dune and beach from material dredged from Ship Shoal along 13 miles of shore on the Caminada Headland. The plan included creation of marsh behind the dunes, and vegetative plantings. The plan also recommended periodic renourishment every 10 years which would be part of the local sponsor's operations and maintenance responsibilities. The estimated annual cost of the operations and maintenance was $500,000. The plan was estimated to create 732 AAHUs. The Shell Island reach would consist of beach, dune, and marsh creation with the creation of two islands and 322 AAHUs, resulting in an estimated total of 1,054 AAHUs.

The Recommended Plan will create a total of 1,718.9 AAHUs in excess to the future without project. A total of 730.6 AAHUs, in excess of the FWOP, will be created on Shell Island and 988.3 AAHUs will be created on Caminada Headland. The 2004 report envisioned one renourishment episode every 10 years, while the Recommended Plan will place 650,000 cubic yards of material 6 times within a 10 year period for a total of 3.9 million cubic yards of material every 10 years. The 2004 recommended plan for Shell Island was a two island plan with no renourishment. The Recommended Plan includes the construction of one island with two renourishment cycles in years 20 and 40. The average annual cost of the O&M is $6,160,938.

Near term restoration of the Caminada Headland and Shell Island is essential to prevent the need for significantly more difficult and costly restoration efforts in the future, or irretrievable loss of these ecosystem habitats. The critical geomorphic features will continue to function as a framework upon which to build a viable barrier system if completed in the near term.

Problems, opportunities, needs, and objectives from the LCA 2004 plan were added to the respective sections of Chapter 2. Much of chapter 2 has been rewritten and is included in full below:

"2.0 PROBLEMS, OPPORTUNITIES, AND NEEDS*(NEPA-Required)

2.1 NATIONAL OBJECTIVES

Ecosystem restoration is one of the primary missions of the USACE Civil Works program. The USACE's objective in ecosystem restoration

planning is to contribute to national ecosystem restoration (NER). Contributions to NER (outputs) are increases in the net quantity and/or quality of desired ecosystem resources. Measurement of NER is based on changes in ecological resource quality as a function of improvement in habitat quality and/or quantity, and is expressed quantitatively in physical units or indexes. These net changes are measured in the planning area and in the rest of the Nation.

Louisiana contains one of the largest expanses of coastal wetlands in the contiguous United States and accounts for 90 percent of the total coastal marsh loss occurring in the Nation. The BBBS project area is an essential ecosystem since it includes wetland habitats, essential fish habitat, and has high fish and wildlife values. The barrier islands protect the interior coastal wetlands, which also have high fish and wildlife value as well as great economic value as commercial and recreational fisheries. These ecosystems provide habitat for migratory birds, wildlife, finfish, shellfish, and other aquatic organisms including threatened or endangered species. The Caminada Headland is the location of Port Fourchon, which handles approximately 18 percent of the Nation's oil supply and is the land base for the LOOP. The LOOP handles approximately 15 percent of the Nation's foreign oil imports and is connected to 50 percent of the United States' refinery capacity. The estuaries surrounding Shell Island are productive oyster habitat and have traditionally supported important fisheries. The restoration of these barrier shorelines would protect these national assets from further degradation.

2.2 PUBLIC CONCERNS

Public input was received during several scoping meetings as well as meetings with various stakeholders. Many people expressed that the timeline for the project needed to be advanced due to the urgency of the need in the project area. Others worried about access to and protection of the restored areas. The impact on landowners and users of the project areas was discussed as well as the impact on threatened and endangered species. Comments were received concerning construction methods and borrow sources. Affects to the tidal prism were also mentioned.

Details of the public comments about the project are in chapter 6 of this document.

2.3 PROBLEM AND OPPORTUNITIES

The LCA 2004 report discusses both natural and manmade actions that are causing adverse impacts on the Louisiana wetlands. The natural processes of subsidence, habitat switching, and erosion of wetlands, combined with widespread human alteration, have caused significant adverse impacts to

the Louisiana coastal area, including increased rates of wetland loss and ecosystem degradation. Without action, Louisiana's healthy and productive coastal ecosystem is not sustainable. Construction of levees along the Mississippi River has cut the coastal ecosystem off from a primary source of sediment and nutrients, and hindered the wetlands' ability to maintain their elevation in the face of sea level change and subsidence. The shorelines are starved for sediment and are retreating. Infrastructure constructed for access into the wetlands has modified the hydrology of the coastal area, thus facilitating and accelerating saltwater intrusion and conversion of wetlands to open water. These alterations have impacted the natural sustainability and quality of the Louisiana coastal ecosystem. This loss of sustainability has manifested itself as accelerated land loss.

The Barataria Basin barrier island system separates the Gulf of Mexico from the Barataria Basin estuary. The barrier islands influence the estuarine and freshwater wetland environment by helping to regulate salinity gradients important to estuarine and freshwater wetland species and by preventing open Gulf of Mexico wave energy from impacting and eroding interior marshes. As islands erode and are breached, marine forces begin to dominate the interior boundaries of the estuaries, thereby accelerating land loss and switching from freshwater and brackish habitats to more saline conditions. Much of the sediment that once maintained these barrier islands is lost from the system off the Mississippi pro-delta and continental shelf. Consequently, there is not an adequate amount of sand and other sediment in the system to maintain barrier islands naturally, thus requiring restoration efforts, such as the BBBS Project, to maintain this critical geomorphic feature in the Barataria Basin estuary. Without mechanical means of introducing sediments, barrier islands and their protected marshes become more vulnerable to the harmful effects of storms. The geomorphic structure of the barrier shoreline is impacted by a cycle of erosion and healing. The episodic nature of the coastal land mass changes is reflective of sharp decreases in land area caused by a tropical event followed by a period of healing as some of the materials washed away by the storm are returned to the land mass. However, human activities, such as: construction of navigation channels, oil and gas industry pipelines, breakwaters and jetties, and vehicular access to the beach, can significantly reduce or eliminate the ability of these natural processes to rebuild the barrier islands.

Many of the barrier shoreline areas in Barataria Basin have become nothing more than fragmented, low mounds of sand, easily washed over by minor storm events that provide poorer habitat than fully developed barrier islands. As the barrier shorelines become narrower and disintegrate, bays and wetlands behind them become more directly

connected with the Gulf of Mexico. This exposes the more fragile landscape features to higher wave energy and higher salinity water.
In addition to its environmental benefits, a restored barrier island system serves as a valuable storm buffer protecting communities, industry, and associated infrastructure from storm surges. In the pilot study, "Coastal Land Loss and Wave-Surge Predictions During Hurricanes in Coastal Louisiana: Implications for Oil and Gas Industry" performed for Louisiana Department of Natural Resources (LDNR), USGS, and Minerals Management Service (MMS), recently reorganized as BOEMRE, the investigators used numerical hydrodynamics models to reveal how the loss of barrier islands and wetlands affects storm surge and wave energy along a portion of the south-central Louisiana coast. The study site location was Terrebonne Bay, which is fronted by Isles Dernieres and Timbalier Islands with an eastern boundary of Port Fourchon. The study states that, "Over the approximate 30 year period between 1990s and 2020, the model forecast results also indicate that a significant increase in surge and wave height will occur throughout much of the study site" (LDNR 2003). Based on this study, the increased surge and wave heights range from 10 feet to greater than 12 feet at the barrier islands and 6 feet throughout the marsh (see **figure 2-1** and **figure 2-2**). The findings of this study concluded that "in the absence of large-scale barrier and marsh restoration, the current infrastructure will experience increasing surge levels and increasing wave energy as the coast erodes"(LDNR 2003). The study also states that "the data are conclusive in that they demonstrate the ability of barrier islands and coastal wetlands to mitigate surge and wave energy during tropical cyclones with a frequency of occurrence indicative of historical storms impacting the Louisiana coast" (LDNR 2003). These findings demonstrate the importance of maintaining barrier islands as a vital component of Louisiana's coastal system. These findings were reaffirmed by modeling performed during the LaCPR study (LaCPR, 2009). Barrier islands were shown to decrease wave energy landward of the island during tropical events. When the barrier islands were degraded in the models, the modeled wave heights increased, thus heightening the potential for overtopping levees and inundation of protected areas.

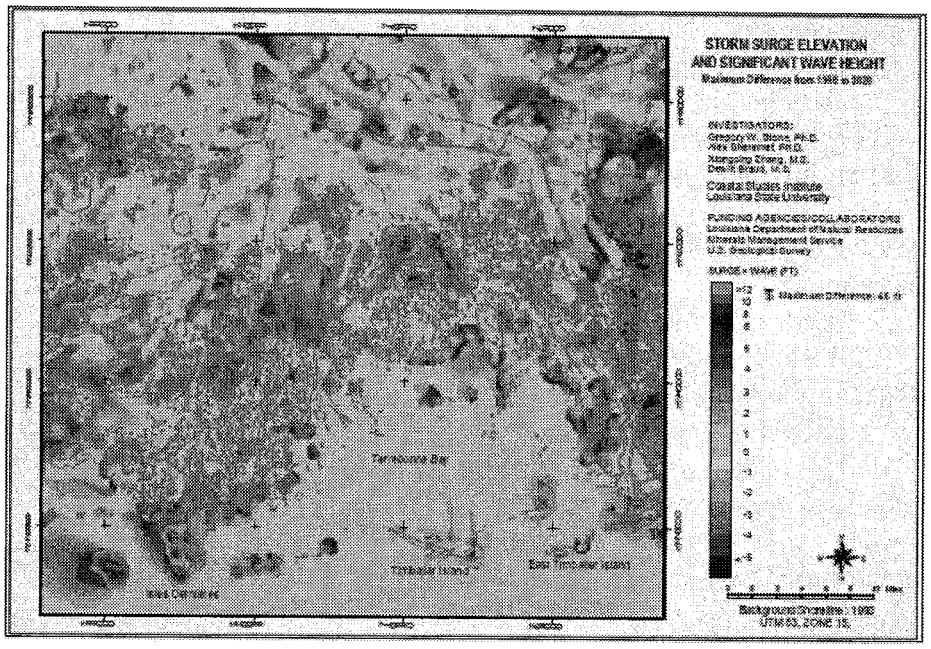

Figure 2-1: Difference in Maximum Storm Surge and Maximum Wave Height between 1990s and 2020 scenarios (LDNR 2003).

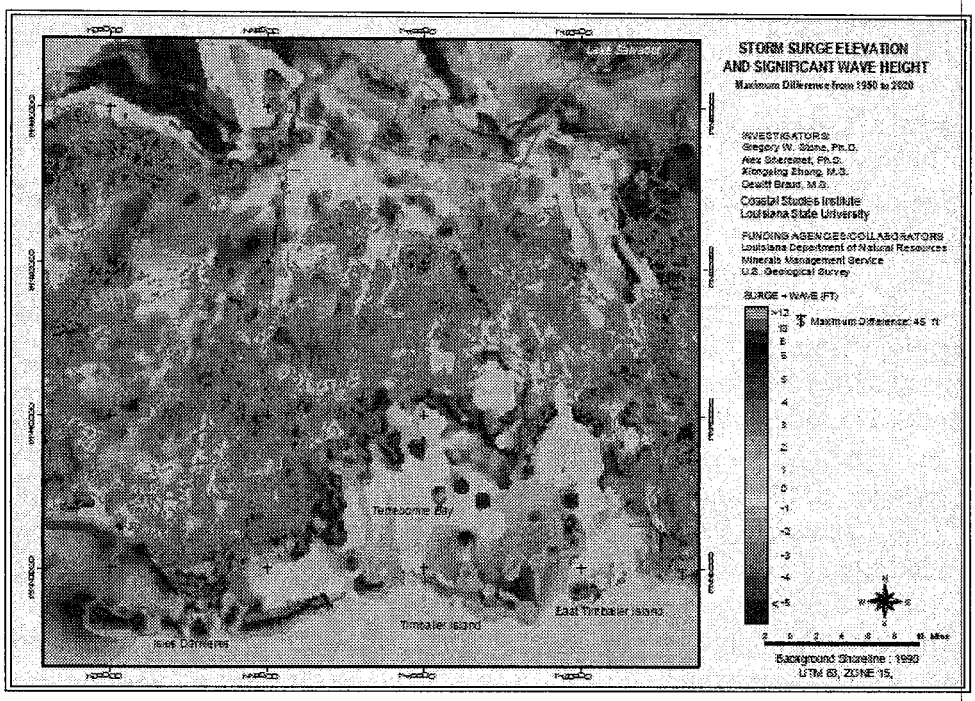

Figure 2-2: Difference in Maximum Storm Surge and Maximum Wave Height between 1950s and 2020 scenarios (LDNR 2003).

The problems in the BBBS project area are:

Land loss due to erosion threatens the geomorphic structure and hydrologic function of barrier shoreline systems

Loss of barrier island/headland ecosystem habitat
Wetlands are impacted by increased salinity, tidal flux, wave action, and storm impacts
Longshore sediment is significantly reduced, limiting the ecosystem's ability to be self-sustaining.

The LCA report lists the following opportunities for ecosystem restoration:

- Freshwater reintroductions and outfall management
- Barrier island restoration through placement of sand from offshore sources or the Mississippi River
- Hydrologic modification
- Use of sediment material from dedicated dredging or maintenance dredging to create a marsh platform

Opportunities for the BBBS project include:

- Barrier island restoration through placement of sand from offshore sources or the Mississippi River to help sustain geomorphic structures that protect the ecology of estuarine bays and marshes by reducing gulf influences.
- The use of sediment material from dedicated dredging to construct a marsh platform which can create a large amount of coastal habitat quickly.
- The beneficial use of dredged material from the Bayou Lafourche, Louisiana navigation project.

2.3.1 Caminada Headland

Historically, the Caminada Headland has suffered loss of wetland habitat and diminished function within the gulf shoreline **(figure 2-3).** It is likely that without restoration efforts, such as the BBBS project, the observed average coastal erosion rate at the Caminada Headland of 45 feet per year will continue for the foreseeable future (LCA Report 2004). The shoreline has thinned and the dune has been breached by overwash from storm surges at several locations along the Caminada Headland shoreline, including multiple shoreline breaches during the 2002 to 2003 hurricane season, and the landfall of Hurricanes Katrina and Rita in 2005. Some of the breaches had begun to heal due to natural sand transport processes, but additional erosion was caused by Hurricanes Gustav and Ike in 2008. In a continuation of the erosion/healing cycle, the beach has begun to rebuild and a breach caused by Hurricane Katrina that opened Bay Champagne to the Gulf of Mexico has closed. However, due to limited sediment, the closure is easily breached during high water events.

Ongoing shoreline erosion and wetlands loss threatens the function of the Caminada Headland as a major geomorphic structural element of the regional coastline that prevents the coalescence of Terrebonne Bay and Barataria Bay. Any connection between these water bodies would result

in a larger area of open water. The increased expanse of open water would have a larger fetch, resulting in increased wave energy and erosion along the bay shorelines. These processes will accelerate the loss of marsh, cheniere, and estuary habitats as the embayment increases in size. Fragmentation would occur when erosion has permanently breached the shoreline, producing detached islands from segments of the barrier shoreline and associated marsh that were formerly part of the headland. Without stabilization of this shoreline reach, permanent fragmentation of the headland is likely to occur.

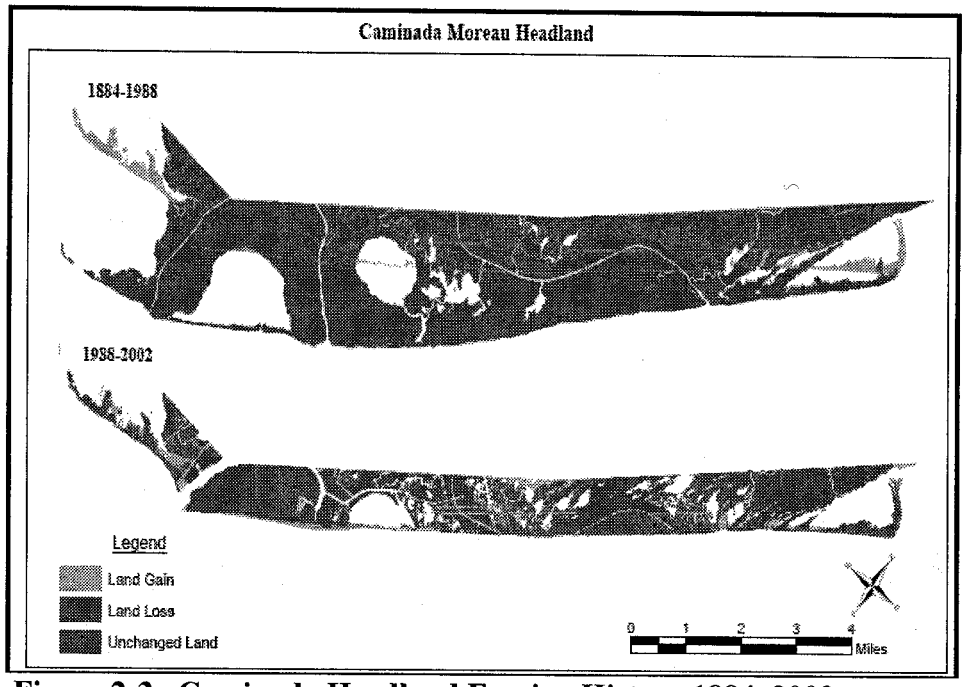

Figure 2-3. Caminada Headland Erosion History 1884–2002.

On the western end of the headland, erosion associated with Hurricane Katrina caused a connection between Bay Champagne and the Gulf of Mexico, resulting in a significant discontinuity of the shoreface and dune landforms. Breaches in the barrier shoreline will subject the interior and back barrier marsh and chenier ridges to degradation by wave action and salt-water intrusion. Based on observed rates of shoreline erosion and conversion of marsh to open water at Caminada Headland, the segment of the barrier shoreline from the western shore of Bay Champagne to the remnant Bayou Moreau ridge will eventually be detached from the headland. This permanent fragmentation would change the western portion of the headland into an island separated from the headland.

On the eastern end of the headland, erosion associated with Hurricane Katrina caused several breaches along the shoreline, including two significant breaches at the spit along the eastern end of the Caminada Headland shoreline segment (also known as Elmer's Island or Cheniere

Caminada). This breach has been partially closed by ongoing sediment transport since the storm, but currents in the breach may result in the permanent separation of the spit from the headland without intervention. This will likely lead to a reconfiguration of Caminada Pass that would cause significant instability on the eastern end of the Caminada Headland and on the western end of Grand Isle, including the western end of the Louisiana Highway 1 Bridge between Caminada Headland and Grand Isle.

Degradation and fragmentation of Caminada Headland will also decrease the quantity of sand available for transport by longshore transport processes, thus increasing the instability of other shoreline reaches east and west of the headland. The resulting decrease in sediment supply will exacerbate loss of downdrift shoreline reaches, further breaching and degrading nearby reaches of the barrier shoreline system. **Figure 2-4, figure 2-5, and figure 2-6** show aerial views of Caminada Headland in 1998, 2004, and after Hurricane Katrina (December 2005). The following images show erosion between 1998 and 2004, and the last image shows erosion associated with Hurricane Katrina, reflected in the multiple breaches visible in the headland shoreline. Several of these breaches have either completely or partially closed. However, due to the limited sediment in the system, the closure of the breaches is tenuous.

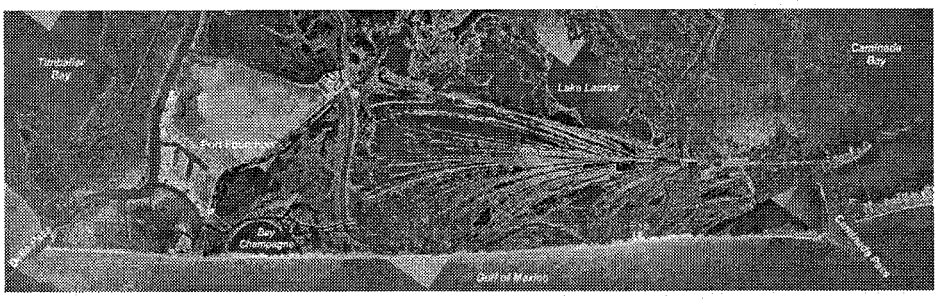

Figure 2-4. Aerial Views of Caminada Headland, 1998

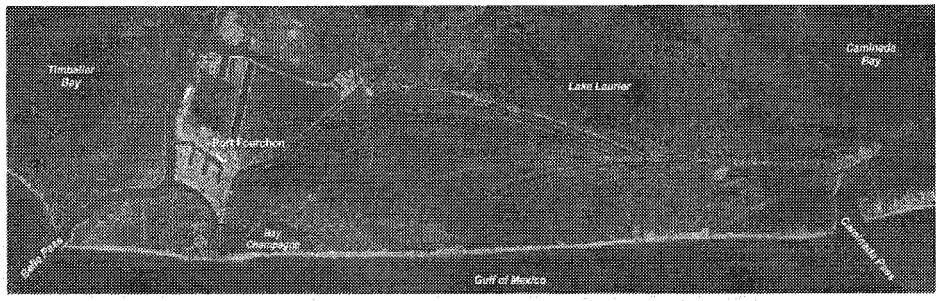

Figure 2-5. Aerial Views of Caminada Headland, 2004

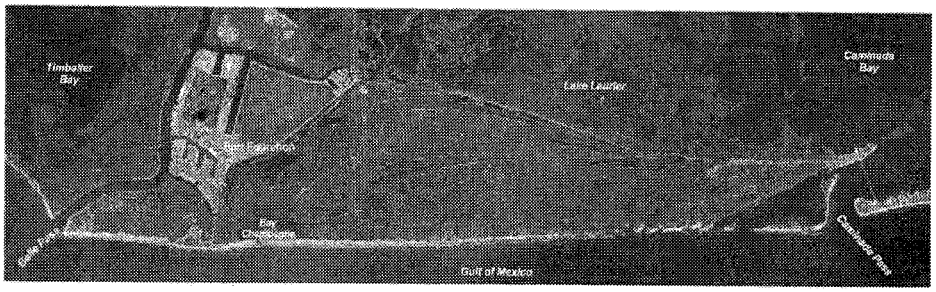

Figure 2-6. Aerial Views of Caminada Headland, 2005.

A USGS-led interagency team developed a land loss model of the Caminada headland for the LCA Report (USGS, 2004). The model simulated land loss over a 50-year period, from 2000 to 2050. The model predicted a land loss of 3,750 acres from the headland and a decrease of 14,780 acres from landward areas protected by the headland between Bayou Lafourche and Caminada Bay that extends inland approximately 12 miles. These additional losses of landforms and habitats will occur as fragmentation and retreat of the barrier shoreline expose back-barrier habitats to the increased wave energy and salinity of the Gulf of Mexico.

2.3.2 Shell Island

Coastal erosion along Shell Island has resulted in nearly complete loss of the barrier shoreline along this coastal segment. The long-term erosion rate for this reach is 38.5 feet per year with a range of 8.0 feet to 101.5 feet per year **(figure 2-7)**. Historically, the Shell Island reach migrated landward and merged with the small barrier island at Grand Bayou Pass. By 1956, jetties had been constructed along Empire Waterway, and Shell Island migrated further landward and attached to the new Empire jetties. An erosional shadow developed downdrift (to the west) from the western Empire Pass jetty. The erosional shadow began affecting Shell Island because western longshore transport along this segment of the barrier shoreline system was disrupted. The erosion rates along Shell Island accelerated from 8 feet per year to 79.5 feet per year, causing Shell Island to rapidly narrow. In 1979, Hurricane Bob breached Shell Island, thus forming Coupe Bob. After the shoreline was breached, erosion rates accelerated further to 101.5 feet per year, exposing Shell Island Bay to marine processes. This pattern of barrier island degradation continued with the enlargement of Coupe Bob and by 2003, Bastion Bay was also exposed to the forces of the open Gulf of Mexico. Loss of the Shell Island reach has contributed to changes in the hydrologic patterns, allowing more saline waters to enter the estuary. The increased salinity of the estuary has also compressed the salinity gradient, decreasing the species diversity associated with transitional environments. Numerous studies have shown that elevated salinity can negatively affect all wetland species (Chabreck and Linscombe, 1982; McKee and Mendelssohn, 1989). These changes in salinity gradient have reduced the productivity of this ecosystem and

negatively impacted the wildlife species that depend on this habitat. Increased wave energy also increases the rate of erosion along the exposed bay shoreline. **Figure 2-8, figure 2-9, and figure 2-10** show aerial views of Shell Island in 1998, 2004, and after Hurricane Katrina (December 2005). These images show a natural progression of erosion between 1998 and 2004, and erosion associated with a significant storm event between 2004 and 2005.

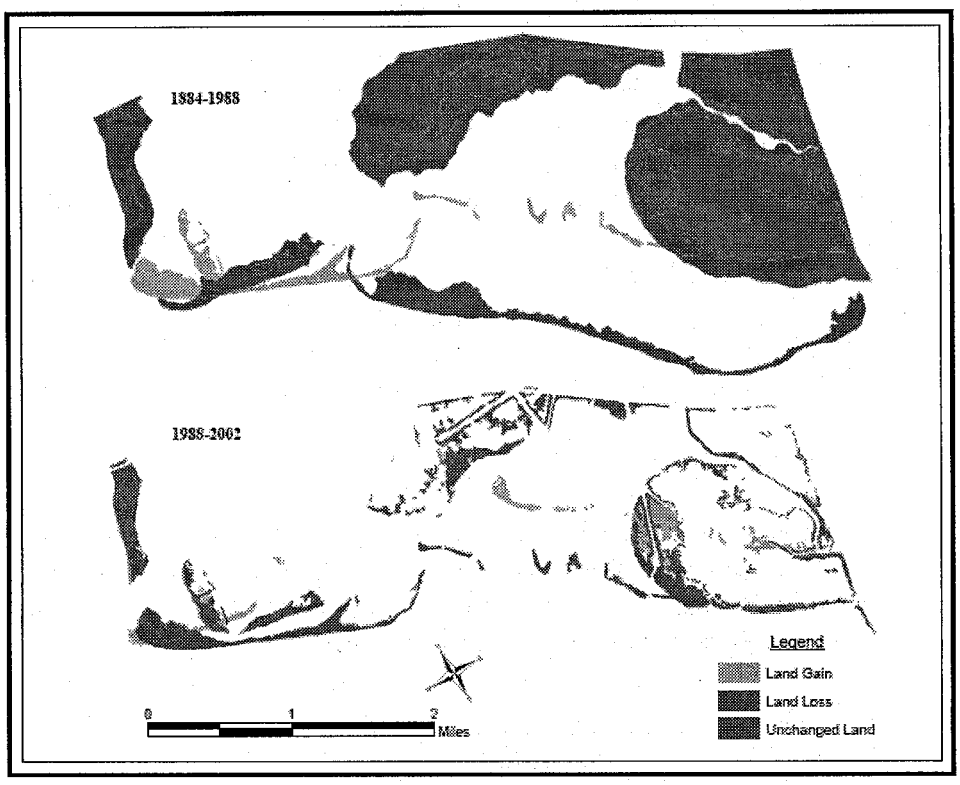

Figure 2-7. Shell Island Erosion History 1884–2002.

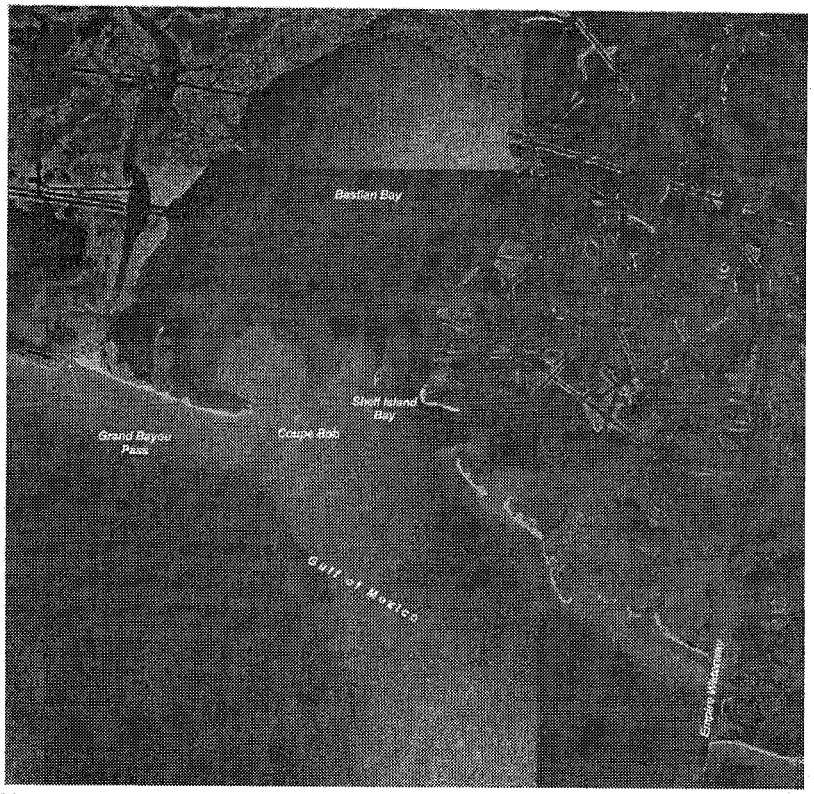

Figure 2-8. Aerial view of Shell Island, 1998.

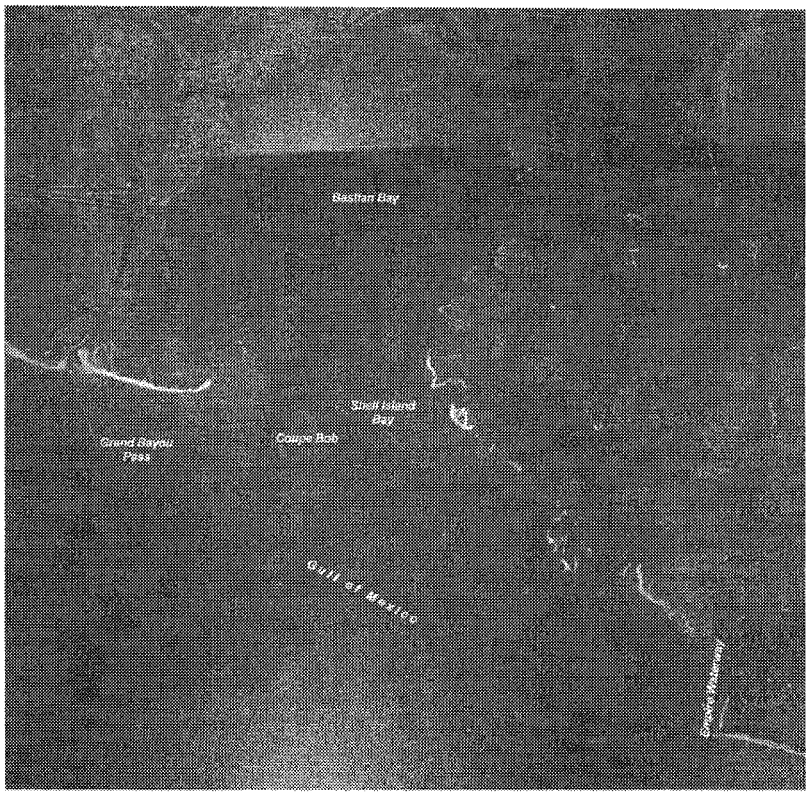

Figure 2-9. Aerial view of Shell Island, 2004.

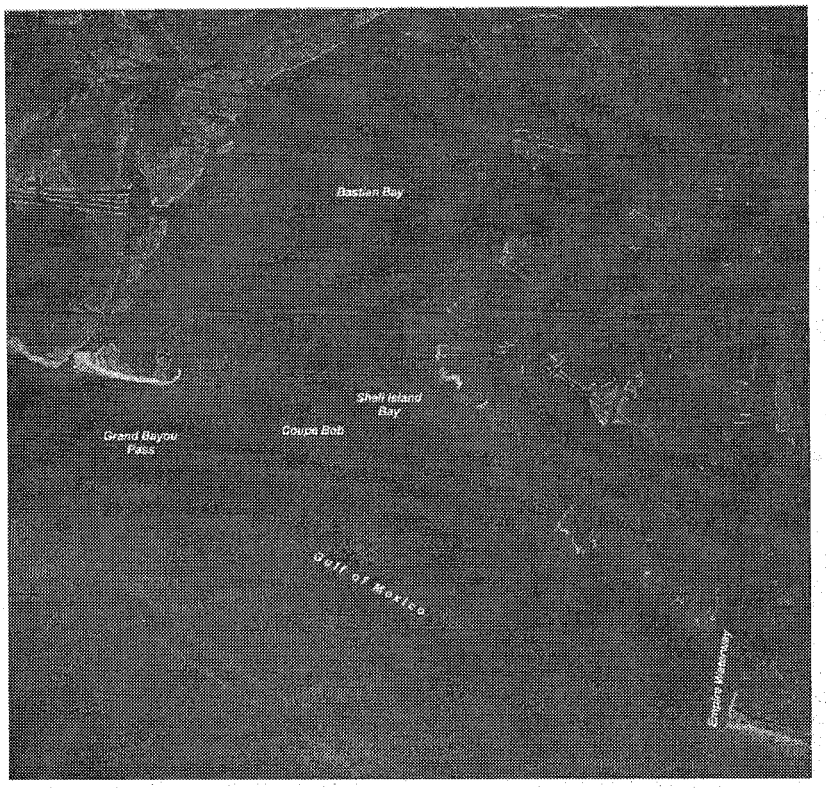

Figure 2-10. Aerial view of Shell Island, 2005.

2.4 NEEDS

The critical needs listed in the LCA 2004 report are:

- Prevent future land loss where predicted to occur.
- Restore fundamentally impaired or mimic deltaic processes through river reintroduction.
- Restore or preserve endangered critical geomorphic structures.
- Protect vital local, regional, and national socioeconomic resources.

Critical needs in the study area are a subset of the critical needs identified in the LCA report and include:

- Preservation of critical and essential geomorphic structures (beach, dune, ridge, and marsh) of the Barataria barrier system.
- Future land loss, habitat loss, and fragmentation of the land features will result in diminishing habitats for threatened and endangered species.
- Vital local, regional, and national socio-economic resources are in danger of being lost.
- The back barrier estuarine environments are being adversely impacted by the high energy marine processes and associated salinities of the Gulf of Mexico.

- Near-term restoration should be synergistic with future restoration by maintaining or restoring the integrity of Louisiana's coastline, upon which all future coastal restoration is dependent.
- Restoration features should be designed that support the development of large-scale, long-range, comprehensive coastal restoration.

2.4.1 Caminada Headland

The Caminada Headland is the central geomorphic feature in the Bayou Lafourche barrier system (Ritchie 1995) and it has suffered the highest land loss rates in this barrier system. The geomorphic elements comprising the Caminada Headland include barrier shorelines, dunes, washovers, inlets, salt and mud flats, chenier ridges, brackish and saline marsh, and bays of variable salinity. These geomorphic elements provide critical and essential habitat to a variety of terrestrial and aquatic plant and animal species.

The extensive and continuing land loss throughout the Caminada Headland has resulted in significant adverse impacts to many of the plants and animals that utilize this area. Recovery of endangered and threatened species, such as the piping plover, brown pelican, and several sea turtles, is significantly threatened by the continued land loss, especially the critical wintering habitat of the piping plover. The continued loss of valuable stopover habitat for neotropical migratory birds further threatens these species who also are being stressed by loss of wintering habitat in the tropics and loss of nesting habitat in North America. The Caminada Headland is considered by the NMFS, as essential fish habitat, or EFH, (personal communication NMFS 2005). Continued land loss and habitat degradation will likely result in significant adverse impacts to commercial and recreational fisheries.

Continued land loss, habitat degradation, and fragmentation of the Caminada Headland further threatens several uncommon habitats in the region, including the only chenier ridges in the Deltaic Plain, the largest black mangrove thickets in the state, and the majority of the coastal dune shrub thickets in the basin. The continued loss of these habitats would likely reduce the numbers and diversity of the birds and terrestrial wildlife that depend on these resources.

Continued land loss and fragmentation of the Caminada Headland also adversely impacts several important socio-economic sectors such as: Port Fourchon, the largest base for offshore oil and gas operations in coastal Louisiana and the largest coastal fishing port; major oil and gas infrastructure, such as regional transportation and storage facilities, the LOOP, and the Mars pipeline; and the regional hurricane evacuation route

serving residents of southern Lafourche Parish, the community of Grand Isle and approximately 6,000 workers stationed at offshore facilities in the central Gulf of Mexico. Continued erosion and potential splintering of the headland will impact the investment in infrastructure located at Port Fourchon by increasing its vulnerability to storm surges. Maintenance requirements would increase to protect oil and gas pipelines, and Louisiana Highway 1.

2.4.2 Shell Island

Shell Island, one of the most fragmented areas along the Louisiana barrier shoreline, has suffered the highest land loss rates in the Plaquemines barrier system (Ritchie 1990). Shell Island forms the demarcation between the predominantly marine influences of the Gulf of Mexico and the fresher influences from the upper reaches of the eastern Barataria estuary. As such, Shell Island is a critically important geomorphic feature of the Barataria estuary that, until recently, protected the back-barrier estuarine environments from the high energy marine processes and associated salinities of the Gulf of Mexico. However, due to continuing and extensive land loss, Shell Island is gradually converting to a series of interconnecting bays (Bastian Bay and Shell Island Bay) directly connected to the Gulf of Mexico.

The NMFS considers the Shell Island area as EFH (personal communication NMFS 2005), especially important for nursery habitat. However, salinities in the Shell Island area, as well as the interior Bastian Bay and Shell Island Bay, are generally the same as the adjacent Gulf of Mexico. The lack of a dynamic salinity gradient, which typically characterizes a functioning estuary, has negatively impacted the productivity of the fish and wildlife that depend on this habitat.

Barrier islands perform some level of protection from storm surge, however, the extensive land loss at Shell Island has significantly reduced the critical first line of defense function of this barrier system. As recently as the 1970s, Shell Island functioned as an important buffer against the daily high-energy forces of the Gulf of Mexico. The significant degradation and fragmentation of the Shell Island system, combined with the loss of wetlands located directly inland of Shell Island, has further compounded the potential for catastrophic damage. Without the barrier islands and interior wetlands, there is an almost unimpeded path for storms to directly impact the Barataria Basin.

The need for restoration of Shell Island is especially time sensitive. The high rate of land loss at Shell Island has eroded the barrier system to the point where the remaining geomorphic barrier features are now just below the water's surface. However, these critical geomorphic features still

function as a skeletal framework upon which to build a viable barrier system, if completed in the very near term. Failure to restore the Shell Island barrier system in the immediate near term would result in the loss of this critical geomorphic skeletal framework, which, in turn, would preclude any future attempts at restoring this barrier system

2.5 PLANNING OBJECTIVES

For the LCA 2004 Study, two tiers of planning objectives were established – hydrogeomorphic and ecosystem objectives. The hydrogeomorphic objectives were:

- Establish dynamic salinity gradients that reflect natural cycles of freshwater availability and marine forcing.
- Increase sediment input from sources outside estuarine basins, and manage existing wetlands and rebuild marsh substrate.
- Maintain or establish natural landscape features and hydrologic processes that are critical to sustainable ecosystem structure and function.

The ecosystem objectives were:

- Sustain productive and diverse fish and wildlife habitats.
- Reduce nutrient delivery to the Continental shelf by routing Mississippi river waters through estuarine basins while minimizing potential adverse effects.

The BBBS study objectives are a localized and project specific delineation of the LCA objectives. The Barataria Basin barrier shoreline is a unique ecosystem that helps to maintain the integrity of the gulf shoreline and protects the interior coast from further degradation. Aside from supporting coastal habitats, the coastal barrier chains in Louisiana are the first line of defense for protecting wetlands, inland bays, and mainland regions from direct effects of wind, waves, and storms. The barrier systems serve multiple defensive purposes to:

- Reduce coastal flooding during periods of storm surge
- Prevent direct ocean wave attack, which would accelerate rates of erosion and degradation of marshes and other wetlands; and
- Help maintain gradients between saline and freshwater, thereby preserving estuarine systems

Based on the function of these barrier islands and problems identified for the Caminada Headland and Shell Island during this study, the following planning objectives were developed to assist the development and evaluation of alternative plans.

- Restore the barrier structures to ensure their ability to provide geomorphic and hydrologic form and function

- Increase the acreage of shoreline, dune, and interior marsh habitat for essential fish and wildlife species, mimicking, as closely as possible,

conditions which would occur in the area in the absence of human changes.

- Protect interior marsh and chenier ridge habitats for essential fish and wildlife species.
- Increase sediment input to supplement long-shore sediment transport processes along the gulf shoreline, increasing the ability of the restored area to continue to function and provide habitat with minimum continuing intervention.
- Reduce land loss, preventing the dissolution of the Caminada Headland into separate barrier islands, and the disappearance of Shell Island.

2.6 PLANNING CONSTRAINTS

Planning constraints are restrictions that limit the planning process. Some general types of constraints that need to be considered are resource constraints and legal and policy constraints. Constraints that are relevant to the study include:

- Natural resources limitations. The limited availability of natural resources such as suitable sand materials is a critical constraint. The sediment particle size used for construction should be similar to the native sand in the project area. The coarser sand required for beach and dune construction is located in a limited number of sites in the Gulf of Mexico and the Mississippi River. The presence of pipelines and cultural artifacts further decreases the available sand.
- Avoid adverse impacts to surrounding coastal areas and threatened and endangered species. Alternatives developed should not adversely impact the surrounding ecosystems. Additionally, these plans should not adversely impact threatened and endangered species such as the piping plover.
- Avoid impacts to infrastructure and cultural resources. On the Caminada Headland, pipeline canals, roads, and oil and gas infrastructure impact the development and evaluation of alternatives. Highway 3090 bisects the project area, and active pipeline canals run the length of most of the headland. Within the Ship Shoal borrow site, areas near pipelines and cultural resources may not be utilized. The project site is also near Port Fourchon, an important commercial site for the oil and gas industry, and includes Fourchon Beach, a beach area visited by local residents. Relocations of the oil and gas infrastructure near Port Fourchon would have national impacts because Port Fourchon is linked to 50% of the refining capacity of the nation. Alternative plans must take into consideration impacts of commercial and recreational activities in the area."

HQUSACE Assessment: The issue is resolved by the inclusion of the above information in the draft report.

2. Identification of NER Plan. HQUSACE believes that the National Ecosystem Restoration (NER) plan has not been correctly identified in the AFB report. The report will need to be revised to identify the NER Plan and also a Locally Preferred Plan (LPP) if an LPP would be the recommended plan. Should an LPP be recommended, a policy waiver request must be submitted for approval by HQUSACE and ASA(CW).

Response: Concur. The NER plan has been identified as Caminada 5/Shell Island 5, a best buy as identified through the cost-effectiveness and incremental cost analyses. Section 3.8.1 details the selection of and components of the NER. The below verbiage describes the NER and its selection:

> **"3.8.1 NER Plan**
>
> Caminada Alternative 5 combined with Shell Island Alternative 5 is cost effective and incrementally justified per the IWR analysis. This alternative combination fulfills the planning objectives stated in section 2.5 of this report. The alternative would restore the barrier structures to ensure their ability to provide geomorphic and hydrologic form and function. The alternatives would restore the shoreline, dune, and interior marsh habitat for essential fish and wildlife by creating/restoring a total of 1,197 acres of beach/dune and 1,652 acres of marsh, providing a total of 1,718.9 AAHUs over the 50 year period of analysis, mimicking as closely as possible, conditions which would occur in the area in the absence of human changes. Caminada Headland Alternative 5 proposes a 7-foot dune for the length of the shoreline from Belle Pass to Caminada pass. The marsh fill of +2 feet is proposed on the landward side of the dune. Approximately 880 acres of beach/dune and 1,186 acres of marsh would be created and/or restored, resulting in a total of 2,066 acres. The Caminada Headland reach will include renourishment in conjunction with the dredging of the navigation channel at Belle Pass (Bayou Lafourche, Louisiana navigation project.) An estimated 3.9 million cubic yards of material will be placed in the littoral zone over each ten year period. Shell Island 5 proposes a one-island configuration, closing Coupe Bob. The marsh and dune would be restored to its original construction template in years 20 and 40. The initial construction will result in 317 acres of beach/dune and 466 acres of marsh. The estimated cost of the construction is $420,000,000 (October 2010) and the estimated present value of operations and maintenance is $129,564,864.
>
> The restoration of the shoreline and marsh would protect the interior marsh and chenier ridge habitats for essential fish and wildlife species by providing a buffer from the marine influences of the Gulf of Mexico. By transporting borrow material from the Mississippi River and Ship Shoal, the alternatives would increase sediment input to supplement the long shore sediment transport processes along the gulf shoreline, increasing the ability of the restored area to continue to function and provide habitat with minimum continuing intervention. Finally, the alternative would reduce land loss and result in storm damage reduction.
>
> The alternative works within the planning constraints. By utilizing the Mississippi River and Ship Shoal as the borrow sources for the beach/dune restoration, the project would provide new sediment to a sediment-starved

ecosystem. The techniques chosen have been used in the restoration of other barrier islands in Louisiana and are proven to be effective. Infrastructure was avoided, requiring no relocations. Barrier shorelines are dynamic, and the alternatives were formulated to work with nature to restore the ecosystem.

The NER was selected from the most efficient alternatives as identified by the IWR analysis. **Figure 3-28** identifies the most efficient alternatives.

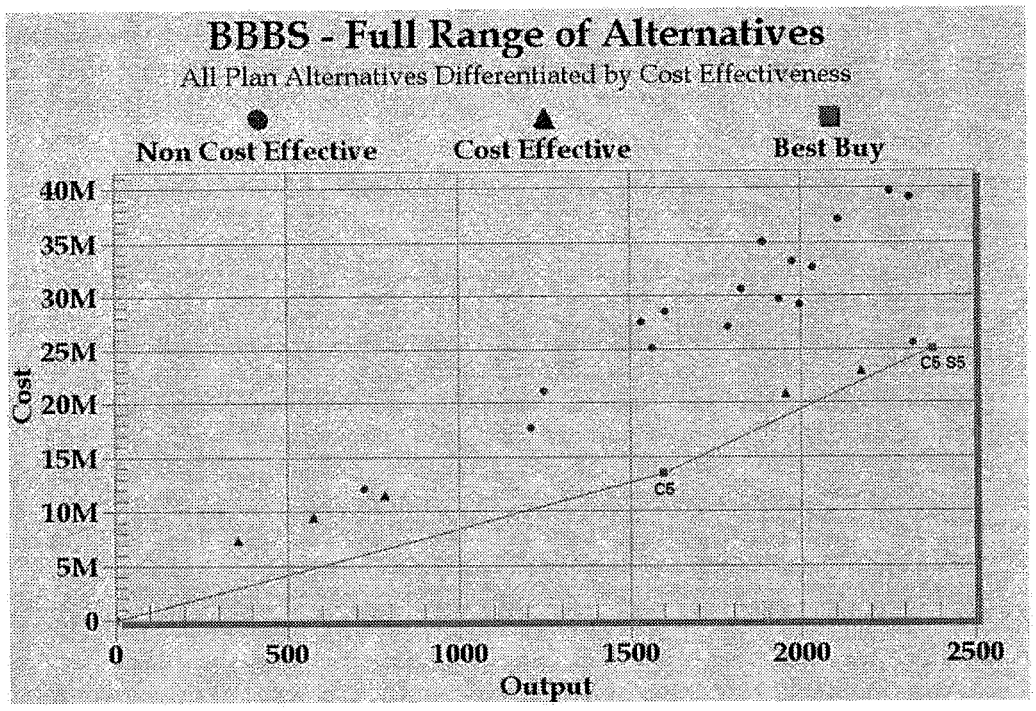

Figure 3-28 Incremental Comparison of Best Buy Plans

The first best buy presented in the IWR analysis is the Caminada Headland Alternative 5. ER 1105-2-100 states that, "Selecting the NER plan requires careful consideration of the plan that meets planning objectives and constraints and reasonably maximizes environmental benefits while passing tests of cost effectiveness and incremental cost analyses, significance of outputs, acceptability, completeness, efficiency, and effectiveness." As stated previously, the 2004 LCA Report identified restoration of Caminada Headland and Shell Island reaches as a critical near-term project because these two reaches were portions of the Barataria Basin barrier shoreline that were not being addressed. The barrier islands protect the interior coastal wetlands and provide habitat for migratory birds, wildlife, finfish, shellfish, and other aquatic animals including threatened and endangered species. The shoreline is the first line of defense for protecting wetland, inland bays and mainland regions from the direct effects of wind, waves, and storms. The barrier islands chain functions as a system. These two reaches will work in concert with restoration efforts under other authorities to increase sustainability of the essential form and function of the natural barrier ecosystem. Consequently, it is important that both reaches are addressed in the

selected restoration plan. Without a fully functioning barrier system and interior wetlands, the estuarial ecosystem will be destroyed.

Without the restoration of both reaches, the systemic weakening of the Barataria barrier island system would continue. Near-term restoration of the Caminada Headland and Shell Island is essential to prevent the need for significantly more difficult and costly restoration efforts in the future, or the irretrievable loss of some islands. The Caminada Headland has experienced some of the highest rates of shoreline retreat on the gulf coast. Shell Island is one of the most fragmented areas of the Louisiana barrier shoreline. Shell Island is a critical element for defining the marine influences of the Gulf of Mexico and the fresher influences of the eastern Barataria estuary. Due to continuing and extensive land loss, Shell Island is gradually converting to a series of interconnecting bays directly connected to the Gulf of Mexico. Additionally, the need for restoration of Shell Island is especially time sensitive. The critical geomorphic features still function as a skeletal framework upon which to build a viable barrier system if completed in the near term. Failure to restore Shell Island in the near term would result in the loss of this critical geomorphic skeletal framework, which may preclude any future attempts at restoring this barrier system. Without the restoration of Shell Island, the 2004 LCA project goal of preventing the intrusion of the Gulf of Mexico into the interior bays and marshes in Plaquemines Parish would not be met. Therefore, Caminada Alternative 5 as a stand-alone alternative was not selected as the NER plan.

The next best buy plan, Caminada Alternative 5 and Shell Island 5, fulfills the objectives of this study and the 2004 LCA report to establish dynamic salinity gradients that reflect natural cycles of freshwater availability and marine forcing and increasing sediment input from sources outside estuarine basins. Additionally, this plan satisfies the 2004 objective to maintain or establish natural landscape features and hydrologic processes that are critical to sustainable ecosystems structure and function. The plan fulfills 3 of the 4 critical needs criteria listed in the 2004 report which are: prevents future land loss where predicted to occur, restores or preserves endangered critical geomorphic structures, and protects vital socioeconomic resources. The plan meets the two overall goals of the Barataria Basin Barrier Shoreline restoration project as defined in Section 4.2.3.2.3 of the 2004 LCA report. The overall goal for the Caminada Headland is to maintain this headland reach, which would sustain significant and unique coastal habitats, help preserve endangered and threatened species, continue to transport sand to Grand Isle, and protect Port Fourchon and the only hurricane evacuation route available to the region. The overall goal of the Shell Island reach is to prevent the intrusion of the Gulf of Mexico into interior bays and marshes, which threatens fisheries and the regional ecology. The project would also help restore natural sand transport along this reach of the coast, supporting the adjacent regional shorelines and various shoreline habitats.

The 2004 plan proposed the creation of dune and beach from material dredged from Ship Shoal along 13 miles of shore on the Caminada Headland. The plan included creation of marsh behind the dunes, and vegetative plantings. The plan also recommended periodic renourishment every 10 years which would be part of the local sponsor's operations and maintenance responsibilities. The plan was estimated to create 732

AAHUs. The Shell Island reach would consist of beach, dune, and marsh creation with the creation of two islands and 322 AAHUs, resulting in an estimated total of 1,054 AAHUs.

The NER plan would create 1,718.9 AAHUs. On the Caminada Headland, the design of the NER plan is similar to the 2004 plan and will create 988.3 AAHUs. Shell Island would be restored as one island with periodic renourishment in years 20 and 40, which varies from the two islands, no renourishment design of the 2004 plan. Approximately 730.6 AAHUs will be created on Shell Island.

The NER plan is cost effective and incrementally justified. It fulfills the planning objectives and works within the planning constraints. The project is sustainable, maintaining or increasing construction acreage through the use of renourishment. Therefore, the NER plan was chosen as the Recommended Plan.

HQUSACE Assessment: The NER plan has been identified, however HQUSACE has determined that the identified NER plan is not policy compliant because the Caminada separable element does not contain standard OMRR&R of all constructed project features. The Shell Island component is consistent with standard OMRR&R practices because the project area would be restored to the constructed template at TY 20 and TY40.

MVN Response: Concur: The OMRR&R for the Caminada Headland has been updated and revised per the above verbiage. An estimated 3.9 million cubic yards of material will be placed on the headland, beneficially using the material from the Bayou Lafourche navigation channel, and exceeding the loss through natural long shore transport. The acreage at TY 50 will exceed or equal the construction template under both the historic and intermediate scenarios of relative sea level rise.

HQUSACE Assessment: The issue is resolved with inclusion of the information in the report as discussed above.

3. Executive Summary. The description of the tentatively selected plan in the executive summary does not discuss several important subjects, including project costs, total acres restored at Caminada Headland and Shell Islands, total acreage of both sites after restoration (existing + restored) and remaining acreage of both sites at the end of the 50 year period of analysis. HQUSACE requests that this information be added to the executive summary in order to better inform the reader about the project costs and outputs.

Response: Concur. The following sentences were added to the Project Description section:

> "The existing 1,431 acres (454 acres of beach/dune and 977acres of marsh), which are severely degraded, will be restored, and 635 acres (426

acres of beach/dune and 209 acres of marsh) will be created." (paragraph 1)

"Under the intermediate relative sea level rise (RSLR) scenario, the Target Year (TY) 50 acreage is estimated to be 2,064 acres; under the historic relative sea level rise scenario, the TY 50 acreage is estimated to be 2,122 acres." (paragraph 4)

"The existing 386 degraded acres (56 acres of beach/dune and 330 acres of marsh) will be restored while 397 acres will be created (261 acres of beach/dune and 136 acres of marsh.)" (paragraph 6)

"Under the intermediate RSLR scenario, the TY 50 acreage is estimated to be 855 acres; under the historic RSLR scenario, the TY 50 acreage is estimated to be 919 acres." (paragraph 7)

The recommendation in the Executive Summary has been revised

RECOMMENDATIONS

Description of the Recommended Plan
The recommended plan is a combination of Caminada Headland Alternative 5 and Shell Island Alternative 5. The initial construction of the barrier shorelines will restore or create 2,849 acres of beach, dune, and marsh habitats. Approximately 1,816 acres of severely degraded habitat will be restored while 1,033 acres of habitat will be created. The project will create an estimated 1,718.9 AAHUs. The fully funded cost of the Recommended Plan is $448,000,000. The average annual cost of the Operations and Maintenance will be $6,160,938 with a present value of $129,564,864. The estimated cost exceeds the authorization. Additional authorization from Congress would be required to implement construction of this project.

Caminada Headland

Caminada Headland Alternative 5 proposes a dune height of +7 feet NAVD88 with a dune width of 290 feet. Alternative 5 also proposes a landward beach and dune component in order to maximize acreage and longevity. The landward and seaward slopes would be set 20 horizontal to 1 vertical. The marsh fill is proposed on the landward side of the dune at an elevation of +2.0 feet NAVD88. Approximately 880 acres of beach/dune and 1,186 acres of marsh would be created or restored, resulting in a total of 2,066 acres. Fill quantities for the dune and marsh fills would be 5.1 million and 5.36 million cubic yards, respectively. Approximately 71,500 feet of sand fencing would be installed. Vegetative

plantings would include a variety of native species. The recommended planting density is no greater than 8-foot centers.

The borrow area identified for the beach/dune restoration is Ship Shoal, a large submerged sand body in the Gulf of Mexico located offshore in south-central Louisiana. The sediment is to originate from South Pelto, Blocks 12 and 13, which is approximately 40 miles from the project site. The borrow site for the marsh restoration would be located approximately 1.5 miles south of the central portion of the Caminada Headland, and 4.7 miles southwest of Caminada Pass. The estimated cost of construction, including contingencies, supervision and administration, real estate, and preconstruction engineering and design (PED), is $220,000,000. The estimated duration of construction is 936 days. It is estimated that the duration of plantings would be 750 days over a 3-year period.

The Recommended Plan will include renourishment of the Caminada Headland in conjunction with USACE operations and maintenance dredging of the Bayou Lafourche, Louisiana (Belle Pass) navigation project which yields on average approximately 650,000 cubic yards of material every 1.5 to 2 years. This material will be placed in the littoral drift south of Bayou Moreau where the long shore transport of material splits going east and west. The material will be placed, allowing the long shore transport and wave action to move and place the sediment along the headland. Over each 10 year period, an estimated 3.9 million cubic yards of material will be returned to the headland. This renourishment is part of the non-Federal sponsor's operations and maintenance requirements. The non-Federal sponsor will pay the incremental cost of beneficially using this material over the federal standard. The estimated incremental cost of the renourishment is $7.35 million per event. Caminada Headland Alternative 5 will create 988.3 AAHUs. At year 50, an estimated 2,064 acres at intermediate RSLR or 2,122 acres at historic RSLR will remain, protecting the more fragile cheniere and marsh habitats within the Caminada Headland.

Shell Island

Under alternative 5, the Shell Island reach would be restored as one island. This alternative would restore Shell Island to a form similar to its pre-Hurricane Bob (1979) condition. It is estimated that 5.6 million cubic yards of shoreline fill would be required to construct 317 acres of shoreline/dune area. The dunes will be built to a height of + 6 feet NAVD, and the marsh will be constructed to a height of + 2 feet NAVD. Approximately 2.1 million cubic yards of marsh fill would be required to construct 466 acres of marsh.

Shell Island would be re-nourished 20 years and 40 years after initial construction to the original construction template of 317 beach/dune acres. The marsh fill for alternative 5 would also be re-nourished to its original construction template at this time interval. Approximately 1.5 million cubic yards of beach fill would be required for re-nourishment cycles in years 20 and 40. In year 20, approximately 907,200 cubic yards of marsh fill would be required and in year 40, 604,700 cubic yards would be required for re-nourishment. The renourishment costs at year 20 and year 40 are estimated to be $63.3 million and $60.9 million, respectively. Alternative 5 will create 730.6 AAHUs. Under the intermediate RSLR scenario, the TY 50 acreage is estimated to be 855 acres; under the historic RSLR scenario, the TY 50 acreage is estimated to be 919 acres.
Sand fencing and vegetative plantings would be similar to those described for the Caminada Headland alternative.

The borrow source for the dune/beach would be a large sand deposit near Nairn in the Mississippi River between mile markers 32 and 34, approximately 11 miles north of the project area. The dredged material would be pumped from the Mississippi River via pipeline. The borrow source for the marsh restoration would be the Empire deposit, approximately 1.5 miles from the Empire Jetties. The estimated construction cost, including contingencies, supervision and administration, real estate, and PED is $200,000,000. It is estimated that duration for construction would be 787 days. It is estimated that the duration for the plantings would be 360 days over a period of 3 years.

Recommended Component of Construction

Because the NER plan cannot be constructed within the maximum project cost as authorized by WRDA 2007, a subset of the NER, Caminada Headland Alternative 5, was selected as the recommended component of construction. The recommended component of construction represents an implementable and separable element of the NER plan, is cost effective and incrementally justified, and within the cost and scope of the current authorization.

HQUSACE Assessment: The comment is partially resolved by the inclusion of the above information in the draft report. The response still does not contain an estimate of the existing acreages at either site, and does not clearly state how many acres of the sites would be in existence at the end of the period of analysis. HQUSACE requests that this information be added to the report to explain clearly what would be accomplished by the proposed plan; it is difficult to assess the effectiveness of any plan where the starting point is not well-defined.
See related comment in item 3.A.2, below.

MVN Response: Acreages have been broken into existing/restored and created/new by reach and by habitat type. Additionally, TY 50 acres for each reach have been included for both intermediate and historic RSLR scenarios.

HQUSACE Assessment: The issue is resolved with inclusion of the edits discussed above.

4. Description of WRDA 2007 authorization. The last seven lines on the first page of the executive summary should be revised to read:

> with the restoration plan in the Report of the Chief of Engineers dated January 2005, contingent on completion of a construction report documenting any modifications to the Chief's Report, approval of the Secretary of the Army, and submission to the House Transportation and Infrastructure Committee and Senate Environment and Public Works Committee. Section 7006(c)(4) of WRDA 2007 states that the cost of a project shall not exceed 150 percent of the cost of such project set forth in Section 7006(c)(1) of WRDA 2007. The cost of the BBBS study set forth in Section 7006(c)(1)(C) of WRDA 2007 is $242,600,000 . . . [continue as written in existing text].

In addition, the "Recommendations" portion of the executive summary will require inclusion of language prior to final approval of the report.

Finally, in part 1.1 on page 1-3 of the report, the last five lines should be revised to read:

> Title VII of WRDA 2007, P.L. 11-114, Section 7006(c)(1)(C) authorizes construction of the Barataria Basin Barrier Shoreline Restoration project in accordance with the restoration plan in the Report of the Chief of Engineers dated January 31, 2005, contingent on completion of a construction report documenting and modifications to the Chief's Report, approval of the Secretary of the Army, and submission to the House Transportation and Infrastructure Committee and Senate Environment and Public Works Committee.

Response: Concur. Recommendation (Chapter 8) has been drafted and the verbiage included in the executive summary is listed in comment 2.A.3 above.

The first paragraph of the executive summary has been amended to say:

> "The Barataria Basin Barrier Shoreline Restoration Study (BBBS) was identified as a critical near-term restoration project in the *Louisiana Coastal Area, Louisiana Ecosystem Restoration Study Report* (LCA Report 2004). As a component of this report, the project was recommended for conditional authorization by the Chief of Engineers on January 31, 2005. The Assistant Secretary of the Army for Civil Works (ASA-CW), after obtaining the concurrence of the Office of Management and Budget, provided his report on the Louisiana Coastal Area to Congress on November 18, 2005. Title VII of the Water Resources

Development Act of 2007, P.L. 110-114, Section 7006(c)(1)(C) authorizes construction of the Barataria Basin Barrier Shoreline Restoration project in accordance with the restoration plan in the Report of the Chief of Engineers dated January 2005, contingent on completion of a construction report documenting modifications to the Chief's Report, approval of the Secretary of the Army, and submission to the House Transportation and Infrastructure Committee and Senate Environment and Public Works Committee. Section 7006(c)(4) of WRDA 2007 states that the cost of a project shall not exceed 150 percent of the cost of such project set forth in Section 7006(c)(1) of WRDA 2007. The cost of the BBBS study set forth in Section 7006(c)(1)(C) of WRDA 2007 is $242,600,000. Therefore, as currently authorized, the Barataria Basin Barrier Shoreline alternatives are limited to a cost of $363,900,000."

The study authority, **Section 1.1**, has been revised to state:

"The BBBS Study was conducted under the authority provided to the USACE through resolutions adopted by the Committees on Public Works of the Senate and U.S. House of Representatives dated April 19, 1967 and October 19, 1967, respectively. These resolutions requested a review of prior USACE reports by the Chief of Engineers to determine the advisability of improvements or modifications to existing improvements in the coastal area of Louisiana, in the interest of hurricane risk reduction, prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and related water resources purposes. These resolutions contain the following language:

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act approved June 13, 1902, be, and is hereby requested to review the reports of the Chief of Engineers on the Mermentau River and Tributaries and Gulf Intracoastal Waterway and connecting waters, Louisiana, published as Senate Document Numbered 231, Seventy-ninth Congress, on the Bayou Teche, Teche-Vermilion Waterway and Vermilion River, Louisiana, published as Senate Document Numbered 93, Seventy-seventh Congress, on the Calcasieu River salt water barrier, Louisiana, published as House Document Numbered 582, Eighty-seventh Congress, and on Bayous Terrebonne, Petit Caillou, Grand Caillou, DuLarge, and connecting channels, Louisiana, and the Atchafalaya River, Morgan City to the Gulf of Mexico, published as House Document Numbered 583, Eighty-seventh Congress, and other pertinent reports including that on Bayou Lafourche and Lafourche-Jump Waterway, Louisiana, published as House Document Numbered 112, Eighty-sixth Congress, with a view to determining the advisability of improvements or modifications to existing improvements in the coastal area of Louisiana in the interest of hurricane protection, prevention of saltwater intrusion, preservation of fish and wildlife, prevention of erosion, and related water resource purposes.

Title VII of the WRDA of 2007, P.L. 110-114, Section 7006(c)(1)(C) authorizes construction of the Barataria Basin Barrier Shoreline Restoration project in accordance with the restoration plan in the Report of the Chief of Engineers, dated January 31, 2005, contingent upon completion of a construction report documenting any modifications to the Chief's Report, approval of the Secretary of the Army, and submission to the House Transportation and Infrastructure Committee and Senate Environmental and Public Works Committee.

Section 7006(c)(1)(C) states:

> Initial projects. – In General – the Secretary is authorized to carry out the following projects substantially in accordance with the restoration plan:
> C. Barataria Basin barrier shoreline restoration at a total cost of $242,600,000.

Section 7006(c)(3) and Section 7006(c)(4) state:

> Construction reports – Before the Secretary may begin construction of any project under this subsection, the Secretary shall submit a report documenting any modifications to the project, including cost changes, to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environmental and Public Works of the Senate.
>
> Applicability of other provisions- Notwithstanding section 902 of the Water Resources Development Act of 1986 (33 U.S.C.2280), the cost of a project under this subsection, including any modifications to the project, shall not exceed 150 percent of the cost of such project set forth in paragraph 1."

HQUSACE Assessment: The comment is resolved by the inclusion of the above information in the draft report.

5. Actions for Change, page 1-26. The use of the term "Actions for Change" should be discontinued, and reference should instead be made to the Corps of Engineers Campaign Plan. The following Corps Headquarters webpage (www.usace.army.mil/campaignplan) provides guidance on how the Campaign Plan should be presented. The existing text in the report and appendices concerning Actions for Change, while generally acceptable, should be edited as needed to make it consistent with the Campaign Plan language.

Response: Concur. The Actions for Change **section 1.6.3** has been deleted and replaced with a section on the campaign plan. The section is stated below:

> "USACE has developed a Campaign Plan to establish our command priorities, focus our transformation initiatives, measure and guide our progress, and adapt to the needs of the future. The goals of the Campaign Plan are 1) deliver USACE support to combat, stability and disaster operations through forward deployed and reachback capabilities, 2)

deliver enduring and essential water resource solutions through collaboration with partners and stakeholders, 3) deliver innovative, resilient, sustainable solutions to the Armed Forces and the Nation, and 4) build and cultivate a competent, disciplined, and resilient team equipped to deliver high quality solutions.

The LCA BBBS Project was conceived as part of the restoration of the entire Barataria Basin barrier island system. These two project locations were chosen because the other reaches of the barrier island system were being studied or constructed under different authorities. Development of the alternatives was completed in concert with the various agencies responsible for the restoration of the other barrier islands. Analysis of the Caminada Headland and Shell Island alternatives incorporated an investigation of the alternatives' impacts on the surrounding environment. Alternatives that resulted in negative consequences to other barrier islands were discarded. The success of the restoration of the barrier island system is dependent upon each component within the system.

The study included an analysis of trends for such variables as sea-level rise, subsidence, and frequency of hurricanes to determine the impacts of these variables on the sustainability of the designs. Various management measures were analyzed to determine which measures best provided the desired results while minimizing the risk that project goals would not be achieved. Knowledge obtained from previous coastal restoration projects was incorporated in the study. In-depth technical review of the study results included Agency Technical Review and Independent External Peer Review. Additionally, input was received from various state and Federal agencies, private contractors, and local stakeholders. The state and Federal agencies were an integral part of the project study team.

The team provided effective and transparent communication with the public and state and Federal agencies. Several public meetings have been held, and local stakeholders have been kept apprised of project status. State and Federal agencies, as part of the study team, have been involved in the development of the alternatives, and knowledgeable of the impacts of each alternative.

The study has incorporated the most recent methodologies in its analysis of the alternatives. Information from completed restoration projects was included in the development and analysis of the project alternatives. The team has updated and adapted the study throughout the study period due to Hurricanes Katrina, Gustav, and Ike. The team collaborated with other government agencies, industry, and stakeholders to improve the project planning process."

HQUSACE Assessment: The comment is resolved by the inclusion of the above information in the draft report.

6. Consideration of Sea Level Change. Changes in sea level through time are not evaluated in the AFB report in accordance with EC 1165-2-211, issued on July 1, 2009. As discussed in the above cited document, planning, engineering and designing for sea level change must consider three 3 major issues;

- How sensitive and adaptable ecosystems and human systems are to climate change and other global changes;
- Planning studies and engineering designs should consider alternatives that are developed and assessed for the entire range of potential sea level changes; and
- Determine how sensitive plan alternatives and designs are to sea level change, how this sensitivity affects calculated risk, and what designs or operations should be implemented to minimize adverse consequences while maximizing beneficial effects.

It is not clear whether sea level rise was taken into consideration in the formulation and evaluation of alternatives. Section 3.10 on Risk and Uncertainty Analysis offers no discussion of sea level rise as required by the EC. Sea level rise would appear to have a major impact on the required elevations of formulated alternatives (both dune and shoreline and marsh restoration features), as well as their effectiveness and long-term sustainability.

Response: Concur. EC 1165-2-11 was not discussed in the report. Sea level rise was included in plan formulation, alternatives analysis, and the report per the Corps' guidance in place at the time the alternatives were formulated and evaluated. The incorporation of eustatic sea level rise and local subsidence is specified in the Engineering Appendix.

The following was added to **Section 3.9**:

> "Risks and uncertainties related to the formulation, selection and implementation of the Recommended Plan have been considered in this study. Uncertainties in the analysis of the alternatives are associated with the precision of the information on ecosystem processes and the methods used to assess performance of alternatives. Physical processes associated with the evolution of coastal landforms are generally very complex. While the underlying principles controlling these processes are well understood, reliable simulation of such processes and their interactions (wind and wave processes, ocean currents, tides, sediment transport, storms) may require very large amounts of data. In order to analyze the alternatives at an appropriate level of detail and reliability for selection of the Recommended Plan, a number of simplifying assumptions and approaches were used to evaluate the restoration feature performance for the alternatives. These uncertainties, assumptions and limitations on reliability of the analyses are provided in the Engineering Appendix. Where uncertainties are present regarding the particular values to use for certain processes or conditions in the study, generally, a mid-range value was selected. A value assignment may be selected that is not at or near the midpoint of a range of estimates where the value can be justified based on the best professional judgment of the PDT members, or where there is a particular rationale for the value selected, such as the need for a conservative safety factor in selection of an estimate. A formal cost risk analysis was completed in accordance with ER 1110-2-1302.
>
> An assessment of sea level rise was included in plan formulation, alternatives analysis, and the report per the Corps' guidance in place at the time the alternatives were formulated and evaluated. The evaluation of eustatic sea level rise and local subsidence is documented in the

Engineering Appendix. The comparison of the rate of sea level change utilized in the Feasibility Study to the requirements of EC 1165-2-211 indicates that the sea level change projection used in this study lies between the intermediate and high trend lines identified in the EC. The subsidence rate of 0.0292 ft/yr utilized in the Feasibility Study, is higher than the rate observed at the Grand Isle CO-OPS gage, which is .0247 ft/yr. The eustatic sea level rise rate utilized in the Feasibility Study is 0.013 ft/yr, and is higher than the global eustatic rate of .0056/yr in the EC. The low, medium, and high rates of RSLR are 0.0304 ft/yr, 0.0382 ft/yr, and 0.0640 ft/yr respectively using the USACE guidance. A RSLR rate of 0.043 ft/yr was applied in the analysis.

An analysis was conducted on the effect of the various sea level rise rates on projected shoreline retreat at the project locations. The results showed that RSLR is the cause of approximately 1/3 of the total projected shoreline loss under future without project conditions. The variation between shoreline loss projections obtained using the high and low values provided in the EC is approximately 25% of the total shoreline retreat. Given that a RSLR value between the intermediate and high value was used in the analysis for this study, the projected shoreline change in the study is about 10% lower than the projected outcome based on the highest rate of change identified in the EC. While RSLR impacts shoreline recession, the conservative assumptions applied in the analysis performed for this study provides a result within the upper portion of the range of outcomes that would be generated following the EC methodology. Acreage and AAHUs would be slightly lower for the study area under the highest rate of sea level change scenario identified in the EC. Consequently the alternatives analysis and resulting benefits utilized in the Feasibility Study are sufficiently conservative for completion of this study and identification of the recommended plan. The risk that the Recommended Plan will not achieve the estimated benefits is minimal. Should the RSLR coincide with the low or intermediate rates as calculated per EC 1165-2-211, output will be greater than anticipated. However, should the RSLR equal the high sea level rise trend, the project will produce less benefits than anticipated as shown in **Table 3-9**.

Table 3-9 Comparison of RSLR outputs at TY 50

	High RSLR	BBBS RSLR	Intermediate RSLR	Low (Historic) RSLR
Caminada Headland Acres	1,736	1,929	2,064	2,122
Shell Island Acres	719	799	855	919

Renourishment through O&M will decrease the risks due to RSLR. Should RSLR be greater than estimated, the material utilized for O&M could be increased. Additionally, the risk of not achieving the benefits stated is minimal. For the Caminada Headland reach, the estimated acres equal or exceed the construction template at year 50 for the intermediate and historic RSLR scenarios, and exceed the existing conditions at all sea

level rise rates. For Shell Island, the estimated acres exceed the construction template for all but the high sea level rise rates, and exceed the existing conditions for all RSLR scenarios. **Figure 3-30** displays the sea level rise rates calculated per the EC and the sea level rise utilized in plan formulation for BBBS."

HQUSACE Assessment: The comment is partially resolved by the inclusion of the above information in the draft report. The first paragraph in the text added to section 3.9 is very confusing because it is inconsistent in use of measurement systems (feet and millimeters), refers to USACE guidance on relative sea level rise, and also says that the rate of relative sea level rise of 0.043 was used in the report, without explaining how the rate was determined, and why it is the most appropriate rate for this study.

For example the text is not clear why a higher subsidence rate was used for this study instead of the gage data from Grand Isle, which is located directly east of the Caminada Headland. Also, why is a higher rate of eustatic sea level rise used instead of the global rate from EC 1165-2-211? Furthermore, adding the 0.0292 ft/yr chosen subsidence rate to the selected sea level rise rate of 0.013 ft/year gives a sum of 0.0422 ft/yr subsidence, which would normally be rounded to 0.042, not 0.043 as stated in the last sentence. Lastly, the penultimate sentence in the first paragraph gives a RSLR rate of 0.034, where 0.0304 is probably intended.

The second paragraph of added text appears to be a discussion of why the calculation of relative sea level rise is justified, but is very confusing. HQUSACE requests that the section be revised as needed to clearly present the justification for the selected rate of RSLR.

See related comment in item 3.B.4, below.

MVN Response: Concur. Verbiage above has been revised to reflect the above comment and comment 3.B.4. Metric measurements were removed to prevent confusion. See comment response 3.B.4 for the explanation of the calculation of the BBBS RSLR. Impacts due to the various RSLR scenarios were analyzed as shown in Table 3.9 above to determine the impacts of varying relative sea level rise rates on the project benefits. Additional verbiage has been added to describe the risk of not achieving the estimated benefits. Additionally, verbiage was added to Section 3.8.12 that states that O&M requirements could be revised should the project not perform as anticipated.

HQUSACE Assessment: The issue is resolved because the above information has been included in the draft report.

7. <u>Cooperating Agency Status, Section 1.2, page 1-7</u>. This section of the report states that a number of agencies are designated as Cooperating Agencies as defined by 40 CFR 1501.6. Has the District requested that the listed agencies be cooperators? Clarification of the wording of this section is needed, because it could be interpreted to mean that the

Corps has designated these agencies as cooperators (which is not something that the Corps cannot do- all the Corps can do is ask an agency to be a cooperator).

Response: Concur. The statement has been revised to say, "Finally, the Corps has requested the following agencies to be cooperating agencies (as defined under 40 CFR 1501.6) for this study: ..."

HQUSACE Assessment: The comment is resolved by the inclusion of the above information in the draft report.

8. OMRR&R Responsibilities and WRDA 2007 Authorization. As indicated in part 1.1 on page 1-3 of the report, Section 7006(c)(1)(C) of the Water Resources Development Act of (WRDA) 2007 authorizes construction of the project "substantially in accordance with the restoration plan"; i.e., the Louisiana Coastal Area (LCA) plan that was the subject of a Chief's Report dated January 31, 2005. However, the Barataria Basin Barrier Shoreline report's tentatively selected plan does not appear to substantially follow the LCA report, given the plan's exclusion of any provision for periodic renourishment of the Caminada Headland reach of the project (and to a lesser extent, the Shell Island reach).

The LCA Chief's Report states that the Barataria project will preserve and protect Barataria Basin by creating substantial net acres of habitat at Caminada and Shell Island. *See* Chief's Report, para. 3.c. on page 3 (stating that the "proposed feature would preserve the integrity of the western and central boundaries of the Barataria Basin and protect the fragile inland marshes from encroachment by the Gulf of Mexico" and "provide a net increase of 640 acres of dune/berm habitat and 1,780 acres of saline marsh habitat at Caminada Headland and 147 acres of shoreline habitat on Shell Island"). Moreover, the Chief's Report makes clear that the sponsor is responsible for operation, maintenance, repair, replacement and rehabilitation (OMRR&R) of the project. *See* Chief's Report, para. 14.f. on pages 11-12 ("the non-Federal sponsor must agree with the following requirements prior to project implementation: . . . [(f) Operate, maintain, repair, replace, and rehabilitate the project, or functional portion [of] the project, including mitigation, at no cost to the Federal Government"). Similarly, the November 2004 LCA study report upon which the Chief's Report was based states that the project segment for Caminada includes periodic nourishment every ten years, and that both the Caminada and Shell Island segments will preserve habitat for 50 years. *See* November 2004 Report, part 4.2.3.2.3 at pages 4-25 to 4-26 (stating that at Caminada, "Approximately 2 million cubic yards of sand would be placed about every 10 years to periodically restore the dune and berm", and the Caminada and Shell Island components would "preserve 640 acres of dune and berm over the next 50 years" and "preserve 147 acres of barrier island habitat over the next 50 years"). The 2004 report also states that the non-Federal sponsor is responsible for OMRR&R, including renourishment. *See* 2004 Report, Attachment 5, at page 36 ("Maintenance of the [Caminada] headland would occur every 10 years when about 2 million cubic yards are added to the dune and berm. No renourishment is scheduled for Shell Island. These OMRR&R actions would be the responsibility of the local sponsor. The estimated annual O&M cost is $500,000.").

In contrast, the AFB report, after considering renourishment as part of various alternatives, ultimately includes no nourishment in the tentatively selected plan. *See* report, parts 3.3.1.7 – 3.3.1.11 on pages 3-17 to 3-20 (describing Caminada alternatives including nourishment), parts 3.3.1.2.3 – 3.3.1.2.8 on pages 3-27 to 3-31 (describing Shell Island alternatives including nourishment), and parts 3.7.2 – 3.8.1 on pages 3-52 to 3-53 (recommending Caminada alternative 5 and Shell alternative 1, both of which omit any renourishment, as the national ecosystem restoration (NER) plan). The draft report itself acknowledges that the tentatively selected plan will create 269 average annual habitat units (AAHUs) at Caminada that will be entirely lost after 50 years, whereas the 2004 report includes the creation of 732 AAHUs that will be preserved through renourishment over 50 years. The report states that the difference for Shell Island is less drastic, with the tentatively selected plan creating 72 net AAHUs after 50 years (compared to the 2004 report's creation of 230 AAHUs, which presumably would be preserved for 50 years). *See* report, part 3.8.1 at pages 3-53 to 54; 2004 Report, Attachment 5, pages 21-22.

Given that the project was authorized for construction substantially in accordance with the plan outlined in the Chief's Report (which included periodic nourishment), it is not clear how a recommended plan omitting nourishment would not constitute an unauthorized change in the project, including its authorized scope, functions, and requirements of local cooperation. While the AFB report asserts that renourishment costs would be too high for the non-Federal sponsor's continued participation, this does not change the fact that the project as authorized appears to require non-Federal performance of OMRR&R, including nourishment. If the sponsor is unable or unwilling to perform renourishment, this raises the question of whether implementation of the project as authorized is feasible. The New Orleans District, in consultation with its District Counsel's office, should explain why omitting renourishment from the tentatively selected plan, and the sponsor's obligation to perform this activity as part of its OMRR&R responsibilities, does not conflict with Section 7006(c)(1)(C) of the Water Resources Development Act of (WRDA) 2007.

Response: Concur. Renourishment has been added to the Recommended Plan. **Section 3.8.11** was amended to say:

> Based on the sediment budget prepared for the Caminada Headland, the loss of sediment from the headland, which is derived from the total gulf shoreline erosion loss minus the total overwash accumulation, is estimated to be 379,000 cubic yards per year. The overwash is captured in the back barrier marsh north of the dunes. Operations and maintenance of the headland will include renourishment beneficially used in conjunction with the USACE operations and maintenance dredging of the bar channel of Bayou Lafourche, Louisiana (Belle Pass) navigation project. Dredging of the pass yields on average approximately 650,000 gross cubic yards of material every 1.5 to 2 years. This material will be placed in the littoral drift south of Bayou Moreau where the sediment budget indicates that the long shore transport of material splits going east and west. The material will be placed unconfined between 100 and 300 feet offshore from the mean high water (MHW) mark, allowing the long shore transport and

wave action to move and place the sediment along the headland. The material will be pumped offshore of the nodal point directly impacting approximately 67 acres. The Caminada Headland is a high energy wave environment that is very dynamic. The material will be stacked no higher than + 6 feet MLG, but will be quickly reworked by the wind and waves. The pumping of the material will take approximately 54 days, with placement and removal of the pipeline taking a total of approximately 98 days. The pipe will be placed offshore. The material will be dredged from a federal navigation channel which previously received NEPA clearance for the maintenance dredging of the Bayou Lafourche channel. Approximately 124.2 acres will be directly impacted by the dredging. Over each 10 year period, an estimated 3.9 million cubic yards of material from six dredging cycles (650,000 cubic yards per cycle) will be returned to the headland. Unless the shoreline is in danger of breaching, timing of the renourishment will be dependent upon the maintenance dredging requirements of the Bayou Lafourche, Louisiana navigation project. Historically, maintenance dredging has begun as early as March and ended as late as November. This renourishment is part of the non-Federal sponsor's operations and maintenance requirements.

The purpose of the O&M is to sustain the constructed footprint and protect the headland north of the project footprint. The O&M is driven by the need to ensure continuity of the shoreface, and is not determined by the dredging cycle. The beach and dunes protect the more fragile marsh habitats from the direct wave action of the marine environment. Once the shoreline has been breached, erosion rates increase. Because a major objective of this study is to protect the interior marsh and chenier habitats of the headland, continuity of the shoreface to protect these fragile habitats is essential. The need for O&M will be determined by the need to balance the sediment budget, breaches or imminent breaches in the shoreline, and erosion of the beach that threatens the dunes.

O&M should be performed in conjunction with the maintenance dredging to ensure that the sediment budget remains balanced. The headland loses approximately 379,000 cy annually. Placement of the material from the maintenance dredging should over time equal the amount of material lost to the headland. Should the maintenance dredging not provide sufficient material, the non-Federal sponsor will be required to provide another source of comparable material. However, the beach should not be allowed to erode to within one year of estimated erosion of the dunes. The long term average erosion rate is 45 feet per year. Consequently, when the distance between the dunes and the water decreases to 50 feet, O&M would be required. Material will be placed at the nodal zone for headland-wide erosion. Should the shoreline breach or a particular area of the shoreline be in danger of breaching, sediment would be placed near the breach to supplement the existing sediment. O&M determinations would be made through use of LIDAR, surveys, aerial photography, or site inspections. Site inspections would conducted by an interagency team containing at minimum USACE and CPRA team members.

Any changes to the approved OMRR&R plan must receive environmental clearances, including consultation with the appropriate agencies for compliance with the Endangered Species Act (ESA.) Additionally, because the Belle Pass jetties provide the important function of acting as a terminal groin and trapping sediment, prior to any navigation dredging

event, the stability of the jetties will be inspected. If USACE, New Orleans District Operations Division determines that stabilization of the jetties is necessary, sufficient material will be placed to support the jetties. The restored marsh is protected from the south by the beach and dunes. The marsh is protected from the north by the marsh and cheniers of the headland. The marsh is renourished by the cross shore sediment transfer from the beach and dunes. An estimated 547,000 cy of material is captured in the marsh through overwash. Consequently, by continually renourishing the beach and dune, the marsh also receives renourishment.

The non-Federal sponsor will pay the incremental cost of beneficially using this material over the federal standard. For the Bayou Lafourche navigation channel, the federal standard, which is the least costly, environmentally acceptable plan for disposal of the dredged material, is to pump the material to the beach adjacent to the channel a minimum of 1,000 feet away from the jetties for an average pump distance of 4,000 feet. The material utilized for O&M will be placed approximately 5 miles from the navigation channel. The total estimated cost for dredging and placement of the 650,000 cy is $13,270,000 with $5,920,000 being the estimated cost for the federal standard and $7,350,000 the estimated incremental cost attributable to the BBBS project.

Shell Island will be renourished 20 and 40 years after initial construction. The marsh is impacted by northerly winds that erode the marsh from the bay side of the island. The marsh is renourished back to an elevation of +2.0 feet NAVD. The volume of marsh fill required for the first renourishment is approximately 907,200 cubic yards while the volume for the second renourishment is 643,600 cubic yards. The volume of beach fill required for each of the beach renourishment cycles is approximately 1,512,000 cubic yards of sediment. The O&M borrow sources are the same as the construction borrow sources. The non-Federal sponsor is responsible for the O&M of Shell Island. The estimated cost of the Shell Island renourishment is $63.3 million in TY 20 and $60.9 million in TY 40.

Research on Louisiana barrier islands determined that islands are in danger of breaching when they reach approximately 300 feet in width. Modeling of Shell Island estimates that the island would breach in year 30. Renourishment episodes are estimated for years 20 and 40. However, should the island narrow to approximately 300 feet in width prior to year 20, O&M should be scheduled.

O&M would also include repair and/or maintenance of sand fencing. The maintenance estimate for sand fencing includes complete replacement in year 5 with 20 percent replacement every 5 years until the end of the period of analysis. In addition to this task, the non-Federal sponsor would monitor the project area and enforce the restrictions of the easements through yearly inspections of the project area. Sufficient land rights will be obtained to perform operations and maintenance in perpetuity. The present value of the operations and maintenance costs including renourishment is $129,564,864 with an average annual cost of $6,160,938.

HQUSACE Assessment: The comment is partially resolved by the inclusion of the above information in the draft report. The proposed O & M actions for the Shell Island segment would restore the constructed profiles at target years 20 and

40, and would appear to be consistent with standard Corps of Engineers operations and maintenance practices. The proposed O & M action for the Caminada Headlands part of the project would replace only about 53% of the sand lost between the 10-year nourishment cycle, and is clearly inconsistent with standard Corps of Engineers practices, and is also not consistent with Section 103 of WRDA 1986 as amended, which requires sponsors to ensure or perform, at their own expense, all OMRR&R required at ecosystem restoration projects.

MVN Response: Concur. Above verbiage has been revised to reflect the placement of 3.9 million cubic yards of material every ten years which would exceed the sediment lost from the headland through longshore transport. Additionally, the O&M triggers have been defined.

HQUSACE Assessment: This comment is closed, and the discussion of OMRR&R is carried on later in this project guidance document.

9. Status of WVA Model Certification. The status of the ongoing model certification process for the Wetlands Value Assessment methodology should be provided in the draft report.

Response: Concur. The status of the WVA certification has been added at the end of section 3.6.1 Benefits Analysis. The below sentence was added:

> "The WVA model is currently undergoing model certification per EC 1105-2-407."

HQUSACE Assessment: The comment is partially resolved by the inclusion of the above information in the draft report. The WVA swamp models used in this report have not been approved for use by the HQUSACE model certification panel, because of an unjustified value for percent cover in the model (variable V1). A sensitivity analysis for the V1 variable is being prepared by MVN and MVD, and will assist in the determination of use of the WVA for this study.

MVN Response: A sensitivity analysis will be completed on the marsh component of the WVA analysis for the Caminada Headland. The Shell Island WVA used the barrier island model which does not use the questioned marsh spreadsheet.

HQUSACE Assessment: The issue is resolved, pending completion of the sensitivity analysis.

MVN Response per FRC dated 1 June 2011: The following statements were added to Section 3.6.1.

> "Model certification of the Barrier Headland and Barrier Island WVA models was approved for certification by the US Army Corps of Engineers, HQ Model Certification Team on November 8, 2011 per EC 1105-2-407. As part of the certification process, a sensitivity analysis of the BBBS WVA analysis was performed by the Engineer Research and Development Center (ERDC) Environmental Laboratory (EL). The WVA models (including the Saline Marsh model) were relatively insensitive to manipulation of the WVA variables 1 through 3 suitability curves. The sensitivity analysis concluded that suggested changes of WVA variables 1 through 3 suitability curves had no impacts on alternative ranking."

HQUSACE Assessment: The issue is resolved.

10. Cost Engineering. HQUSACE has the following comments concerning cost engineering.

- MCACES Cost Estimate. The MCACES cost estimate is reasonable and well documented. It is well organized and presented in a logical sequence of work. The contingency reflected in the estimate is reasonable and based on cost risk analysis.

- Value Engineering. The Engineering Appendix does not include discussion about value engineering. The district should address value engineering in the Engineering Appendix in accordance with the requirements prescribed in ER 1110-2-1150 and ER 11-1-321.

Response: Concur. Discussion of Value Engineering was included in **Section 3.2** under "Management Measures and Preliminary Plans." Section 3.2 states,

> "As part of the plan formulation, a Value Engineering (VE) study was conducted to identify potential modifications of restoration measures and plan configurations that could improve the performance and cost effectiveness of the preliminary alternatives. The results of the VE study for this project were fully considered and were used to refine the alternative plans."

The following sentence was added to **Appendix A, Introduction**:

> "A value engineering study was completed in March 2006 and its recommendations incorporated in the alternative analyses."

- Appendix A. The total project cost shown on the Tables 1 and 2 does not match the costs certified by the Cost DX. It appears the costs shown on the tables have not been adjusted to a common price level date. Please verify and make the necessary correction.

Response: Concur. Only the baseline and fully funded costs were included. The baseline numbers, dated October 2010, are the MCASES numbers completed in December 2010 that were reviewed and approved by the Cost DX. The Cost DX certified the budget EC, dated October 2011 and the fully funded cost estimate. Another chart has been added to show the certified October 2011 costs. Below shows the charts in Appendix A, Introduction, Cost Estimates.

"Table 2 Cost Summary – Baseline Project Cost

BBBS Restoration Total Project Costs		COST ($1,000)	CNTG ($1,000)	TOTAL ($1,000)
01	Lands and Damages	2,929	732	3,661
17	Beach Replenishment	301,139	95,397	396,536
30	Planning, Engineering, and Design	5,440	1,360	6,800
31	Adaptive Management/Monitoring	975	310	1,285
31	Construction Management	9,311	2,984	12,295
	TOTAL PROJECT COSTS	**319,794**	**100,783**	**420,577**

Notes:

1) Costs include all contingencies, supported by a risk analysis

2) Costs exclude O&M and Life Cycle Cost estimates

3) Costs taken from TPCS

Table 3 Cost Summary – October 2011 Cost

BBBS Restoration Total Project Costs		COST ($1,000)	CNTG ($1,000)	TOTAL ($1,000)
01	Lands and Damages	2,929	732	3,661
17	Beach Replenishment	306,858	97,209	404,067
30	Planning, Engineering, and Design	5,440	1,360	6,800
31	Adaptive Management/Monitoring	986	313	1,299
31	Construction Management	9,417	3,018	12,435
	TOTAL PROJECT COSTS	**325,630**	**102,632**	**428,262**

Notes:

1) Costs include all contingencies and escalation, supported by a risk analysis

2) Costs exclude O&M and Life Cycle Cost estimates

3) Costs taken from TPCS

Table 4 Cost Summary – Fully Funded Project Cost

BBBS Restoration Total Project Costs		COST ($1,000)	CNTG ($1,000)	TOTAL ($1,000)
01	Lands and Damages	2,929	732	3,661
17	Beach Replenishment	320,611	101,556	422,167
30	Planning, Engineering, and Design	5,440	1,360	6,800
31	Adaptive Management/Monitoring	1,282	407	1,690
31	Construction Management	10,626	3,408	14,034
	TOTAL PROJECT COSTS	**340,888**	**107,463**	**448,351**

Notes:

1) Costs include all contingencies and escalation, supported by a risk analysis

2) Costs exclude O&M and Life Cycle Cost estimates

3) Costs taken from TPCS

HQUSACE Assessment: The issue is resolved.

B. Plan formulation.

1. Planning Objectives, page 2-13. The planning objectives would be more valuable if made more specific. The Planning Manual, IWR Report 96-R-1, pages 82-83, states that objectives should include a subject, location, timing, duration, and measurement. None of the objectives are quantified, and there no discussion of timing or duration. Defining the objectives is required in order to help assess the effectiveness of the various alternatives at achieving the desired outputs of the project. As it stands, any level of restoration, however small in extent and ephemeral in nature, could be seen as meeting the planning objectives for this study.

Response: Concur. The BBBS objectives are amended as follows in Section 2.5:

- Restore the barrier structures to ensure their ability to provide geomorphic and hydrologic form and function

- Increase the acreage of shoreline, dune, and interior marsh habitat for essential fish and wildlife species, mimicking, as closely as possible, conditions which would occur in the area in the absence of human changes.

- Protect interior marsh and chenier ridge habitats for essential fish and wildlife species.

- Increase sediment input to supplement long-shore sediment transport processes along the gulf shoreline, increasing the ability of the restored area to continue to function and provide habitat with minimum continuing intervention.

- Reduce land loss, preventing the dissolution of the Caminada Headland into separate barrier islands, and the disappearance of Shell Island.

HQUSACE Assessment: The comment is resolved by the inclusion of the above response in the draft report.

2. Discussion of Problems, Sections 2.3.2, 2.3.1.1 and 2.3.2.1. These sections do a good job of describing some of the problems, and the significance of the problems. Section 2.3.2 also does a good job of describing some of the root causes of the identified problems. However, the last paragraph in section 2.3.2 goes beyond problem identification and begins to make a case for the justification of alternatives. This could be important information for the sections on evaluation of alternatives but should be removed from section 2.3.2. This section should focus on the problems associated with the existing and likely future condition without a project. Lastly, this section is lacking a clear and concise problem statement. HQUSACE requests that cited sections of the report be revised as noted above, and that section 2.3.2 be rewritten to better state the identified problems.

Response: Concur. The last paragraph of 2.3.2 has been deleted from this section. The problem section has been moved before the needs section per request from MVD. The sections will be titled: Problems, Opportunities, and Needs.

The following problem statement has been added to the end of section 2.3.

"The problems in the BBBS project area are:

- Land loss due to erosion threatens the geomorphic structure and hydrologic function of barrier shoreline systems
- Loss of barrier island/headland ecosystem habitat
- Wetlands are impacted by increased salinity, tidal flux, wave action and storm impacts.
- Longshore sediment is significantly reduced, limiting the ecosystem's ability to be self-sustaining."

Chapter 2, which has undergone complete revision since September 2009, has been included as part of comment response 2.A.1.

HQUSACE Assessment: The issue is resolved.

3. Longshore Transport. Chapters 2 & 3 of the report seem to indicate the long shore transport process plays an important role and yet in the plan formulation section the

consideration of this process is minimal. The report needs to address longshore transport in a consistent manor. The following quotes are a sampling of longshore transport statements from the report:

- "Some of the breaches had begun to heal due to natural sand transport process"
- "The increased sediment input would supplement the available long shore transport processes"
- "Longshore transport of sand and other sediment often offset losses from recurring storm and repeated wave action, thus resulting in a natural healing of the damages caused by the waves. However, human activities, such as: construction of navigation channels, oil and gas industry pipelines, breakwaters and jetties; and vehicular access to the beach, can significantly reduce or eliminate the ability of these natural processes to rebuild the barrier islands"
- "Degradation and fragmentation of Caminada Headland will also decrease the quantity of sand available to transport by long shore transport processes"
- "Beach and nearshore sand geomorphic structures are also self-sustaining, with maintenance being driven by longshore transport"

HQUSACE requests that the various statements from the report concerning longshore transport be analyzed for consistency, and evaluated to present a clear picture of how longshore transport operates in the Barataria system, and how the transport should be considered in the study.

Response: Concur. The statements appear to be contradictory, but the context varies under which the different statements are made. Sediment budgets were developed for both project areas, and in-depth analyses of the sediment budgets are presented in the Engineering Appendix. While long shore sediment transfer, in addition to transfer of sand from within the depth of closure, help to heal breaches caused by storms, the overall lack of sediment prevents the system from being self-sustaining. The LCA 2004 study **(2.3.1)** discusses the lack of sediment in coastal Louisiana as a threat to the sustainability and quality of the Louisiana coastal ecosystem. "This loss of sustainability has manifested itself as accelerated land loss." A planning objective from the 2004 report, carried into this study is to increase sediment input from sources outside estuarine basins. While existing conditions are impacted by longshore transport, allowing for some healing of storm damage, there is insufficient sediment in the system to sustain the coastal ecosystems.

The first statement describes that some of the breaches caused by Hurricane Katrina had begun to close **(Section 2.3.1)**, but due to limited sediment, the closures re-established shorelines are ephemeral, and breaches are often reopened during high water events. The second statement was deleted from the problem section based on another comment. The first part of the 3rd statement was deleted from **Section 2.3**. The second part of the statement was added to the problem section to help describe why current natural processes are not sufficient. The sediment budget shows that the Caminada Headland loses some sand to Grand Isle. With the loss of the headland, there would be a loss of sand transported to Grand Isle, as stated in the 4th statement. The last statement describes the form and function of barrier structures, which is a target of this project.

HQUSACE Assessment: The issue is resolved.

4. Acres vs. Habitat Units in Screening. The cost effectiveness analysis displayed in **Section 3.5.1** eliminates Caminada Headlands alternatives from further analysis based on whether they fall above or below the "trend line." While this is not the usual method for determining cost effectiveness (i.e., it is possible for an alternative to fall above a particular trend line and still be cost effective), in this case the cost effective alternatives were in fact carried through for further analysis PROVIDED that "acres" is a suitable surrogate for "ecosystem output." HQUSACE requests clarification concerning whether acres are closely enough related to the habitat units (ecosystem output) employed in the benefits assessment methodology (Wetlands Value Assessment) used in the BBBS study so as to be suitable for this screening cost effectiveness analysis?

Response: Concur. AAHUs are the benefit metric for the determination of the NER. Acres were used as a surrogate for the initial, preliminary screenings due to the large number of features developed for the barrier shorelines. Acres are used to develop AAHUs, which are based on elevation and acreage. The WVA employs a suitability index that must be applied to an actual measurement of habitat quantity. The areal extent of a restoration project is generally proportional to its ecological output. Therefore, for the purpose of the initial screening of island features, the size of the feature in acres was used. The relative cost-effectiveness criterion is based on the ratio of the preliminary estimated cost to the size of the output for features in an effort to identify cost effective combinations of features, expressed in dollars per acre of wetland. WVAs, which are much more labor intensive, were conducted on the final array.

The following statement was added to **section 3.5**:

> "Acres were utilized as a surrogate for the Wetland Valuation Assessment (WVA) outputs. Acres are the major input of the WVA evaluation. The WVA benefit analysis would then be completed on this intermediate array of alternatives."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

5. CE/ICA. In **section 3.6.2** on Cost Effectiveness and Incremental Cost Analyses, it would be helpful to provide a table (similar to Table 3 in Appendix B) that lists the costs and outputs for ALL the alternatives considered, not just the cost effective and best buy plans. Also, in **Section 3.6.2.2** on Incremental Cost Analyses, the Best Buy graph should be included to visually portray incremental costs per unit of output for the best buy alternatives.

Response: Concur. The incremental analysis chart was added to **section 3.6.2.2** Incremental Cost Analysis.

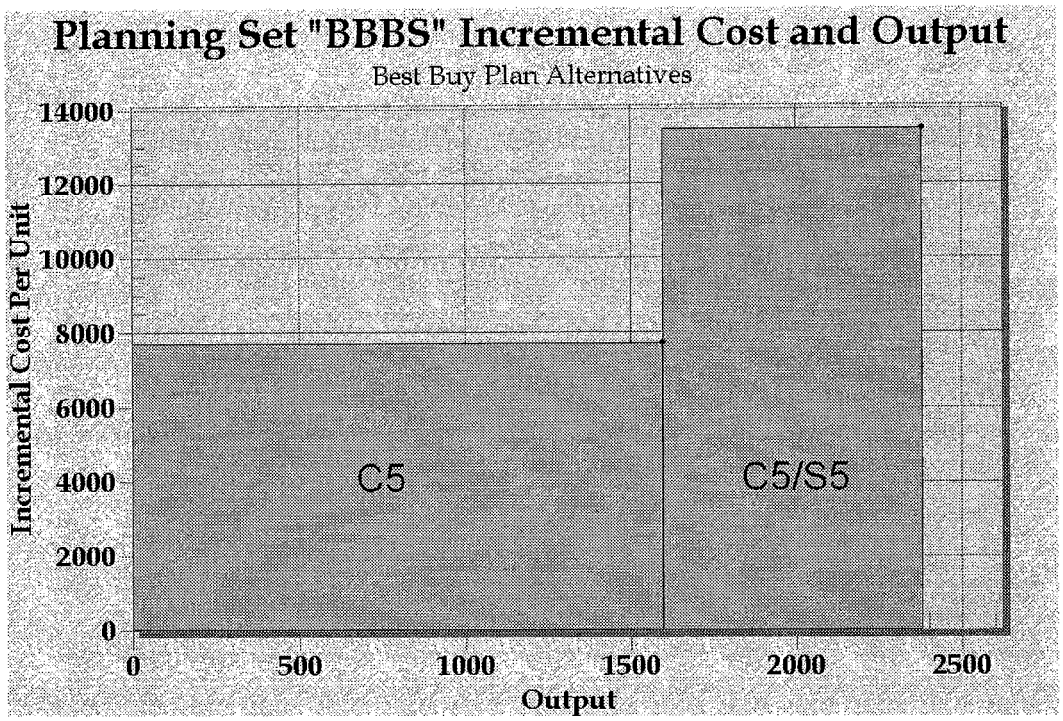

Table 3 was not added to the report in an effort to limit the detailed technical information included in the main report.

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

6. Empire Jetties, Section 3.2.1. The management measure for modifying the Empire jetties is eliminated from further consideration because of impacts to navigation from shoaling and limited longshore transport of sand in this system, rendering this feature an inefficient means to restore the shoreline. The logic behind this determination is not clear, given that there apparently is enough sediment being moved by natural mechanisms to necessitate additional maintenance dredging if the jetties are removed, but not enough material in the longshore transport system to help restore Shell Island. The question arises because the construction of jetties & subsequent disruption of longshore transport is cited as one of the reasons that the Shell Island reach has been starved of island-building or sustaining sediments (see Section 2.3.2.2). Likewise, the aerial photographs on pages 2-10 through 2-11 show dramatic loss of land downdrift (west) of the jetties. This management measure (modifying the jetties) may have been more thoroughly investigated by the PDT than is suggested by the report, but the brief reason cited for eliminating this management measure seems cursory and potentially contradictory (i.e., could opening the jetties provide a cost effective means of restoring the sediment sources for Shell Island?).

Response: Concur. Shell Island has been adversely impacted by the construction of the Empire Jetties. An in-depth analysis was conducted on the impacts of the Empire Jetties

and is included in the **Engineering Appendix, Annex 2**. While the Empire Jetties have interrupted the littoral drift and the sediment supply to Shell Island, the formation of Coupe Bob in 1979 has had a much larger impact on Shell Island. Additionally, the downdrift effect of the Empire Jetties appears to be limited to 3,000 to 8,000 feet west of the jetties. Therefore, removing the jetties would have no impact on Shell Island West. The below verbiage was added to **Section 3.2.1** to better explain why modification of the jetties was not included.

> "**Modify Empire Jetties** – This feature consists of the modification of the Empire jetties to restore longshore transport of sediments to renourish the Barataria Basin barrier shoreline. The Empire jetties presently protect the Empire waterway navigation channel. Modification of the Empire jetties to restore the longshore transport of sediments would result in the channel filling in, thus necessitating dredging for continued use. Additionally, an in-depth analysis was conducted on the impacts of the Empire Jetties and is included in Appendix A, Annex 2. While the Empire Jetties have interrupted the littoral drift and the sediment supply to Shell Island, the formation of Coupe Bob in 1979 has had a much greater impact on Shell Island. Following the formation of Coupe Bob, Shell Island East underwent a shoreline retreat and reorientation to a southeast-northwest alignment that has resulted in disintegration of the island. Only a few scattered sections of Shell Island East remain. The shoreline retreat rate increased to 89 feet per year on the east side of Shell Island. Shell Island West continued to undergo retreat due to rollover and migration to the west. The Empire jetties are responsible for a shoreline recession of approximately 10 feet per year along only a portion of Shell Island. The downward drift of the Empire Jetties appears to be limited to 3,000 to 8,000 feet west of the jetties, and would therefore have no effect on Shell Island West. Further, the limited longshore transport of sand in this barrier shoreline system makes this feature an inefficient means to restore the shoreline. For these reasons, modifications to the Empire jetties were eliminated from further consideration."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

7. <u>Incremental Justification for Dune Restoration</u>. The length of the dune restoration needs to be incrementally justified. Based on the information provided in the report, HQUSACE questions whether there are significant environmental benefits to extending the dune restoration beyond Bay Champagne.

Response: Concur. To better explain the formulation process, the following paragraph was added to **section 3.3.1.1**:

> "With the exception of Caminada Alternative 1, (marsh only), and Alternative 4, (which does not include beach fill near Highway 3090, behind the breakwaters) the Caminada Alternatives include restoration of the entire 13 mile coastline. Much of the Caminada Headland from Belle Pass to the east for 7 miles, and from Bayou Thunder Von Tranc to the eastern point of the Caminada Headland, including Elmer's Island has

been designated as critical habitat for the piping plover by USFWS. The shoreline also protects a rare maritime forest, important to neotropical migratory birds. The headland's nearshore zone is considered an essential fish habitat by NMFS. Restoring the entire shoreline and dune along the headland is critical to the survivability of these important ecological habitats and to prevent the dissolution of the headland into separate islands. If only a portion of the headland were to be restored, breaching would occur on the unrestored portion of the headland. Once this has occurred, erosion rates will increase, thus impacting the environmental resources and reducing the longevity of the restored portion. Consequently it was considered necessary to meet project goals to restore the dune/beach on the entire headland. Four different configurations of marsh were evaluated for the Caminada alternatives. Various configurations and designs were considered during the analysis to select the most efficient and effective design."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

8.Shell Islands Optimization. It is unclear from the report how island size was optimized for the two island option at the Shell site. Could the islands be smaller or larger, or in a different configuration?

Response: Concur. The description of the criteria used to develop the Shell Island plan is described in Appendix A, Annex 2. The following paragraph was added to section 3.3.1.2 of the main report:

"The description of the criteria used to develop the Shell Island plan is described in Appendix A, Annex 2. Both one island and two island configurations were evaluated. The Shell Island design was chosen for several reasons. The beach portion of the islands would be built in front of the existing island so that the marsh component of the erosive face, with its fine sediments, would not be exposed during profile retreat. The marsh restoration footprint was then located to minimize the thickness of marsh fill, limiting settlement. The two island design location is based on the existing location of the island remnants so that the seaward construction slope intercepts the existing beach face, reducing the volume of beach fill required to construct the project. SBEACH and GENESIS models as well as observations of past coastal restoration projects were used to determine the optimal design with respect to overwash and orientation of the shoreline. The width of the single island alternatives was based on the minimum width required to prevent breaching over the 50-year project evaluation period. The single island alternative was also oriented so as to minimize construction volume."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

9. Clarification of Meaning, Section 3.2.1. Section 3.2.1 of the report states, in part, that "Shoreline restoration and protection at Caminada Headland and Shell Island is needed to stabilize these geomorphic features and reduce the rapid rate of shoreline erosion" but no

alternatives that are capable of reducing the rapid rate of shoreline erosion are identified in the study (e.g. breakwaters that would effectively decrease erosion rates). The proposed measures would decrease the net land loss over the period of analysis, but would not be effective at stabilizing the geomorphic feature in question, and would do nothing to decrease the rate of land loss. HQUSACE requests clarification of this section of the report.

Response: Concur. The sentence has been revised to say in **Section 3.2.1**:

> "Shoreline restoration and protection at Caminada Headland and Shell Island are needed to protect the marsh habitats which when exposed to open marine influences have been impacted by very high erosion rates."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

10. Alternatives Using Hard Structure Eliminated. Hard structures were eliminated because "significant adverse impacts that would result from the interruption of longshore sediment transport. This interference with sediment transport processes would increase the rates of erosion and shoreline retreat to adjacent reaches of the barrier shoreline." However, if the lack of sediment is limiting the long shore transport and one of the few methods that would help retain sediment to the system is hard structural measures, it is unclear why this would be considered a negative impact. It appears that hard structures could help meet the identified objectives in a more cost effective way. It is noted that (in?) the without project condition if the beach area is eroded away, then the plover and turtle habitat would disappear. Given the loss of this habitat, it is not clear that the negative effects of hard structures are more negative than the complete loss of the turtle and plover habitats.

Response: Concur. The team, following ER 1105-2-100, section E-30, and USEPA's Principles for the Ecological Restoration of Aquatic Resources, believes that ecosystem restoration should mimic, as closely as possible, conditions which would occur in the area in the absence of human changes to the landscaping and hydrology. A guiding principle of the LCA 2004 study is that alternatives should mimic natural processes and rely on natural cycles and processes for their operation and maintenance. The barrier shorelines are affected by both cross-shore sediment transport and longshore sediment transport. The breakwaters interrupt the natural longshore transport processes and increase the rates of erosion and shoreline retreat to adjacent reaches. Hardened structures adversely impact adjacent shorelines not protected by hardened structures. While it appears that hardened structures would reduce erosion, in most cases, hardened structures have not been successful in the soft, fluid Louisiana environment. The breakwaters near Port Fourchon appear to provide some protection, but at the cost of an erosional shadow that has caused a breach to occur at Bay Champagne. During storms, hardened structures on the beach have been tossed aside, providing no protection at all. The goal is to improve the potential for survival as a self-regulating, functioning system. By providing additional sediments, and allowing natural processes to shape these sediments, habitat is

preserved. While not all sediments remain in the system after a storm, many are captured in the overwash. Consequently, the beach habitat rolls back as opposed to being washed away. Often, as the barrier islands roll back, the rock structures become separated from the land, providing no benefits to the island. The hardened structures interfere with the natural longshore migration. The following verbiage was added to **Section 3.2.1**.

> **"Groins and Breakwaters** – This measure consists of the construction of hard structures (such as rock or the sinking of old ships) perpendicular (groins) or parallel (breakwaters) to the shoreline. This measure would protect a portion of the shoreline by reducing wave energy and/or capturing sediment that would otherwise be lost through offshore transport and deposition. Placement of groins would retain sediment on Caminada Headland and Shell Island while breakwaters would reduce the wave energy and reduce the amount of erosion. While the impact from breakwaters may appear to be positive as reduced erosion rates along portions of the shorelines would enhance project performance and potentially increase the interval between re-nourishment events, these benefits would be offset by significant adverse impacts that would result from the interruption of longshore sediment transport. This interference with sediment transport processes would increase the rates of erosion and shoreline retreat to adjacent reaches of the barrier shoreline. The breakwaters near Port Fourchon appear to provide some protection, but at the cost of an erosional shadow that contributed to the creation of a breach at Bay Champagne. Once breaches have occurred and marsh is exposed, erosion rates increase. During storms, hardened structures have been tossed aside, providing no protection or causing a scouring affect behind any remaining structures.
>
> In general, restoration projects should be designed to mimic natural environmental processes and structures. (See the USEPA's Principles for the Ecological Restoration of Aquatic Resources: www.epa.gov/owow/wetlands/restore/principles.html .) A guiding principle of the 2004 LCA study is that alternatives should mimic natural processes and rely on natural cycles and processes for their operation and maintenance. Rock breakwaters do not mimic or reflect natural environmental features or processes in coastal Louisiana. Hard, immobile structures are fundamentally inconsistent with the soft and highly dynamic nature of the coastal system. This inconsistency is the basis for a number of concerns with the use of armoring and rock breakwaters, including the potential for unintended adverse environmental impacts such as changing long-shore sediment transport at the expense of adjacent or downdrift areas, lost restoration opportunities, maintenance requirements, and uncertainties with respect to the long-term viability of rock projects. If focus is placed on hard protection, it is potentially diverted from other types of coastal restoration projects. In the case of barrier island and barrier shoreline projects, efforts placed on hard protection result in less attention on the placement of external sediment. Sediment deprivation is a root cause of coastal decline in the Barataria Basin. Additionally, the effects of subsidence and sea-level rise, combined with the dynamic nature of barrier islands and shorelines bring into question the long-term viability of rock breakwaters and similar hard and stationary structures in the deltaic plain. The life expectancy of hard structures would be shortened as the shoreline continues to migrate landward and subside. In many cases,

hardened structures have not been successful in the soft, fluid environment of coastal Louisiana.

Because of the predicted adverse impacts associated with the placement of these hardened structures along the barrier shorelines, additional costs, and reduced environmental benefits, breakwaters and groins were eliminated from further consideration."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

11. Modify Belle Pass Jetties. The modification of the Belle Pass Jetties would appear to satisfy some of the identified planning objectives. Just because the modification would require additional maintenance dredging should not necessarily eliminate this alternative from consideration of cost-effective measures. Increase dredging would be required for the beach and dune restoration alternatives as well to provide a source of construction material. The increase in dredging of the navigation channel could provide a nearby source of sediment.

Response: Concur. Additional maintenance is not the major reason for eliminating this measure. The Belle Pass jetties impede long shore transport to the west. The jetties act as a terminal groin for the Caminada Headland and collect longshore sediments which benefits the Caminada Headland. The paragraph has been clarified to state that the existing jetties positively impact the headland. Sediments dredged from the channel are currently used beneficially as part of the Corps' O&M dredging. Additionally, the sediments dredged from the Belle Pass channel will be used as renourishment for the Caminada Headland.

Section 3.2.1 has been revised to say:

"**Modify Belle Pass Jetties** – The Belle Pass jetties protect the Bayou Lafourche Navigation Channel. This feature includes removal of the Belle Pass jetties, or modification of the jetties by reducing their length or putting in gaps. This feature is intended to restore the longshore transport of sediments, thereby creating a new source of material for downstream barrier shoreline, but the jetty positively impacts Caminada Headland as the existing jetty serves as a terminal groin and collects longshore sediments that would otherwise be lost to the headland. Further, removal or modification of the Belle Pass jetties would adversely impact the Bayou Lafourche Navigation Channel, which would require additional maintenance dredging, greatly increasing the costs of maintaining the navigation channel. For these reasons, modifications to Belle Pass jetties were eliminated from further consideration."

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

12. Sustainability of Tentatively Selected Plan. The Caminada Headland portion of the tentatively selected plan (C5/S1) shows that all of the 2066 acres of constructed marsh and dune acreage would be lost over the 50 year period of analysis, although the average

annual habitat gain for this plan is still positive, i.e., 269.1 AAHUs. Similarly, only 56 acres of the 683 acres of marsh and dune constructed at the Shell Islands site would remain at the end of the period of analysis, providing a gain of 72 AAHUs. From the information provided, it is clear that the tentatively selected plan is not sustainable over time, because 98% of the constructed acreage would cease to exist within the period of analysis. As required by EC 1105-2-100, Para. 3-5: "Ecosystem restoration projects should be formulated in a systems context to improve the potential for long-term survival of aquatic, wetlands, and terrestrial complexes as self-regulating, functioning systems." HQUSACE believes that such a plan would not be supportable under Corps policies, and cannot be recommended for implementation.

In addition, HQUSACE requests a breakdown of the acreage of the constructed features for the Caminada and Shell Islands sites at 10-year increments after construction until such time that the constructed features would disappear. Lastly, the habitat output that the constructed features would provide over these same time increments is also requested.

Response: Concur. Renourishment has been added to both the Caminada Headland and Shell Island reaches. A total of 1,718 AAHUs will be created by the Recommended Plan, 988.3 AAHUs on the Caminada Headland and 730.6 AAHUs on Shell Island. The summary sheets for the WVA analysis are included as Attachment 1 showing the breakout of the acres and AAHUs.

HQUSACE Assessment: The issue is partially resolved through the clarification as discussed above; HQUSACE has determined that the proposed renourishment plan for Caminada Headland is not policy compliant or consistent with the OMRR&R requirements on WRDA 1986. This comment is closed, and the discussion will be continued in section 3.A.2, below.

NOTE: The OMRR&R plan for the Caminada Headland was revised to include the placement of 3.9 million cubic yards of dredged material, exceeding the amount of material lost through longshore transport.

MVN Response: Please see comment 2.A.8 for the revised verbiage of the O&M. The O&M for the Caminada Headland is designed to balance the sediment budget to ensure that sand lost through long shore transport is replaced through O&M, maintaining the benefits created or restored by the project. The O&M will also protect the integrity of the shoreline by preventing or repairing breaches. Shoreline breaches threaten the project benefits because erosion rates increase once the marine forces impact the fragile marsh habitats.

HQUSACE Assessment: The issue is resolved, and the report has been revised to include the placement of 3.9 mcy of dredged material.

13. <u>P & G Criteria, Completeness and Effectiveness</u>. **Section 3.8.1** states that the tentatively selected plan and NER plan would provide zero net acres at the end of 50 years for the Caminada Headlands. The tentatively selected plan does not include

periodic nourishment, with the result that the constructed features at the Caminada and Shell Islands sites would almost completely disappear during the period of analysis, and would not be able to provide substantial benefits over time. Given this situation, HQUSACE does not believe that the tentatively selected plan may be considered "complete" as defined in the Principles and Guidelines, because the periodic nourishment appears to be an essential element for realizing the planned effects of the work. Similarly, it is difficult to envision that the tentatively selected plan is effective as defined in the P&G given that it is not capable of alleviating the identified problems of the study area or meeting the study objectives. HQUSACE does not believe that the tentatively selected plan is in compliance with the P & G, and therefore, it not suitable for release to the public in its present form.

Response: Concur. Renourishment has been added to both reaches as stated in Comment Response 2.A.8. Additionally, **Section 3.8.4,** Significance of Ecosystem Benefits was added to the report as shown below.

> The significance of the ecosystem outputs plays an important role in ecosystem restoration evaluation per section E-37of ER 1105-2-100. Information on the significance of ecosystem outputs helps to determine whether the proposed environmental investment is worth the cost and whether a particular alternative should be recommended. The significance of restoration outputs are characterized in terms of institutional, public, and technical importance.
>
> *Institutional Recognition:*
>
> Institutional recognition refers to the importance of an environmental resource as acknowledged in laws, executive orders, rules and regulations, and treaties. Federal and Louisiana authorities and executive orders relevant to the BBBS project are listed in **Tables 7-1 and 7-2.**
>
> The outputs are institutionally recognized. NMFS has declared both project areas essential fish habitats (EFH) per the Magnuson-Stevens Fishery Conservation and Management Act of 1996. Much of the Caminada Headland has been designated by USFWS as critical habitat for the piping plover, a species protected by the Endangered Species Act of 1973. The project will preserve and protect these important habitats. The importance of the coastal zones was codified in the Coastal Zone Management Act of 1972. A Consistency Determination has been completed and is included in Appendix D. Executive Order 13186, Migratory Bird Habitat Protection, requires the evaluation of effects of projects on migratory birds. The Recommended Plan will preserve valuable migratory bird habitat. The Council on Environmental Quality's (CEQ) March 2010 *Roadmap for Restoring Ecosystem Resiliency and Sustainability* lists the BBBS project as a necessary component of coastal restoration in Louisiana. Louisiana Highway 1 has been designated by the United States Congress as a "high priority corridor." This project is listed in the Louisiana State Master Plan, and is designated as a critical near term feature in the LCA Ecosystem Restoration Study.
>
> *Public Recognition:*

There is public support in Louisiana for this project, with specific emphasis on beginning construction as soon as possible. Fourchon Beach is one of the few beaches that is publically accessible by car. The area is utilized for camping, fishing, and holiday celebrations. Commercial and recreational fishing are culturally significant to many south Louisiana residents. The wetlands protected by the barrier structures are nurseries for many fish species. The wetlands and wildlife in the project area draw birders, hunters, fisherman, boaters and other outdoor enthusiasts.

Several national and regional organizations have campaigned to save the Louisiana wetlands, and the BBBS project area is considered of great importance to these groups. Organizations such as America's Wetland Foundation, Coalition to Restore Coastal Louisiana, Restore or Retreat, National Wildlife Federation, and the National Audubon Society consider saving the Louisiana wetlands a top priority.

Technical Recognition:

Technical recognition refers to the importance of an environmental resource as based on scientific or technical knowledge or judgment of critical resource characteristics. Examples of technical significance are:

- Scarcity: Louisiana's coastline represents 90% of the wetlands in the contiguous United States and is currently disappearing at an alarming rate. This unique and scarce habitat has high fish and wildlife values. The Recommended plan will create valuable wetland habitats as well as reduce impacts from marine forces and increase the longevity of the inland marsh habitats. The project will also restore and protect barrier island and headland habitats, coastal barrier vegetation, important estuarine/marine transition habitat and other EFH, and critical piping plover habitat. There are only a few hectares of black mangrove in Louisiana, including the study area. This plant species is important because the root system helps prevent soil erosion and land loss and for nesting habitat.

- Representativeness: The project footprint is uninhabited. The Recommended Plan will restore the headland and island using sediment and native plantings that exemplify the natural habitat. The use of compatible sediments as shoreline protection provides considerable environmental benefit. Subtropical sandy beaches support a broad range of organisms and the varied plants that stabilize the berm and dune and shelter its inhabitants. Of particular importance is the berm nesting activity of sea turtles, the berm and dune nesting activities of several species of shorebirds, and the foraging activities of both shorebirds and transient migratory neotropical birds. The nearshore and surf zones are prime foraging areas for pelicans, skimmers, terns, and gulls. A restored and periodically renourished beach berm and dune system affords more protection than one that continues to erode.

- Status and Trends: The project areas are declining and imperiled. Over the last 100 years, the Caminada Headland has experienced an average shoreline erosion rate of 45 feet per year (USACE 2004). Shell Island has experienced an average erosion rate of -89 feet per year between1988 - 2004. While the project cannot stop the natural processes of sea level rise, subsidence, and storm caused erosion, the project can greatly slow down the

disappearance of these landforms by increasing the amount of sediment in the coastal system. Additionally, utilization of 3.9 million cubic yards of material dredged from Belle Pass as renourishment every 10 years will replace sediment lost from the headland. Shell Island has almost completely disappeared. Construction of the Shell Island plan will restore the historical footprint of the barrier island. Renourishment in years 20 and 40 will extend the longevity of the island well beyond the 50 year period of analysis.

- Connectivity: The Caminada Headland is the largest expanse of critical piping plover habitat in southeast Louisiana. With the loss of the headland, only small, geographically dispersed areas will remain for the threatened piping plover. The barrier shorelines are also valuable stopover habitats for migratory birds. The construction of Shell Island will result in additional habitat for the piping plover and migratory birds in an area that is greatly eroded. The Louisiana coast is where the Central and Mississippi flyways meet. It provides a place for neotropical migratory songbirds to rest and feed before or after crossing the Gulf of Mexico, and it is a winter home to 70 percent of the waterfowl that migrate across these flyways such as the gadwall, green-winged teal, northern shoveler, and snow goose. The Louisiana estuaries and wetlands are nurseries for young fish and shellfish.

- Limiting Habitat: Much of the Caminada Headland is designated critical habitat for the piping plover. NMFS has designated both Shell Island and the Caminada Headland as important transitional estuarine/marine habitats and valuable EFH. The proposed action would provide important transitional estuarine/marine habitats and valuable EFH for foraging, breeding, spawning and cover for a variety of larval, juvenile and adult fish and shellfish such as the white and brown shrimp. It also limits inter/intra-specific competition between resident and migratory fish and mammal species with limited coastal vegetation resources.

- Biodiversity: In the Shell Island area, the compressed salinity gradient has decreased the species diversity. This lack of dynamic salinity gradient has negatively impacted the productivity of the fish and wildlife. The proposed action would restore biodiversity including important transitional estuarine/marine habitats and valuable EFH for foraging, breeding, spawning and cover for a variety of larval, juvenile and adult fish and shellfish such as the white and brown shrimp. On the Caminada Headland, the diversity of birds and terrestrial wildlife is dependent upon the cheniere ridges and the mangrove thickets which are protected by the Recommended Plan.

The Recommended Plan meets the four evaluation criteria specified in the P&G.

- Acceptability: The plan is implementable from a technical, environmental, economic, political, legal, institutional, and social perspective. The Recommended Plan is acceptable to the State and the Federal Agencies. The Recommended Plan was selected by an interagency and interdisciplinary team. There is broad based public support for the plan. The agencies' and public's greatest concern is beginning construction as soon as possible.

- Completeness: The plan provides and accounts for all necessary investments and actions to ensure the realization of the planned restoration outputs specified in the Recommended Plan. The plan prevents the disappearance of Shell Island and the dissolution of the Caminada Headland as stated in the project objectives. Consequently, the project improves the potential for long term survival of the coastal systems. The project restores or creates 2,849 acres, all of which are maintained through OMRR&R. The Caminada Headland maintains its beach and dune footprint through the input of 3.9 million cubic yards of material over a 10 year period. The marsh is maintained through cross shore transport of materials from the beach to the back barrier marsh. Shell Island will be returned to its construction template in years 20 and 40.
- Efficient: The Recommended Plan was identified as a cost effective and incrementally justified best buy by the IWR analysis.
- Effectiveness: The plan makes a significant contribution to addressing the specific restoration problems. Increasing sediment in the coastal system will improve the self-sustainability of the coastal system. The Recommended Plan will prevent the loss of Shell Island and the break–up of the Caminada Headland, reducing the land loss and providing essential habitat for wildlife. By maintaining the geomorphic and hydrologic form and function of a barrier system, salinity impacts on the wetland interiors will be lessened. In addition, the Recommended Plan will reduce the impacts of increased wave action, tidal flux, and resulting habitat switching and estuarine shoreline loss and marsh fragmentation in areas landward of the barrier shoreline.

  The 2004 LCA report states that, "The BBBS restoration feature addresses critical ecological needs and would sustain essential geomorphic features for the protection of Louisiana's coastal wetlands and coastal infrastructure…The design and operation of the feature would maintain the opportunity for, and support the development of large-scale, long-range comprehensive coastal restoration." While the project will not stop the natural force of coastal erosion, the project will keep intact the geomorphic and hydrologic form and function of these barrier structures, allowing for the opportunity to develop large-scale and long range comprehensive coastal restoration. Renourishment will replace sediment lost from the Caminada Headland, significantly reducing the estimated rate of erosion. The creation of the feeder beach with the dredged materials will benefit the Headland both to the east and west as longshore transport nourishes the beach and adds width to the shoreline. The added width will afford protection to the uplands by attenuating wave run-up and thus reducing storm damage. In addition transport of the finer sediment into the dune system will bolster it, resulting in benefits to the flora and fauna species and habitats. Shell Island will be restored to its pre-1979 configuration. The two renourishment cycles will result in an island at TY50 that is greater than double its current size.

HQUSACE Assessment: The issue is partially resolved through the clarification as discussed above. The proposed OMRR&R for Shell Island as discussed in the draft report is a complete plan; HQUSACE has determined that the partial (53%) shoreline

renourishment for Caminada Headland and the failure to maintain the constructed marsh areas means that the selected plan is still incomplete.

MVN Response: Concur. Verbiage has been added to the significance write-up and the criteria write-up.

HQUSACE Assessment: This issue is resolved, as discussed in comment 2.B.12, above.

14. Adaptive Management and Monitoring Plan, Section 3.9.6. The stated purpose of the monitoring program is to determine if the predicted performance of the constructed features is being achieved, and to provide feedback for future projects. Given that the tentatively selected plan does not include periodic nourishment and would allow the constructed features to degrade over time, the need for the monitoring and adaptive management program does not appear to be justified because there is no "performance" to monitor. Also, even if monitoring were done and adaptive management measures were identified, it appears that the sponsor may not be willing or able to implement these measures, given that the stated focus of the maintenance efforts for the project would be limited to maintaining the sand fencing and enforcing easements (see section 3.9.5). HQUSACE requests additional information concerning the justification for any monitoring measures that are not directly related to the maintenance of the sand fencing or enforcement of the easements.

Response: Concur. Adaptive Management, now **Section 3.8.12,** has been revised. Below is the revised text:

> "3.8.12 Monitoring Plan and Adaptive Management
>
> Monitoring would be necessary to determine if the predicted performance is being achieved and to provide feedback for future projects. Construction is estimated to require 2 years. As part of the construction phase of the project, the active profile would be surveyed at completion of construction activities to document completion of construction. Post-construction monitoring of the Caminada Headland would be coordinated with Bayou Lafourche operation and maintenance activities, and would be carried out to support adaptive management of the project. In addition, the project monitoring for both the Caminada Headland and Shell Island would incorporate available monitoring data on the project features gathered by ongoing regional monitoring programs. Monitoring data for the project area is collected by the U.S. Geological Survey's National Assessment of Coastal Change Hazards Program, which monitors shoreline change over time and assesses shoreline impacts of hurricanes and other extreme storm events. Monitoring of the shoreline configurations and landforms in the project areas would be done with remote-sensing techniques such as aerial photography, surveys, and satellite imagery. All data acquired for project monitoring would be applied to subsequent barrier island projects. In addition to shoreline landform monitoring, vegetation plantings should be monitored for a period of 5 years post construction to document the establishment of effective vegetative cover for shoreline stabilization. During annual site

visits, USACE will conduct endangered species monitoring. Additionally, USACE will conduct a baseline piping plover survey within the migrating and wintering season immediately prior to initial construction in order to determine the piping plover's preferred habitat use within the action area.

Because the sand budget for shorelines along the central Gulf Coast is a relatively small fraction of available sediment, the challenge for Louisiana barrier island and shoreline management is to maximize the volume of sand retained in the beach environment and to minimize sand dispersal into the surrounding mud environments. This must be accomplished in a context of a highly dynamic system in which both fair weather and storm conditions may continuously or sporadically alter the movement of sand.

For initial construction, the Recommended Plan would place external sediment into a sediment starved system and then let the natural shoreline processes shape these materials. The Recommended Plan has designed the restored areas to sufficient height and width to minimize the risk of breaching. Additionally, Operations and Maintenance plans include beneficial use of dredged material from Belle Pass for periodic renourishment of the Caminada Headland shoreline reach at an average frequency of four times per decade. Shell Island would be rebuilt to its post construction design at years 20 and 40. Operations and Maintenance will also include the repair and replacement of the sand fencing due to both normal wear and tear and storm damage.

An adaptive management approach will be used to carry out the renourishment activities for Operation and Maintenance of the Caminada Headland shoreline reach. Historical records indicate that maintenance dredging is carried out on an average frequency of one dredging event every 1.5 to 2 years. Prior to each dredging event, shoreline conditions will be assessed to determine the best strategy for placement of material for maintenance of the Caminada Headland shoreline reach. The adaptive management strategy will use the following steps for determining how the Operations and Maintenance beneficial use will be carried out:

1. Existing monitoring information will be evaluated to determine whether the data are sufficient for supporting the adaptive management of the project maintenance renourishment. Project-specific data will be acquired as needed. It is anticipated that the monitoring will provide for survey data collection for three events over the operational period of the project, based on the frequency of past dredging operations, availability of data from other programs, and rate of change expected along the shoreline reach.

2. For maintenance events where material will be placed for renourishment of the Caminada Headland shoreline reach, shoreline imagery will be evaluated to determine the renourishment approach. The following basic approaches will be used, based on shoreline conditions:

a. When monitoring data indicate that the shoreline is relatively intact, with no breaches created by storm surge or wave action, the dredged material from Belle Pass will be placed beneficially at the nodal point located at approximately the midpoint of the shoreline reach. Placement of material at this location sustains the project by building out the shoreline at the nodal point, which is an area of more rapid shoreline erosion, and by

feeding material along the entire reach through existing longshore transport patterns.

b. When monitoring data indicate that the shoreline reach has been breached or severely damaged by overwash or other erosion, dredged material will be beneficially placed to repair breaches and other highly eroded areas of the shoreline reach. The material will be placed 100 to 300 feet offshore, similar to the placement at the nodal point. If the volume of material available is greater than the quantity required to address breaches and erosional hot spots, then the remaining material will be placed at the nodal point of the shoreline reach.

c. During O&M events for the Bayou Lafourche navigation channel, material has been placed on either side of the jetties for support. The integrity of the Belle Pass jetties is essential to the effectiveness of the BBBS project. The jetties act as a terminal groin, protecting the project benefits by preventing the loss of sediment from the headland. Should it appear that the stability of the jetties is in question, some of the material would be used to stabilize the landward connection of the jetties and beachhead.

For Shell Island, monitoring results may determine that the timing of the renourishment cycles and the amount of material required to restore the construction template be adjusted. Analyses may also help to optimize the configuration for the renourishment design. Additionally, the need for renourishment will be re-evaluated as longer term strategies are implemented such as LCA Medium Diversion at Myrtle Grove and any projects resulting from the LCA Mississippi River Hydrodynamic and Delta Management Study.

According to the CECW-PB Memo dated 31 August 2009:

Monitoring is identified as supporting information needs that will help further understand and corroborate project effects and includes the systemic collection and analysis of data that provides information useful for assessing project performance, determining whether ecological success has been achieved, or whether adaptive management may be needed to attain project benefits.

A monitoring design was established to determine if the desired outcome or risk endpoint is met. Upon completion of the BBBS project, monitoring for ecological success and adaptive management will be initiated and will continue until such time as the Secretary of the Army determines that the success criteria has been met, as defined by the project-specific objectives. This monitoring plan includes the monitoring actions to evaluate success and to determine adaptive management needs. Although the law allows for a ten-year cost-shared monitoring plan, ten years of monitoring may not be required. Once ecological success has been achieved, which may occur in less than ten years post-construction, no further monitoring will be performed. If success cannot be determined within that ten-year period of monitoring, any additional monitoring will be a non-Federal responsibility. This plan estimated monitoring costs for a period of ten years because that is the maximum allowed federal contribution to monitoring. As soon as ecological success is achieved, monitoring will cease.

The following discussion outlines key components of a monitoring plan that will support the BBBS project Adaptive Management Program. The plan identifies performance measures along with desired outcomes (i.e. targets) and monitoring designs in relation to specific project goals and objectives. Performance is measured against the predicted benefits generated by the project as quantified by the WVA and project modeling. A performance measure includes specific feature(s) to be monitored to determine project performance. If applicable, a risk endpoint would be identified. Risk endpoints measure undesirable outcomes of a management or restoration action.

Objective 1: Restore the barrier structures to ensure their ability to provide geomorphic and hydrologic form and function.

Performance Measure 1: Aerial extent.

Desired Outcome: Maintain an aerial extent that matches the predicted aerial extent of the species specific landscape features (surface area of barrier island habitats) at a particular point in time as estimated by project modeling. For the Caminada Headland, renouishment in conjunction with the maintenance dredging of Belle Pass will stabilize the size of the project area. Over each 10 year period, desired acreage would be within 15% of the constructed area of 2,066 acres. Shell Island will be renourished in years 20 and 40. The desired acreage would be within 15% of the following values TY 10 – 650 acres; TY 15 – 617 acres; TY 25 – 688 acres; TY 30 – 648 acres; TY 35 – 615 acres; and TY 45 – 688 acres.

Monitoring Design: Aerial photography will be used to assess the barrier headland/island's dimensions over time. One pre-construction and three post-construction surveys will be obtained.

Objective 2: Restore and improve various barrier headland/island habitats that provide essential habitats for fish, migratory birds, and other terrestrial and aquatic species, mimicking, as closely as possible, conditions which occur naturally in the area.

Performance Measure 2: Habitat composition.

Desired Outcome: Provide a distribution of acreage between habitat types that matches the predicted acreages of the barrier island habitats at a particular point in time. Successful barrier islands in Louisiana require beach, dunes, and marsh. The acres would be equal to or greater than those predicted at varying target years in the WVA for the dune, supratidal, and marsh habitats. For the Caminada Headland, renouishment in conjunction with the maintenance dredging of Belle Pass will stabilize the size of the project area. Over each 10 year period, desired acreage for beach/dunes will be within 15 % of 880 acres. Desired acreage for marsh will be within 15 % of 1,186 acres. For Shell Island, The desired acreage would be within 15% of the following values TY 10 – 257 acres of beach and dune and 393 acres of marsh; TY 15 – 235 acres of beach and dune and 382 acres of marsh; TY 25 – 278 acres of beach and dune and 410 acres of marsh; TY 30 – 256 acres of beach and dune and 392 acres of marsh; TY 35 – 234 acres of beach and dune and 381 acres of marsh; and TY 45 – 278 acres of beach and dune and 410 acres of marsh.

Monitoring Design: Habitats will be classified using aerial photography to assess trends in conversion of beach and marsh to open water. One pre-construction and three post-construction acquisitions will be obtained.

Site visits will monitor plantings and check accuracy of aerial photography assessments.

Objective 3: Increase sediment input to supplement long-shore sediment transport processes along the gulf shoreline by mechanically introducing compatible sediment, and increasing the ability of the restored area to continue to function and provide habitat with minimum continuing intervention.

Performance Measure 3: Island elevation changes.

Desired Outcome: Maintain elevation profile that matches the predicted profiles of the associated barrier island landscape features at a particular point in time. Desired elevations would match the elevation classifications of the WVA: dunes greater than or equal to +5 feet NAVD and marshes between 0 feet NAVD and +2 NAVD.

Monitoring Design: Topographic surveys will be used to determine the cross shore profile and volumes of the barrier islands in order to characterize the changes that are occurring in the sediment budget and barrier platform stability over time. One pre-construction and three post-construction acquisitions will be obtained.

Costs for implementing the Monitoring and Adaptive Management Plans

To be conservative, the costs assume the maximum allowable cost shared time of 10 years. Should ecological success be determined in less than 10 years, no further monitoring will be performed and costs will be less than estimated.

Annual site visits are planned. The site visits will take two days (one for each reach) and require two additional days per site to evaluate and document the results of the investigation. Site visits to Shell Island will require the rental of a boat, estimated at a cost of $1,500 per trip. In addition to the annual site visits, aerial photography will be used to assess the barrier shorelines' dimensions and habitat distribution. Evaluations of the aerial photography will take place every three years at a cost of $25,000 each. Additionally, one pre-construction evaluation will be completed.

One pre-construction and three post-construction surveys will be obtained at a cost of $150,000 per cycle. Evaluation of the surveys and documentation of the findings will cost an estimated $20,000 per cycle or $80,000. **Table 3-8** provides a detailed description of the costs.

Table 3-8 Ten Year Cost Description

Activity	Purpose	Description	Unit Cost	Ten Year Cost
Site Visits	Monitor plantings. Evaluate habitat composition. Monitor for ESA compliance	Annual visits. 2 days for visits. 4 days for documentation	$18,000	$180,000
Boat Rental	Access to Shell		$1,500	$15,000

	Island			
Aerial Photography Evaluations	Evaluate aerial extent and habitat composition	Evaluate aerial photography to assess island dimensions and classify habitats	$25,000	$100,000
Surveys	Evaluate aerial extent, habitat composition, and island elevations	One pre-construction and three post-construction surveys	$150,000	$600,000
Survey Evaluations	Evaluate aerial extent, habitat composition, and island elevations	5 days for evaluation of each reach	$20,000	$80,000
Cost				$975,000
Monitoring & Adaptive Management Cost w/ Contingencies				$1,285,000

The project will be adaptively managed by altering the required operations and maintenance based on the renourishment needs for the barrier shorelines. The O&M is the responsibility of the nonfederal sponsor. The need for renourishment will be impacted by the number and intensity of storms and the impact of future projects such as the LCA Medium Diversion at Myrtle Grove and any other coastal restoration projects. Monitoring results will determine the need for varying the O&M. The nonfederal sponsor, as part of its O&M responsibilities, will be responsible for the increase or decrease in O&M costs.

Adaptive management triggers reflect aerial extent (acres), habitat composition (acres), and island elevation (elevation profile of habitat type.) For the Caminada Headland, timing of the renourishment will be dependent upon the maintenance dredging requirements of the Bayou Lafourche, Louisiana navigation project unless the monitoring reveals a more immediate need. O&M requirements will be determined by the need to balance the sediment budget, breaches or imminent breaches in the shoreline, or erosion of the beach that threatens the dunes. If acres are not achieved, O&M cycles would be adjusted to ensure that target acres are met, similar to the O&M triggers discussed in section 3.8.11. For island elevation, O&M would be adjusted to include the use of construction techniques such as the construction of dunes to target height or addition of material to the marshes (marsh renourishment.) For the Caminada Headland, when the distance between the dunes and the water decreases to

50 feet, O&M would be required. For Shell Island, the monitoring results may indicate the need to change the timing or quantities estimated for the renourishment. The timing of the O&M can be either pushed up or moved back dependent upon the achievement of the desired outcomes. Should the island narrow to approximately 300 feet in width prior to year 20, O&M would be scheduled.

Monitoring results will also determine the placement of the material on the Caminada Headland. Should the placement of the dredged material be within the federal standard, there will be no incremental cost to the nonfederal sponsor. If the material is placed outside of the federal standard, but west of the nodal point, the cost of the O&M will decrease. However, should monitoring determine that the material should be placed east of the nodal point, the nonfederal sponsor will be responsible for the additional cost. If more material is required than is provided by the maintenance dredging, it is the nonfederal sponsor's responsibility to locate additional sand sources.

Ecological Success

Close out of the monitoring would occur when it is determined that the project has been successful. Success would be considered to have been achieved when project objectives have been met or when it is clear that they will be met based upon the trend for the site conditions and processes. Project success would be based upon the following:

- Reduction in land loss in the project areas
- Decline in current trend in conversion of beach and marsh to open water
- Increase in elevation

These criteria will be compared to the performance measures and the desired outcomes to ensure that the project is achieving the stated objectives. Once it is determined that the project is performing as expected, ecological success may be determined."

HQUSACE Assessment: The issue is partially resolved through the clarification as discussed above. The description of the adaptive management and monitoring plan is adequate, however, no performance measures (i.e., success criteria) have been developed to use as the basis to assess how well the proposed plan works.

MVN Response: Concur. Performance measures and criteria have been added to the above write-up.

HQUSACE Assessment: This issue is partially resolved. Success criteria should be clear and explicit. For example, a range of acceptable elevations could be provided for performance measure 3.

MVN Response: Concur. Verbiage has been revised to clarify the success criteria per comment response above.

MVN Response: Please see comment 2.A.8 for the revised verbiage of the O&M. The O&M for the Caminada Headland is designed to balance the sediment budget to ensure that sand lost through long shore transport is replaced through O&M, maintaining the benefits created or restored by the project. The O&M will also protect the integrity of the shoreline by preventing or repairing breaches. Shoreline breaches threaten the project benefits because erosion rates increase once the marine forces impact the fragile marsh habitats.
MVN Response: Please see comment 2.A.8 for the revised verbiage of the O&M. The O&M for the Caminada Headland is designed to balance the sediment budget to ensure that sand lost through long shore transport is replaced through O&M, maintaining the benefits created or restored by the project. The O&M will also protect the integrity of the shoreline by preventing or repairing breaches. Shoreline breaches threaten the project benefits because erosion rates increase once the marine forces impact the fragile marsh habitats.

HQUSACE Assessment: The issue has been resolved through clarification of the success criteria.

C. Crediting, Financial Capability and Real Estate Issues.

1. Credit for sponsor work prior to selection of NER plan. In tab 4 of the report, a memo from CEMVN-PD-N is included (whose date appears to be October 21, 2009), as well as a staff summary cover sheet dated October 7, 2009, both of which discuss the issue of crediting the State for work on the project prior to selection of the optimal national ecosystem restoration plan. The cover sheet indicates that legal review was requested on the crediting issue, but it is not clear that such review occurred. MVN and MVD should clarify this.

Response: Concur. OC initialed the status sheet.

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

2. Sponsor financial requirements and views. Part 3.11.5 on page 3-62 of the report states that a letter of financial capacity still needs to be provided by the State. In addition, part 3.11.6 of the report indicates that the State also needs to provide a letter indicating its views and support of the project. Please provide a status of these items and update the report to reflect that status as well as include the latest letter of support for the final Tentatively Selected Plan.

Response: Concur. A letter of support has been requested from the state and will be included in the draft report. Cost Sharing (3.10.3) and Financial Requirements (3.10.5) have been updated to match the language of the LCA 6 report.

Section 3.10.3 states:

The State of Louisiana, acting through the Coastal Protection and Restoration Authority of Louisiana (CPRA), will be the non-Federal sponsor for the LCA Barataria Basin Barrier Shoreline project. The cost-share during the feasibility phase was 50% Federal and 50% non-Federal. Following the feasibility phase, the cost share for the planning, design and construction of the project will be 65% Federal and 35% non-Federal. The CPRA must provide all lands, easements, rights-of-way, utility or public facility relocations, and disposal areas (LERRDs) required for the project. Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) of the project would be a 100% CPRA responsibility. The O&M costs are estimated to have a present value of $129,564,864 with an average annual cost of $6,160,938. The cost apportionment for the first costs is presented in **Table 3-10.**

Table 3-9. Cost Apportionment of First Costs: Recommended Plan (October 2010 Price Level)

Item	Total	Federal	Non-Federal
PED	$6,800,000	$4,420,000	$2,380,000
Construction	409,000,000	$268,255,000	$140,745,000
Lands, Easements, Rights of way	$3,700,000	$0	$3,700,000
Monitoring & Adaptive Management	$1,285,000	$835,000	$450,000
Total First Costs(R)	$421,000,000	$274,000,000	$147,000,000

The estimated fully funded construction cost of the BBBS project is $448,000,000.

The State of Louisiana is in full support of the LCA Barataria Basin Barrier Shoreline Restoration project at the current cost share ratio of 65 percent Federal, 35 percent non-Federal, with operations, maintenance, repair, replacement and rehabilitation being a 100 percent non-Federal responsibility, as required in WRDA 2007. Additionally, project monitoring and any Adaptive Management deemed necessary will be cost shared at 65/35 for the first ten years of the project life.

Under current law, authority for the non-Federal sponsor to receive credit for construction activities is limited. Section 7007(a) of WRDA 2007 authorizes the Secretary to credit, "toward the non-Federal share of the cost of a study or project under this title the cost of work carried out in the coastal Louisiana ecosystem by the non-Federal interest for the project before the date of the execution of the partnership agreement for the study or project." In addition, section 7007(a) incorporates the requirement of section 221 of the Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) that the Government and non-Federal sponsor must enter into a

separate agreement for any work that will be carried out prior to execution of the partnership agreement. In other words, work undertaken by the non-Federal sponsor prior to (but not after) execution of the project partnership agreement (PPA) is eligible for credit subject to execution of a separate agreement covering such work before it is undertaken. For design work that the non-Federal sponsor proposes to undertake, the Design Agreement will serve as the required separate agreement. For construction work that the non-Federal sponsor proposes to undertake, an In-Kind Memorandum of Understanding will be required. Opportunities to enter into an In-Kind MOU for construction activities will depend on the schedule for entering into the PPA for a project.

Section 7007(d) provides that credit afforded under section 7007 that is in "excess" of the non-Federal cost share for a study or project authorized in Title VII of the Water Resources Development Act of 2007 may be applied toward the non-Federal cost share of any other study or project under that title. "Excess" credit will be applied only toward another study or project involving the same sponsor. In addition, "excess" credit will be applied within project phases (i.e., study to study, design to design, and construction to construction). At this time, it is anticipated that that there are limited opportunities for the application of "excess credit" from other Title VII projects toward these projects.

Section 3.10.5 states:

"It is expected that the CPRA will have the capacity to provide the required local cooperation for the Recommended Plan. A project schedule and cost estimate will be provided to the CPRA so that it may develop a financing plan. A financial analysis will be conducted to assess the CPRA's capability to financially participate in the Recommended Plan. A standard cost share percentage of 65% Federal and 35% non-Federal would be applied to the total first cost of the project, including the value of pre-construction engineering and design costs construction features.

Section 7007(b) of WRDA 2007 provides that "The non-Federal interest may use, and the Secretary shall accept, funds provided by a Federal agency under any other Federal program, to satisfy, in whole or part, the non-Federal share of the cost of the study or project if the Federal agency that provides the funds determines that the funds are authorized to carry out the study or project." If the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE), formerly the Mineral Management Services (MMS), determines in writing that funds it provides to the non-Federal sponsor under the Energy Policy Act of 2005 (Coastal Impact Assistance Program - CIAP) and the Gulf of Mexico Energy Security Act of 2006 (GOMESA) are authorized to be used to carry out LCA projects, the non-Federal sponsor can use those funds toward satisfying its local cooperation for the project, including the non-Federal sponsor's acquisition of Lands, Easements, Relocations, Right-of-ways and Disposals (LERRD) required for the project.

By letters dated July 2, 2009 and December 18, 2009, a process was established for the BOEMRE to provide its written determination regarding the acceptability of the use of CIAP funds for LCA studies,

projects, and programs. That process provides that the BOEMRE's written determination for a specific study, project, or program will take the form of the grant award document for that activity."

HQUSACE Assessment: This issue is partially resolved. Prior to public release, the draft report should be revised to acknowledge that a letter of intent (as required by ER 1105-2-100, Appendix G, at G-9 and self-certification of financial capability for decision documents (As required by CECW-PC's 12 June 2007 guidance) will be obtained from the sponsor to confirm its intent and financial capability to support the project, including providing all required local cooperation. This issue will be finally resolved when a letter of intent and self-certification of financial capability is received and included in the final report.

MVN Response: A letter of intent has been received and is included in the report in Section 3.10.7. MVN has received a self-certification of financial capability from the State of Louisiana.

HQUSACE Assessment: The issue is resolved.

3. Cost-sharing of LERR. Table 3-8 in Section 3.11.3 on Cost-Sharing, LERR costs are apportioned 65/35 between Federal and non-Federal costs. LERR costs are borne solely by the non-Federal sponsor, and should not be listed as a Federal cost in this table.

Response: Concur: The table was amended moving all of the LERRD costs to the NFS, increasing the Federal and decreasing the NFS construction costs to maintain the 65/35 balance. Please see answer to comment C2.

HQUSACE Assessment: The issue is resolved through the clarification as discussed above.

4. Perpetual Easement and Sustainability of Constructed Features, Section **3.9.4.1**. The report proposes to use perpetual easements for both the Caminada and Shell sites, even though it is apparent that the constructed features would effectively cease to exist, and become open water within the 50 year period of analysis. Given this situation, it is not clear why a perpetual easement makes sense, given that open water areas are generally claimed as State lands. Would this situation result in annual payments for lands that are no longer in existence, and for which the landowner can establish no claim? The issue of easement payments is related to the larger issues of nourishment, NER plan selection, and construction authorization as discussed in WRDA 2007.

Response: The valuation of temporary easements is generally based on the value of rental property. If the term of the easement extends much beyond 10 years, there is little difference between the estimated values of the property for a temporary easement versus a perpetual easement. Real estate payments are not paid in annual payments. The value of a temporary easement is discounted to the present value of the annual payments, and is paid in one lump sum prior to the start of construction. Consequently, there will be no annual payments for lands that are not in existence. However, it would be advantageous

to purchase a perpetual easement since there would be little or no additional cost to obtain the perpetual versus a 20 or 50 year easement. The modeling was conservative, using a fairly high relative sea level rise rate and the inclusion of several tropical storms, including another of the magnitude of Hurricane Katrina. If the coast of Louisiana experiences a period of low storm activity, the coast may not erode at the rate anticipated by the models and incorporated in our benefit analysis, resulting in less land loss than expected.

HQUSACE Assessment: The issue is partially resolved through the above discussion. The issue cannot be completely resolved until the larger issues with the use of non-standard estates have been closed out.

MVN Response: MVN-RE has requested approval of the estates from MVD and HQ. MVN is awaiting a decision from HQ regarding the request for waiver of fee acquisition and approval of nonstandard estates.

HQUSACE Assessment: The decision regarding the request for waiver of the requirement to acquire fee and, if the waiver is granted, if NSEs may be used will be made at a later date. MVN should add the appropriate fee estate to Exhibit B of the REP and remove the NSEs from Exhibit B.

MVN Response: Concur, MVN has revised the REP and indicated the property to be acquired in Fee, excluding minerals rather than as easements. The Fee, excluding minerals estate has been added to Exhibit B of the REP. However, a request to deviate from fee acquisition in favor of approval of non-standard estates may be submitted in the future.

HQUSACE Assessment: The issue is resolved.

5. Real Estate Plan, Appendices B, C, and D

a. Page 18, Wetland Creation. Suggest the following language starting at line 13; "machinery useful in the operation, maintenance, and repair of such pipeline..."

Response: The request for approval of nonstandard estates is included in Exhibit E of the Appendix C, Real Estate Plan. The Wetland Creation and Restoration Easement, a non-standard estate, has been reviewed and certified as legally sufficient for the requirements of the project. The easements have been substantially revised to be more consistent with the rights and restrictions enumerated in approved standard estates. Based on a review of the approved standard estates, MVN-OC felt it was not necessary to explicitly enumerate the right to utilize machinery. The revised Wetland Creation and Restoration Easement states:

WETLAND CREATION AND RESTORATION EASEMENT
(based on the standard Perpetual Beach
Nourishment Easement and other standard estates)

A perpetual and assignable easement and right-of-way in, on, over and across (the land described in Schedule A) (Tract No. -) to construct, operate, maintain, patrol, repair, renourish, and replace wetlands, including the right to borrow and/or deposit fill; to accomplish any alterations of contours on said land; to plant vegetation on said land; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; to construct dikes and to install, alter, relocate, repair or plug cuts in the banks of dikes; to construct, operate and maintain pipelines for the purpose of dredge or spoil material transport and deposition; to move, store and remove equipment and supplies; to plug, fill or alter pipeline canals located within the limits of the easement; to trim, cut, fell and remove there from all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the easement (excepting the structures now existing on the land, described as), provided that no other structures shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project, that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill, [that no vehicles shall be operated within the limits of the easement without such approval, except as may be required to operate and maintain the easement,] and that no trimming, cutting, felling or removal of trees, underbrush, and any other vegetation shall be conducted without such approval; the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs,) successors and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; and expressly excepting and excluding all oil, gas and other minerals occurring naturally in liquid or gaseous form, in and under said land and all appurtenant rights for the exploration, development, production and removal of said oil, gas and other minerals occurring naturally in liquid or gaseous form, but without the right to enter upon or over the surface of said land for the purpose of exploration, development, production and removal therefrom of said oil, gas and other minerals occurring naturally in liquid or gaseous form.

HQUSACE Assessment: The issue is partially resolved through the above discussion. The issue cannot be completely resolved until the larger issues with the use of non-standard estates have been closed out.

HQUSACE Assessment: The decision regarding the request for waiver of the requirement to acquire fee and, if the waiver is granted, if NSEs may be used will be made at a later date. MVN should add the appropriate fee estate to Exhibit B of the REP and remove the NSEs from Exhibit B. The REP should be clear that approval is not guaranteed. Also, HQUSACE has commented in other requests to use NSEs that the US should not be the approval authority.

MVN Response: Concur. MVN has revised the REP and indicated the property to be acquired in Fee, excluding minerals rather than as easements. The Fee, excluding minerals estate has been added to Exhibit B of the REP and the NSE have been removed. The exceptions are the standard Utility and/or Pipeline Easement and the Temporary Work Area Easement, needed for staging area.

b. Line 19. Are we allowing EITHER the United States OR Louisiana to approve excavations, or do we want to require approval by both entities? See the following discussion in report for context of this question.

> machinery necessary and useful in the operation of such pipelines; to place, move and utilize other equipment useful in the control of the such material and effluent; to plant or cause the growth of vegetation on said land; and to create, restore, nourish and enhance the wetlands and associated coastal habitats in, over, across and upon the said lands; provided that no structures for human habitation shall be constructed on the land but existing structures may be maintained and that no other structures shall be constructed or maintained on the land without the prior written approval of the United States, as represented by the U.S. Army Corps of Engineers, or the State of Louisiana, as represented by the Louisiana Department of Natural Resources, or authorized representative, and that no excavation shall be conducted and no disposal of any kind placed on

Response: Concur. Language has been revised to say representative of the United States in charge of the project. Please see comment above.

HQUSACE Assessment: The issue is partially resolved through the above discussion. The issue cannot be completely resolved until the larger issues with the use of non-standard estates have been closed out.

HQUSACE Assessment: The decision regarding the request for waiver of the requirement to acquire fee and, if the waiver is granted, if NSEs may be used will be made at a later date. MVN should add the appropriate fee estate to Exhibit B of the REP and remove the NSEs from Exhibit B. The REP should be clear that approval is not guaranteed. Also, HQUSACE has commented in other requests to use NSEs that the US should not be the approval authority.

MVN Response: Concur. MVN has revised the REP and indicated the property to be acquired in Fee, excluding minerals rather than as easements. The Fee, excluding minerals estate has been added to Exhibit B of the REP and the NSE have been removed. The exceptions are the standard Utility and/or Pipeline Easement and the Temporary Work Area Easement, needed for staging area.

HQUSACE Assessment: The issue has been resolved by the above revisions.

c. Page 19, Perpetual Dune. Suggest the following language starting at line 13; "machinery useful in the operation, maintenance, and repair of such pipelines..."

Response: The Perpetual Dune Restoration and Creation Easement has been revised and certified as legally sufficient for the project. The easements have been substantially revised to be more consistent with the rights and restrictions enumerated in approved standard estates. Based on a review of the approved standard estates, we felt it was not necessary to explicitly enumerate the right to utilize machinery. Please see text below:

PERPETUAL DUNE RESTORATION and CREATION EASEMENT
(Non-Standard Estate)

A perpetual and assignable right, servitude and easement in, on, over and across those lands to
construct, operate and maintain, patrol, repair, renourish, and replace dunes and associated coastal habitats on the land hereinafter described, including the right to borrow and/or deposit fill; to accomplish any alterations of contours on said land; to plant vegetation on said land; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; to construct dikes and to install, alter, relocate, repair or plug cuts in the banks of dikes; to construct, operate and maintain pipelines for the purpose of dredge or spoil material transport and deposition; to move, store and remove equipment and supplies; to plug, fill or alter pipeline canals located within the limits of the easement; to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the easement (excepting the structures now existing on the land, described as), provided that no other structures shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project, that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill, that no trimming cutting, felling or removal of trees, underbrush, and any other vegetation shall be conducted without such approval, and that, except for the equipment and machinery required to operate and maintain this easement, and except for vehicles whose use is required within the area by (1) a duly commissioned law enforcement officer in the performance of his duties, (2) any person engaged in locating and suppressing a fire, or (3) any person engaged in the rendering of emergency medical assistance to an individual, no vehicles are allowed within the area without such approval; the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the grantor(s), (his) (her) (its) (their) (heirs,) successors and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; and expressly excepting and excluding all oil, gas and other minerals occurring naturally in liquid or gaseous form , in and under said land and all appurtenant rights for the exploration, development, production and
removal of said oil, gas and other minerals occurring naturally in liquid or gaseous form, but without the right to enter upon or over the surface of said land for the purpose of exploration, development, production and removal therefrom of said oil, gas and other minerals occurring naturally in liquid or gaseous form.

HQUSACE Assessment: The issue is partially resolved through the above discussion. The issue cannot be completely resolved until the larger issues with the use of non-standard estates have been closed out.

MVN Response: MVN is awaiting a decision from HQ regarding the request for waiver of fee acquisition and approval of nonstandard estates.

HQUSACE Assessment: The decision regarding the request for waiver of the requirement to acquire fee and, if the waiver is granted, if NSEs may be used will be made at a later date. MVN should add the appropriate fee estate to Exhibit B of the REP and remove the NSEs from Exhibit B. The REP should be clear that approval is not guaranteed.

HQUSACE Assessment: The issue has been resolved by the above revisions.

MVN Response: Concur. MVN has revised the REP and indicated the property to be acquired in Fee, excluding minerals rather than as easements. The Fee, excluding minerals estate has been added to Exhibit B of the REP and the NSE have been removed. The exceptions are the standard Utility and/or Pipeline Easement and the Temporary Work Area Easement, needed for staging area.

D. Report Organization.

1. The third paragraph of chapter 1 includes "The BBBS Project would complete the barrier island chain to restore these shoreline reaches and maintain the geomorphic structure and functions of barrier shorelines in the Barataria Basin." This information should be removed from this section as it implies that the plan is already complete before the study is even begun. This section should focus on why we are doing a study not why we are recommending a project.

Response: Concur. The sentence has been deleted.

HQUSACE Assessment: The issue is resolved through the above discussion.

2. Section 1.2.1 Study Purpose starts with "The purpose of this study is to evaluate alternatives to restore the Barataria Basin barrier shoreline through shoreline and marsh restoration" which does give the reader an idea of the "study" purpose. However, the very next sentence begins with "The purpose of the proposed action". There should not be a proposed action yet, we should be only discussing the study purpose. Somewhere between these two sentences we have completed the whole study. This section should not be discussing the purpose of the "proposed project". The rest of this section discusses the proposed action. Any discussion of the proposed action should be removed from this section.
Response: Concur: The Study purpose, **Section 1.2.1,** has been amended to read:

> The purpose of this study is to evaluate alternatives to restore the Barataria Basin barrier shoreline through shoreline and marsh restoration to ensure the continuing geomorphic and hydrologic form and function of the barrier structures. Louisiana contains one of the largest expanses of coastal wetlands in the contiguous U.S. and accounts for 90 percent of the total coastal marsh loss occurring in the nation. The coastal wetlands, built by the deltaic process of the Mississippi River, contain an extraordinary diversity of habitats ranging from narrow natural levees and dunes to expanses of forested swamps and freshwater, intermediate, and brackish, and saline marshes.

HQUSACE Assessment: The issue is resolved through the above discussion.

3. <u>Section 1.4, History of the Investigation</u>. The first half of the first paragraph of this section would fit nicely in the study purpose section. The discussion of the major causes of wetland loss does not fit in the history of the investigation.

Response: Concur. The first part of this paragraph was moved to study purpose as requested in comment 2. Figure 1-8 will be deleted. **Section 1.4** has been revised to say:

HISTORY OF THE INVESTIGATON

Loss of coastal wetlands in Louisiana has been occurring since the early 1900s. During the past 20 years to 30 years, individual studies and construction projects have provided localized remedies to this problem. In 1990, passage of CWPPRA (PL-101-646, Title III) provided authorization and funding for the Louisiana Coastal Wetlands Conservation and Restoration Task Force to begin actions to curtail wetland losses. The task force consists of five Federal agencies and the State of Louisiana (Federal agencies include USACE, U.S. Environmental Protection Agency [USEPA], U.S. Department of Interior [U.S. Fish and Wildlife Service (USFWS)], U.S. Department of Agriculture [Natural Resources Conservation Service (NRCS)], and U.S. Department of Commerce [National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)]). CWPPRA is authorized until 2019. As of January 2009, 176 CWPPRA projects have been approved; 82 have been constructed, 15 are under construction, 30 have been de-authorized, 2 projects were transferred to other authorities, and the other projects are in the Engineering and Design phase (http://www.mvn.usace.army.mil/pd/cwppra_mission.htm).

After extensive studies and construction of a number of coastal restoration projects under CWPPRA, it was apparent that a systematic approach involving large projects working in conjunction with these smaller projects would be necessary to deal with the continuing loss of the coastal wetlands effectively. In 1998, the State of Louisiana and the five CWPPRA Federal agencies developed the "Coast 2050: Toward a Sustainable Coastal Louisiana" report (known as the Coast 2050 Plan). The underlying principles of the Coast 2050 Plan are to restore or mimic the natural processes that built and maintained coastal Louisiana.

The Coast 2050 Plan was the basis for a USACE reconnaissance report that demonstrated a Federal interest in restoration of coastal Louisiana wetlands. As a result of the reconnaissance report, the USACE and the State of Louisiana developed the LCA Report, (November 2004). A programmatic EIS (PEIS) was prepared as part of the LCA Report. The Record of Decision (ROD) was signed on November 18, 2005.

The LCA Report has multiple components that help to address the critical water resource problems and opportunities in coastal Louisiana. As stated previously in section 1.0 of this report, the Caminada Headland and Shell Island reaches were not being addressed through other programs. Therefore, the LCA Report identified these two reaches of the BBBS Project as one of five near-term critical projects that could be implemented within 5 years based on proven restoration techniques. The critical near-term projects also address ecosystem losses that will result in rapidly increasing or irreversible impacts if existing trends continue unabated.

Title VII of WRDA of 2007 authorizes construction for these five near-term projects.

HQUSACE Assessment: The issue is resolved through the above discussion.

4. What does the chapter heading "Need for Objectives of Action" mean? This section appears to be similar to "Problems, Needs and Opportunities" heading that is typically used in Corps feasibility reports

Response: Concur. The chapter has been renamed Problems, Opportunities, and Needs. Problems will be identified first followed by opportunities and needs as requested by MVD.

HQUSACE Assessment: The issue is resolved through the above discussion.

5. Section 2.3.1 Needs. The need is based on the historical losses of valuable habitat in this region. The study will evaluate these losses to determine the causes and develop alternatives to reduce or eliminate them. Needs should be addressed as an item, not as an action. For example, you could identify the need for dune habitat, not the need to create dune habitat. The restoration of dune habitat would be the method to obtain the identified need, i.e., it is the appropriate action to meet the need. Objectives will be defined as the action that will help satisfy a need. The Needs identified in section 2.3.1 would be better defined as objectives.

Response: Concur. Needs, in **Section 2.4**, were rewritten as follows:

"Critical needs in the study area are a subset of the critical needs identified in the LCA report and include:

- Preservation of critical and essential geomorphic structures (beach, dune, ridge, and marsh) of the Barataria barrier system.
- Future land loss, habitat loss, and fragmentation of the land features will result in diminishing habitats for threatened and endangered species.
- Vital local, regional, and national socio-economic resources are in danger of being lost.
- The back barrier estuarine environments are being adversely impacted by the high energy marine processes and associated salinities of the Gulf of Mexico.
- Near-term restoration should be synergistic with future restoration by maintaining or restoring the integrity of Louisiana's coastline, upon which all future coastal restoration is dependent.
- Restoration features should be designed that support the development of large-scale, long-range, comprehensive coastal restoration."

HQUSACE Assessment: The issue is resolved through the above discussion.

6. Standard Naming Convention Recommended. In Section 3.3 (Preliminary Array of Alternatives), HQ suggests using a standard naming convention for the alternatives when they are referring to similar alternatives. For example, it appears that Alternatives 5, 6, and 7 (all "Preferred Dune with Expanded Marsh" with renourishment variations) are all the same as Alternative 9, "Optimized Project with Expanded Marsh" with 4 renourishment episodes -- except for the renourishment cycles. Is "preferred dune" the same as "optimized project?" If so, does that make Alternative 8 ("Optimized Project with Base Marsh and 4 renourishment episodes") and Alternative 10 ("Optimized Project with Expanded Marsh and 4 renourishment episodes and Full Storm Protection") also the same as "Preferred Dune" alternatives, but just with different marsh quantities and renourishment cycles (and advanced fill for Alternative 10)? Are the "preferred dune" and "optimized project" alternatives the same as Alternative 4's "landward dune" footprint (i.e., are Alternatives 5-10 also "landward?")? These descriptions and distinctions between alternatives should be clearer.

Response: Concur. An in depth description of the alternatives is included in the Engineering Appendix. The names of the alternatives in the report match the names provided by the NFS's engineering contractors. The following paragraph was added to **Section 3.3.1.1** to clarify.

> "The Caminada alternatives were developed sequentially with alternatives 1 through 4 designed first, and output from their analyses used to develop alternatives 5 through 10. For the preferred dune design fill, a dune height of + 7 feet was proposed. Modeling results show that an 8 foot dune provided greater storm risk reduction, but is higher than the existing dunes. The higher dunes restrict overwash, which blocks the supply of sand required to help the back barrier marshes keep up with relative sea level rise. Consequently, a 7-foot dune height was selected as a compromise between the competing interests of maintaining the ecology of the interior wetlands, minimizing collateral damage that would occur on both ends of the Caminada Headland as a result of the damming effect of a higher than neighboring dune height, and affording a higher level of protection to infrastructure. This 7-foot dune height was incorporated into alternatives 5 through 10. Their design fill template is consistent with Alternative 4 in that the majority of the template is sited landward over existing elevations, maximizing acreage and longevity. However, alternatives 5-10 create a greater number of acres with their designs due to the increased marsh template. The optimized design attempts to maintain the TY0 habitat and offer storm risk reduction for 50 years. Per the 2004 LCA report, to ameliorate the immediate or subsequent impact of storm events, the alternatives should include designs of barrier islands of sufficient height and width to minimize the risk of breaching. Various renourishment intervals were evaluated to determine the most cost effective operations and maintenance schedule."

HQUSACE Assessment: The issue is resolved through the above discussion.

3. Review of the February 2011 Draft Feasibility Report and Integrated EIS.

A. General comments.

1. Policy compliance of OMRR&R for Caminada Headland. The proposed OMRR&R plan for Caminada Headland would place about 500,000 cy of dredged material from the Belle Pass navigation channel at the shoreline of Caminada Headland 4 times in each 10 year period, resulting in the placement of 2mcy in each 10 year period. The placement of the dredged material would be determined by monitoring and adaptive management plan that would target the placement at any breaks or other weak points in the beach and dune system. The proposed nourishment plan would replace about 53% of the sand lost from Caminada Headland in each 10 year period.
HQUSACE is evaluating the proposed OMRR&R plan for consistency with the OMRR&R considerations for the National Park Service's Gulf Islands National Seashore, as discussed in the September 15, 2009 Chief's Report for Mississippi Coastal Improvements Program. HQUSACE will make a determination on the proposed Caminada Headland OMRR&R plan in the near future.

HQUSACE Assessment: The issue has been resolved by the above revisions and those discussed in comment 2, immediately below.

2. Sustainability of Caminada Alternative 5 (C5) not demonstrated. HQUSACE questions whether the tentatively selected Caminada alternative (C5) is sustainable. While the report is clear that the C5 alternative would provide benefits over the no-action plan, it is not apparent that the plan is sustainable in the long term, based upon the following information provided in the report;

- Page 3-11 states that "the current project area" at Caminada Headland consists of 485 acres of beach and dune and 876 acres of marsh;
- Page 3-15 states that the C5 alternative would create 880 acres of beach and dune and 1,186 acres of saline marsh;
- Page 8-4 in the Recommendations section states that the study area, which is only a part of Caminada Headland, would consist of 1,023 acres at TY 50.

Based on the above information, it appears possible that the 1,023 acres of "study area" at TY 50 may be considerably smaller than the existing condition at Caminada Headland (1,361 acres), although the use of inconsistent and poorly defined terms such as "the current project area" (as used in existing condition) and "study area" (used throughout the report) makes it difficult to determine how many acres of beach, dune and marsh are found in the existing condition and future conditions at the Caminada Headland. It is noted that the description of Caminada Headland on page 1-9 does not say how many acres of beach, dune or marsh are found in this location, and Figure 1-6 does not clearly delineate the study area. If the terms "the current project area" and "study area" are not synonymous, please define these terms and show on a map how these areas differ in location and extent. If these two terms are synonymous, please use a consistent term. Establishing the baseline of the existing conditions at the Caminada site is essential to determine the ultimate result (and acreage) of the constructed project at TY 50, and to assess the fate and survivability of the 880 acres of beach/dune and 1,186 acres of saline marsh that would be constructed under Alternative C5. It is unclear from the report how many of the 2066 acres of the constructed project features would exist at TY 50.

Lastly, it is noted on page 3-65 that the sediment loss from Caminada Headland is estimated to be 379,000 cy per year, and that 500,000 cy of sediment would be placed at the shoreline every two years. The estimated loss and placement amounts suggest that Caminada would be in a perpetual sediment deficit condition, with an estimated annual sediment shortfall of 129,000 cy (equal to 34% of the estimated loss).
Editorial Note: The maps and other figures describing the Caminada location utilize GIS and computer-assisted drafting software. One way to facilitate the display of the habitats, landforms and other features in the report would be to scribe a standard polygon around the study area that would be large enough to accommodate all potential project alternatives, and the existing, without-project, with-project and future conditions. The standard polygon would have a fixed acreage, and would make a straightforward accounting of beach, dune, marsh, open water and other acreages relatively easy.

Response: Concur. "Current" will be deleted from the write-up on page 3-11. The existing condition acres have been revised to match the acres in the WVA. Per the WVA, the study area, which is only a portion of the headland, includes 454 acres of dune/beach and 977 acres of marsh, resulting in 1,431 acres. These descriptions will be added to page 1-9 and page 3-11. The construction of the Recommended Plan will create 635 acres and nourish the existing 1,431 acres.

Page 3-15 correctly states that the construction of the Recommended Plan will result in 880 acres of beach/dune and 1,186 acres of marsh. The description has been further refined to state that the Recommended Plan will create 635 acres and restore/nourish 1,431 acres, resulting in 2,066 acres.

The purpose of Figure 1-6 is to show the location of the headland and water and land features in the vicinity of the headland. To delineate the project area on the map would obscure some of the labeled features. Consequently, the description of the headland is in the narrative on page 1-9 which will be augmented with the information stated above.

Section 3.8.2.1 states that,

> "Approximately 880 acres of beach/dune and 1,186 acres of marsh would be created/restored, resulting in a total of 2,066 acres. The project will restore 1,431 acres of degraded habitat and create 635 acres of new habitat, 426 acres of beach/dune and 209 acres of marsh."

The amount originally selected for the O&M did not include all of the dredged material from Belle Pass. The BBBS O&M was designed to match the 2004 LCA Report.

A sediment budget has been developed for the Caminada Headland. Annually, approximately 379,000 cy of material is lost from the headland due to longshore transport. Cross shore transport is captured by the marsh platform north of the beach.

Utilization of all of the dredged material will result in placing approximately 3,900,000 cy of material over a ten year period, exceeding the sediment lost by 110,000 cy. The O&M will be revised to utilize all of the dredged material from the Bayou Lafourche

navigation channel. Utilizing all of the dredged material from the channel will replace the sediment that was lost and sustain the headland. The marsh is nourished by the cross shore sediment transport from the beach to the marsh platform behind the beach. The following statement was added to Section 3.8.2.1:

> "The marsh is continually renourished through overwash as the cross shore sediment transport moves sand from the beach to the marsh. By adding sediment to the beach, the marsh is also sustained."

Under the 4 sea level rise scenarios evaluated in the BBBS study, the TY 50 acres at Caminada are estimated to be:

High Sea Level Rise:	1,736 acres
BBBS Sea Level Rise:	1,929 acres
Intermediate Sea Level Rise:	2,064 acres
Low (Historic) Sea Level Rise:	2,122 acres.

Under the low and intermediate sea level rise rates, the Recommended Plan maintains the constructed acres of 2,066 acres and at all sea level rises, exceeds the existing conditions of 1,431 acres.

The material that is "lost" from the headland is not lost from the Barataria Basin ecosystem. Annually, approximately 83,000 CY of material is transported to the east. This sediment benefits Grand Isle, the barrier island to the east and another USACE project.

For Shell Island, Section 3.8.2.2 .states that,

> "It is estimated that 5.6 million cubic yards of shoreline fill would be required to construct 317 acres of shoreline/dune area (area above +2 feet, NAVD). Approximately 2.1 million cubic yards of marsh fill would be required to construct 466 acres of marsh. The project will restore 386 acres of degraded habitat and create 397 acres of new habitat, 261 acres of beach/dune and 136 acres of marsh."

The Recommended Plan sustains the critical natural resource within the project area through its operations and maintenance features. Construction acreage is maintained or exceeded under the historic and intermediate RSLR scenarios. Sediment, or the lack thereof, is the major determinant of whether the barrier islands are sustainable. The project needs, opportunities, problems, and objectives focus on the lack of sediment and the need to increase sediment input to supplement the natural shoreline processes. The project sustains the energy in the system by keeping the sediment necessary to support the habitats, thereby producing a sustainable ecosystem.

HQUSACE Assessment: This issue is partially resolved with this response and revision of the draft report. Further discussion of triggers for OMRR&R and how marsh habitat would be sustained would strengthen the response.

MVN Response: The revised verbiage of Section 3.8.11 is included in its entirety in comment response 2.A.8. The verbiage concerning triggers and marsh habitat is included below.

> "The purpose of the O&M is to sustain the constructed footprint and protect the headland north of the project footprint. The O&M is driven by the need to ensure continuity of the shoreface, and is not determined by the dredging cycle. The beach and dunes protect the more fragile marsh habitats from the direct wave action of the marine environment. Once the shoreline has been breached, erosion rates increase. Because a major objective of this study is to protect the interior marsh and chenier habitats of the headland, continuity of the shoreface to protect these fragile habitats is essential. The need for O&M will be determined by the need to balance the sediment budget, breaches or imminent breaches in the shoreline, and erosion of the beach that threatens the dunes.
> O&M should be performed in conjunction with the maintenance dredging to ensure that the sediment budget remains balanced. The headland loses approximately 379,000 cy annually. Placement of the material from the maintenance dredging should over time equal the amount of material lost to the headland. Should the maintenance dredging not provide sufficient material, the non-Federal sponsor will be required to provide another source of comparable material. However, the beach should not be allowed to erode to within one year of estimated erosion of the dunes. The long term average erosion rate is 45 feet per year. Consequently, when the distance between the dunes and the water decreases to 50 feet, O&M would be required. Material will be placed at the nodal zone for headland-wide erosion. Should the shoreline breach or a particular area of the shoreline be in danger of breaching, sediment would be placed near the breach to supplement the existing sediment. O&M determinations would be made through use of LIDAR, surveys, aerial photography, or site inspections. Site inspections would conducted by an interagency team containing at minimum USACE and CPRA team members.
>
> Any changes to the approved OMRR&R plan must receive environmental clearances, including consultation with the appropriate agencies for compliance with the Endangered Species Act (ESA.) Additionally, because the Belle Pass jetties provide the important function of acting as a terminal groin and trapping sediment, prior to any navigation dredging event, the stability of the jetties will be inspected. If USACE, New Orleans District Operations Division determines that stabilization of the jetties is necessary, sufficient material will be placed to support the jetties. The restored marsh is protected from the south by the beach and dunes.

> The marsh is protected from the north by the marsh and cheniers of the headland. The marsh is renourished by the cross shore sediment transfer from the beach and dunes. An estimated 547,000 cy of material is captured in the marsh through overwash. Consequently, by continually renourishing the beach and dune, the marsh also receives renourishment."

HQUSACE Assessment: The issue has been resolved by the above revisions.

3. Sponsor letter of intent. As noted in part 3.10.6 on page 3-75 of the report, the District is awaiting a new letter of intent from the sponsor. This letter will need to be added to the report prior to final approval to ensure that sufficient local support for the project will enable it to be implemented, as required by ER 1105-2-100, Appendix G, at G-9 ("The non-Federal sponsor's acceptance of, or desired departures from, the terms of the applicable model PCA must be presented, including: 1) applicable cost sharing and financial policies; 2) policies regarding provision and valuation of non-Federal lands, easements, rights-of-way, and disposal areas provided by non-Federal sponsors; 3) policies governing non-Federal project construction; and, 4) other provisions required by law and policy for new start construction projects.").

Response: Concur. The State has not informed the District as to whether a letter of intent is forthcoming. MVN is working with OCPR to obtain the letter.

HQUSACE Assessment: Prior to public release, the draft report should be revised to acknowledge that a letter of intent will be obtained from the sponsor to confirm its intent to support for the project, including providing all required local cooperation. This issue will be finally resolved when a letter of intent is received and included in the final report.

MVN Response: The State's letter of intent is included in Section 3.10.7 of the report.

HQUSACE Assessment: The issue has been resolved by the above revisions.

4. Sponsor statement of financial capability. Part 3.10.5 on page 3-74 of the report states, "A project schedule and cost estimate will be provided to the CPRA so that it may develop a financing plan." As noted in this office's prior comments, the report still needs to include a certification by the non-Federal sponsor that it has a preliminary financing plan for providing non-Federal share of the project's cost. This will need to be added prior to approval of the report. See CECW-PC memorandum dated 12 June 2007, Lean Six Sigma (L6S) Actions to Improve the Project Cooperation Agreement Process – Non-Federal Sponsor's Self-Certification of Financial Capability ("a non-Federal sponsor will sign the Non-Federal Sponsor's Self-Certification of Financial Capability For Decision Documents (enclosure 3) for such purpose.").

Response: Concur. Upon receipt of the letter of intent, MVN will request from OCPR the financial self-certification.

HQUSACE Assessment: Prior to public release, the report should be revised to acknowledge that, as required by CECW-PC's 12 June 2007 guidance, a completed Self-Certification of Financial Capability for Decision Documents (enclosure 3 to the June 2007 guidance) will be needed prior to approval of the final report. As reflected in the June 2007 guidance enclosures, the form of the self-certification for decision documents includes a less significant commitment than the self-certification form required prior to execution of the project partnership agreement. This issue will be resolved with receipt of the Self-Certification of Financial Capability for Decision Documents prior to the approval of the final report.

MVN Response: Concur. the State has provided a Self-Certification of Financial Capability.

HQUSACE Assessment: The issue has been resolved by the above revisions.

5. Public use and access. Part 8.1 on page 8-1 of the report notes that a number of beach areas in the project area front private property, and are accessible only by pedestrians due to the presence of pilings that prevent vehicle access. The report should provide an analysis specifically addressing whether these proposed areas within the project currently provide adequate public use and access necessary for Federally cost-shared ecosystem restoration projects. See ER 1105-2-100, paragraph 3-5 (b) (4): "Public interest. For projects where the land on which the majority of the physical ecosystem restoration will occur in the ownership of a single firm, individual, club or association with restrictive membership requirements, it must be demonstrated clearly that the restoration benefits are in the overall public interest and that the benefits do not accrue primarily to the property owner."

Response: For the Caminada reach, LERRD will be acquired from 1 public and 5 private ownerships. In addition to these ownerships, the project will protect the various ownerships and infrastructure throughout the headland, including Port Fourchon, Louisiana Highway 1, nationally important oil and gas infrastructure, and the marsh and chenier habitats located north of the project area. Access is available currently, and will be available after the completion of the project. Access to the beach is provided by either Louisiana Highway 3090 or a dirt road at Elmer's Island. There is no other possible access because the area between these two roads is marsh. However, after construction, vehicle access will be prohibited along the beach in the restored areas to protect the restored ecosystem.

Construction of the project is in the public interest. The project will restore scarce and important habitat for fisheries and migratory birds. Recreational activities facilitated by this project such as fishing and bird watching are accessible to the public. Similar to the restoration of riparian habitat, much of the area will remain in private hands with limited access, but the project improves fishing, bird watching, and beach recreation that are accessible to the public. Additionally, the project provides critical habitat for the threatened piping plover.

The following sentence has been added to the Executive Summary under Areas of Controversy and Unresolved Issues, and in Section 8.1.

> "However, vehicular traffic on the beach would be incompatible with the ecosystem goals and objectives of the BBBS project and the attainment of the project benefits."

HQUSACE Assessment: This issue is resolved with inclusion of the above description of public access opportunities and prohibition of vehicle access in the restored areas in the draft report.

6. Local cooperation. Part 8.2.3 on page 8-6 of the report appears to include incomplete and outdated items of local cooperation. For example, these items exclude the general bar on using the project as mitigation bank ("Shall not use the project or lands, easements, and rights-of-way required for the project as a wetlands bank or mitigation credit for any other project"). Recommend that the items be compared with the model list available at http://www.usace.army.mil/CECW/Pages/ioclist.aspx, or with the customized list that was prepared recently for the LCA 6 Chief's Report.

Response: Concur. Items of local cooperation from the LCA 6 Chief's Report will be used.

HQUSACE Assessment: This issue is resolved with inclusion of the appropriate items of local cooperation in the draft report.

7. Credit for work prior to construction agreement. In tab 4, the report includes a 29 October 2008 CEMVD-PD-N memorandum, concurred in by MVD-OC, finding that the sponsor could obtain credit for construction work performed prior to the Corps selection of the NER plan, so long as it was consistent with the Corps' plan, the Minerals Management Service approved use of CIAP funds to meet the non-Federal share was authorized, the sponsor adequately documents its costs incurred, and a memorandum of understanding was executed covering the work. MVD should clarify how each of these required elements have been satisfied in order for the sponsor to be afforded credit.

Response: By letters dated July 2, 2009 and December 18, 2009, the Minerals Management Service and the USACE established a process for the Minerals Management Service to provide its written determination regarding the acceptability of the use of CIAP funds for LCA studies, projects, and programs. That process provides that the Minerals Management Services' written determination for a specific study, project, or program will take the form of the grant award document for that activity. However, the CIAP program is being transferred to USFWS, and will now be administered through the USFWS grant program through their regional office in Atlanta. This issue will need to be revisited once the transfer process is complete.

HQUSACE Assessment: This issue is partially resolved by the discussion above. The report should be revised to acknowledge that, as required by Section 2007 of WRDA

2007 and pursuant to ER 1165-2-131 para. 9.b., an updated written determination by the Bureau of Ocean Energy Management, Regulation and Enforcement (formerly the Minerals Management Service) that the CIAP funds are authorized to be used to carry out the project will be required prior to approval of a PPA for execution.

MVN Response: Concur. The last paragraph of Section 3.10.5 has been revised to say:

> "By letters dated July 2, 2009 and December 18, 2009, a process was established for the BOEMRE to provide its written determination regarding the acceptability of the use of CIAP funds for LCA studies, projects, and programs. That process provides that the BOEMRE's written determination for a specific study, project, or program will take the form of the grant award document for that activity. An updated written determination by the federal CIAP managing agency that states that CIAP funds are authorized to be used to carry out the project will be required prior to the approval of a Project Partnership Agreement for execution."

HQUSACE Assessment: The issue is resolved.

8. Deepwater Horizon Oil Impacts. The report articulates the continued monitoring of impacts from the Deepwater Horizon oil spill, while the Supplemental Biological Assessment states that oil has been found on the project shores. The report does not address whether the proposed borrow area at Ship shoal has been characterized with respect to damage from the oil spill. HQUSACE recommends that information be developed to characterize the effects, if any, of the oil spill on the sand resources of Ship Shoal. Any significant clean-up of the borrow area needed to facilitate the Caminada element could have the potential to add significant cost to the project and time to the proposed implementation schedule.

Response: Concur: MVN is coordinating with the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) which feels that significant oil contamination is unlikely at Ship Shoal. Investigations at Sandy Point, which is much closer to the well site, have shown little impacts. Therefore, no increase in cost is expected.

HQUSACE Assessment: This issue is partially resolved. More information should be provided to back up the BOEMRE "feeling" that Ship Shoal is unlikely to be contaminated, and a discussion of the level of risk, as well as how potential contamination would be handled if monitoring reveals a problem, and the potential impact to project cost should be added to the report.

MVN Response: Additional consultation with BOEMRE revealed that the State of Louisiana performed sampling, in coordination with EPA, of the Ship Shoal area planned for use by the BBBS project. The results of that testing showed that there are no adverse impacts to Ship Shoal due to the oil spill.

HQUSACE Assessment: The issue is resolved.

9. Figures missing, Chapter 4. The discussions of the sediment budget and salinity regime of Caminada Headland appear to incorrectly reference figures in the report. Page 4-28 references Figure 4-14, where Figure 4-11 seems to be the correct figure. Similarly, the reference to Figure 4-13 on the bottom of page 4-27 should be referencing Figure 4-12 on page 4-28. It does not appear that the referenced Figures 4-13 through 4-15 exist, given that the figures leave off with Figure 4-12 on page 4-30 and pick up again with Figure 4-16 on page 4-49. Please revise the text and figures of the report, as needed.

Response: Concur. The chapter has been reviewed and corrected.

HQUSACE Assessment: This issue is resolved through correction of the figures in the draft report.

B. Plan formulation.

1. Sponsor's cost for O&M Nourishments. The report articulates that the non-Federal sponsor will be required to pay the incremental cost of beneficially using material (to nourish the beaches/shoreline) over the Federal standard. This needs to be better documented/defined – what is the Federal Standard, what are the costs of the Federal standard versus the BU of material for this project? The documentation should be expanded to describe the Federal Standard (per the authorizing decision document – features, costs, etc.) and illustrate/calculate the incremental costs beyond the Federal Standard that will be required for this project. Furthermore, the cost allocation for O&M should be included in a table of total project costs (suggest including in Section 3.10).

Response: Concur. A description of the federal standard for the navigation channel and a breakout of the costs will be included in Section 3.8.11. The revised section will say,

> "The non-Federal sponsor will pay the incremental cost of beneficially using this material over the federal standard. For the Bayou Lafourche navigation channel, the federal standard, which is the least costly, environmentally acceptable plan for disposal of the dredged material, is to pump the material to the beach adjacent to the channel a minimum of 1,000 feet away from the jetties for an average pump distance of 4,000 feet. The material utilized for O&M will be placed approximately 5 miles from the navigation channel. The total estimated cost for dredging and placement of the 650,000 cy is $13,270,000 with $5,290,000 being the estimated cost for the federal standard and $7,350,000 the estimated incremental cost attributable to the BBBS project."

Section 3-10 discusses the cost apportionment. Table 3-9 includes only first costs. The Table will be revised to clarify. The present value and average annual value of the O&M will be added to the sentence above the table.

HQUSACE Assessment: This issue is partially resolved by inclusion of the above response in the draft report. The report should also acknowledge that OMRR&R

responsibilities remain, even if the navigation channel dredging frequency or volumes change, or if another source of material must be utilized.

MVN Response: The following verbiage has been included in Section 3.8.11, paragraph 3.

> "Should the maintenance dredging not provide sufficient material, the non-Federal sponsor will be required to provide another source of comparable material."

2. Recommendations.

- Section 8.2.1.1 of the Recommendations. The third paragraph gives the estimated project cost for Caminada as $220,000; the correct cost is $220 million. Also, the discussion of OMRR&R costs is framed in terms of 10 year periods, with 4 placements of dredged material in each 10 year period. A cost of $6.21 million per event is given. Does the $6.21 million per event cost refer to one of the four individual beneficial use episodes within each 10 year period, or is this dollar amount the cumulative figure for each 10 year period?

Response: Concur. The estimated project cost is $220 million. The OMRR&R is framed in terms of 10 years periods to provide a direct comparison to the 2004 report which includes renourishment every 10 years. The O&M cost of $7.35 million per event refers to each one of the six individual beneficial use episodes. The language in the section will be clarified.

HQUSACE Assessment: This issue is resolved with inclusion of the above edits in the draft report.

- Section 8.2.2 of the Recommendations states that Caminada Alternative C5 is the recommended component of construction because it is a separable element of the NER plan, and is within the cost and scope of the current authorization. However, there is no discussion of whether additional authorization would be requested to allow construction of the tentatively selected NER plan. If additional authorization for the NER plan is being contemplated, a statement should be added to the Recommendations section.

Response: Concur. Section 8.2.1 states that additional authorization will be requested. However, to avoid confusion, the beginning of Section 8.2.2 will be revised to say,

> "Additional authorization will be requested to implement the construction of the NER. However, because the NER cannot be constructed within the maximum project cost as authorized by WRDA 2007, a subset of the NER, Caminada Headland Alternative 5, was selected as the recommended component of construction."

HQUSACE Assessment: The comment is resolved with inclusion of the above statement in the draft report.

3. Significance of ecological outputs, page 4-17, and other pages. Section 4.5 and several other sections of the report discuss in the opening paragraphs why the resource under consideration is significant. This approach is a good start, but it is also important to point out in the report how the project-specific outputs represent valuable contributions to the resources in question. The focus of Section 4.5 and the other sections is on existing conditions, and do not adequately discuss how the proposed work contributes to these important functions. The contributions of the plan should be quantified where practicable, should discuss the species or habitat types benefited, and should also include a discussion of the duration of effects (particularly given that HQUSACE has concerns about the long-term sustainability of the Caminada project, and whether the outputs of the C5 plan would be temporary or permanent in nature). The significance of project outputs is of great interest to OASA (CW) and OMB reviewers in evaluating projects for budget approval.

Response: Concur. Project specific impacts on significant resources are discussed in Table 3-9, on pages 3-77 through 3-82. The FWOP impacts and the impacts of the final array alternatives on each significant resource are discussed both qualitatively and quantitatively. MVN will work with the commenter to determine if this information would be better presented in a different section.

Additional information has been added to Section 3.8.4, Significance of Ecosystem Benefits. Revised verbiage is presented in the response to Comment 2B13.

HQUSACE Assessment: This issue is resolved with inclusion of the indicated language in the draft report.

4. Consideration of sea level rise, Sections 3.9 and 4.2.2. These sections of the report discuss sea level rise rates, and the potential effects of the various rate on the project outputs. HQUSACE has several concerns about these discussions;

- The discussion of the sea level rise rates is confusing because of the inconsistent use of English and metric measurement systems and the presence of a typographical error mistake, i.e., second to last sentence in second paragraph has RSLR rate of 0.304 ft/yr where 0.0304 is surely intended.
- The justification for the specific rate of sea level rise used in this study (between the intermediate and high curves of EC 1165-2-211, figure 3-30) is not provided, and no reference is given concerning the methods used to develop this rate. As you may be aware, HQUSACE has not approved the proposed MVD Supplemental Guidance to EC 1165-2-211. Please be advised that the use of the specific SLR curve used in this study may have to be reconsidered in the future should the MVD Supplement Guidance not be approved.
- The analysis of impacts of the various sea level rise rates is qualitative and very general, and as such is not capable of providing decision-makers with useful information concerning risks needed to inform the alternative selection and approval processes.
- The focus of these two sections of the report is on rates of sea level rise, when the real issue of concern is the effects and outcomes of sea level rise (the expected sea level elevations are outcomes, not rates) and how the forecasted future sea level elevations

were used to inform plan formulation and selection. The analysis of long-term sustainability of the project alternative is also heavily dependent on the expected sea level elevation. The proper consideration of sea level rise is important to this project, even though it is recognized that geologic subsidence is the major factor contributing to relative sea level rise in the study area (Section 4.2.2, page 4-6).

Response: The RSLR figure should be 0.0304 feet/year. The metric measurements were removed to prevent confusion.

HQUSACE Assessment: The first bulleted issue is resolved by revision of the report as documented in the response.

The Engineering analysis was completed by the State's contractor prior to EC 1165-2-211 dated July 2009. A draft report was submitted to ATR in March 2009. The RSLR rate was developed and approved by USACE under the guidance current at the time of development. The policy at that time was to determine the sea level rise and subsidence rates separately and then combine to obtain the RSLR. The policy also was to use the mid range value from IPCC calculations (Climate change 2001: The Scientific Basis) for sea level rise. The RSLR curve utilized for the BBBS analysis would fall between the high and intermediate curves as demonstrated in Figure 3-30, page 3-69. Due to the extremely aggressive RSLR rate, the risk that the project will not achieve the estimated benefits is minimal.

The third paragraph of Section 3.9, Risk and Uncertainty will be revised to say:

> "An analysis was conducted on the effect of the various sea level rise rates on projected shoreline retreat at the project locations. The results showed that RSLR is the cause of approximately 1/3 of the total projected shoreline loss under future without project conditions. The variation between shoreline loss projections obtained using the high and low values provided in the EC is approximately 25% of the total shoreline retreat. Given that a RSLR value between the intermediate and high value was used in the analysis for this study, the projected shoreline change in the study is about 10% lower than the projected outcome based on the highest rate of change identified in the EC. While RSLR impacts shoreline recession, the conservative assumptions applied in the analysis performed for this study provides a result within the upper portion of the range of outcomes that would be generated following the EC methodology. Acreage and AAHUs would be slightly lower for the study area under the highest rate of sea level change scenario identified in the EC. Consequently the alternatives analysis and resulting benefits utilized in the Feasibility Study are sufficiently conservative for completion of this study and identification of the recommended plan. The risk that the Recommended Plan will not achieve the estimated benefits is minimal. Should the RSLR coincide with the low or intermediate rates as calculated per EC 1165-2-211, output will be greater than anticipated. However, should the RSLR equal the high sea level rise trend, the project will produce less benefits than anticipated as shown in **Table 3-9**.
>
> .

Table 3-9 Comparison of RSLR outputs at TY 50

	High RSLR	BBBS RSLR	Intermediate RSLR	Low (Historic) RSLR
Caminada Headland Acres	1,736	1,929	2,064	2,122
Shell Island Acres	719	799	855	919

> Renourishment through O&M will decrease the risks due to RSLR. Should RSLR be greater than estimated, the material utilized for O&M could be increased. Additionally, the risk of not achieving the benefits stated is minimal. For the Caminada Headland reach, the estimated acres equal or exceed the construction template at year 50 for the intermediate and historic RSLR scenarios, and exceed the existing conditions at all sea level rise rates. For Shell Island, the estimated acres exceed the construction template for all but the high sea level rise rates, and exceed the existing conditions for all RSLR scenarios. **Figure 3-30** displays the sea level rise rates calculated per the EC and the sea level rise utilized in plan formulation for BBBS."

The various rates of RSLR will impact each alternative the same way. Consequently, the alternative selection would not be impacted.

HQUSACE Assessment: This issue is resolved.

C. Compliance.

1. Water Quality Certification. The Executive Summary makes a statement that "The requirements for 404(r) have been met". The report also contains a 404(b) (1) analysis. It is unclear which direction the PDT proposes to take to achieve Water Quality certification for this project. Is it envisioned that the Corps would request exemption from the state certification process under Section 404(r)? The report should be expanded to describe the District's plans/intent to obtain state water quality certification.

Response: Concur. The reference to 404(r) was added to the executive summary per the requirements of ER 1105-2-100, Appendix G, Section G-9 (g)((1)(l)(c), page G-43. For clarity, the verbiage in the Executive Summary will be revised to:

> "The requirements of Section 404(r) of Public Law 92-500, as amended, have been met. A PL 92-500, Section 404(b)(1) analysis has been completed. A section 401 Water Quality Certification will be requested from the State of Louisiana."

HQUSACE Assessment: The comment is resolved with inclusion of the above language in the draft report.

2. Cultural Resources. It is unclear is the PDT has identified or evaluated impacts of potentially buried shipwrecks within the study area or shipping/pipeline routes to obtain source material for project implementation.

Response: Concur. A Phase I cultural resource survey was completed for the subject areas, including offshore and areas considered for borrow material. The compliance statement in Chapter 7, section 7.1.8 has been modified to state the following:

> "In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and 36CFR 800, Federal agencies are required to identify and consider potential effects that their undertakings might have on significant archeological properties which include shipwrecks, districts, sites, buildings, structures, or objects that are included in or eligible for inclusion in the National Register. Additionally, a Federal agency shall consult with any tribe that attached religious and cultural significance to such properties. Furthermore, agencies shall afford the State Historic Preservation Officer (SHPO) and tribes' reasonable opportunity to comment before decisions are made. Coordination letters received from the SHPO are included in appendix D. Accordingly, the Recommended Plan, which includes both terrestrial and marine (offshore and river) areas as well as any potential borrow source locations, have been surveyed and evaluated in compliance with Section 106, with no impacts to prehistoric or historic archeological properties. The integrated LCA BBBS Draft Construction Report and SEIS will be provided to the SHPO and tribes, as well as other interested parties for comment."

Letters concurring with the report findings are located in Appendix D.

HQUSACE Assessment: The issue is resolved through the response above and inclusion of the modification to the draft report.

3. Cumulative Impacts. Table 5.2 is a comparison of Cumulative Impacts, however the report fails to document what other "past, present, and foreseeable future" actions are included in this analysis – beyond the TSP. The report should be modified to include a cumulative impact analysis, per CEQ's Implementing Guidelines for NEPA contained in 40 CFR 1508.7.

Response: Concur. Report was updated with inclusion of Deepwater Horizon oil spill (BP Oil Spill 2010) as well as impacts of CWPPRA and CIAP projects. Construction of 83,258 linear feet of protective sand berm against the BP oil spill (2010) will provide a redistribution of 19.7 million cy of sediment resources into the sediment-starved Louisiana coastal barrier system. From this total, approximately 36,388 linear feet of protective sand against the BP oil spill will provide a redistribution of 4.2 million cy of sediment resources into the sediment-starved Barataria barrier island system, especially near Shell Island.

HQUSACE Assessment: This issue is partially resolved. The report must fully explain the potential cumulative impacts that may result from the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such actions. Furthermore, the report should articulate the interdependencies of any identified projects. The District response mostly mentions Federal actions. In addition, it is unclear how the BP oil spill berm would affect the TSP positively or negatively, and vice versa. Additional explanation and clarifications are needed in the report documentation.

MVN Response: Concur. The summary table (Table 5-2) has been updated to include additional information for the historic, existing, future without and future with project conditions with regard to BP Oil spill and protective sand berm, other restoration projects as well as other actions including:

- Construction 36,388 lf protective sand berm against the BP Oil Spill (2010) (with 36,388 lf within study area) provide redistribution of 19.7 million cy (4.2 million CY in study area) of sediment resources into the sediment-starved Barataria barrier island system, especially near Shell Island.
- Other impacts including beneficial use of Bayou Lafourche maintenance dredged material and potential impacts to maintaining jetties.
- Potential impacts of CWPPRA BA-40 and BA-35; impacts of Davis Pond and Myrtle Grove diversions; Positive synergistic interaction of Recommended Plan/NER impacts to 1,684 acres with restoration of 641,804 acres by other Federal, State, local and private restoration efforts (see table 5-3 and 5-4) contribute to reducing estimated loss of 328,000 acres by 2050 and reduce further degradation and loss of important estuarine/marine transitional habitat, increase productivity and restore important stopover habitat for migrating neotropic birds as well as provide critical habitat for threatened piping plover.
- Impacts of the BP oil spill as well as the various emergency actions taken to address oil spill impacts (e.g., use of oil dispersants, creation of sand berms, use of Hesco baskets, rip-rap, sheet piling and other actions.
- Infrastructure primarily oil and natural gas pipelines and shoreline protection along the Caminada Headland at Port Fourchon, as well as Bayou Lafourche and Empire jetties are at risk of damage and/or loss due to barrier land loss .
- Impacts of land loss and BP oil spill within the study area that would continue to adversely impact essential spawning, nursery, nesting, and foraging habitats for commercially and recreationally important species of finfish and shellfish, as well as other aquatic organisms but would be offset to some degree by the Recommended Plan/NER and other restoration efforts such as CWPPRA BA-40 and BA-35; impacts of Davis Pond Diversion and Myrtle Grove Diversion.

The text of the report has detailed explanations of the above.

HQUSACE Assessment: The issue is resolved.

4. Environmental Justice, page 7-8. There is no discussion of outreach efforts undertaken in order to solicit the views of any potentially affected low-income and minority groups,

and no analysis of demographics to justify the claim that there are no EJ effects in the study area. Guidance on how to conduct an environmental justice analysis is found at the following USEPA website.
http://www.epa.gov/compliance/ej/resources/policy/ej_guidance_nepa_ceq1297.pdf.

Response: Concur. MVN developed an outreach plan for Environmental Justice (EJ) efforts after Hurricane Katrina. The Environmental Justice analysis has been added to Chapter 4 Affected Environment section 4.18 on page 4-54 and in Chapter 5 Environmental Consequences section 5.16 on page 5-83, which details the methodology used in our analysis per requirements of Executive Order 12898 and per EPA recommended Guidelines.

Using up-to-date census information as well as field visits to the project area, it was determined that the project area was ineligible for further outreach efforts. Because the community in the vicinity was predominately non-minority/non-low income in nature it did not meet the requirements identified in Section 12898 and EPA guidelines for an identified minority/low-income community or for further outreach efforts. Additionally there were no land or property acquisitions and no impacts to existing homes or businesses in the project area, further eliminating any potential impacts to both minority and non-minority and low-income as well as non-low income families or groups.
Per NEPA requirements, public meetings were held in the project area and an Environmental Justice representative was on hand to address specific EJ concerns. However, none were identified for this project.

HQUSACE Assessment: The issue is resolved through inclusion of the above information in the draft report.

D. Real Estate.

1. Nonstandard estates. The District proposes to use three NSEs. As noted in the REP, the District must request approval through Division to Headquarters and provide justification for diverting from standard estates and for the NSE proposed. Does the language of the proposed NSEs differ from that of the NSEs of the same name in other projects?

Response: Concur. MVD has informed the District to include the request for approval for nonstandard estates in the REP or through a separate memorandum. The request for approval and quality control plan checklist was attached to the REP, dated 12/8/2010, but was inadvertently excluded from the REP dated 1/24/2011. The request for approval for the nonstandard estates and the quality control plan checklist are attached to the current REP and is awaiting approval.

The same nonstandard estates have been requested for approval on the LCA 6 studies and district is awaiting approval at the current time.

The project can be constructed and maintained through the acquisition of the Wetland Creation and Restoration Easement and the Dune Restoration and Creation Easement.

HQUSACE Assessment: The decision regarding the request for waiver of the requirement to acquire fee and, if the waiver is granted, if NSEs may be used will be made at a later date. MVN should add the appropriate fee estate to Exhibit B of the REP and remove the NSEs from Exhibit B. The REP should be clear that approval is not guaranteed. Also, HQUSACE has commented in other requests to use NSEs that the US should not be the approval authority.

MVN Response: Concur. MVN has revised the REP and indicated the property to be acquired in Fee, excluding minerals rather than as easements. The Fee, excluding minerals estate has been added to Exhibit B of the REP and the NSE have been removed. The exceptions are the standard Utility and/or Pipeline Easement and the Temporary Work Area Easement, needed for staging area.

HQUSACE Assessment: The issue is resolved.

2. Real Estate Issues paper. Is fee the only estate Wisner Foundation is prohibited from conveying? The need to condemn, by itself, is not sufficient grounds to deviate from policy.

Response: By its Charter, the Wisner Foundation is not allowed to sell property in fee. In regulation ER 405-1-12,(12-9), fee title is generally required for some uses such as for ecosystem restoration, however, a lesser, or easement estate may be appropriate based on the extent of interest required for the operation or requirements of a project.

Also as noted in the request to deviate from Fee acquisition, the District acknowledges that it is Corps of Engineers policy to acquire fee simple title for ecosystem restoration projects in order to reduce the risk that incompatible uses on project land will occur after project construction, and to ensure that ownership rights vested in the project are clear and enforceable (ER 1105-2-100, Appendix F, Amendment # 2, F-20b(2)(a)). However, regulations also indicate that a lesser interest, such as, a specific type of permanent easement, may be appropriate depending upon the operational requirements of the project and other circumstances relevant to project implementation, including landowner preference (EP 1165-2-502, 17b). Circumstances wherein the acquisition of interests less than fee may be appropriate are where only select and easily identifiable and narrow affirmative rights are required for successful implementation of the project (ER 1105-2-100, Appendix F, Amendment # 2, F-20b(2)(b)i.)

HQUSACE Assessment: The Response did not answer the question about whether or not the Wisner Foundation was able to convey less than fee. The argument for not acquiring fee because we would have to condemn holds much less weight if we would also have to condemn an easement.

MVN Response: Wisner is able to convey less than fee.

HQUSACE Assessment: The issue is resolved.

3. Exhibits: The HQUSACE real estate reviewer was not able to open the PDFs on the CD provided with the report, and was unable to review the chart of accounts or the Assessment of the Non-Federal Sponsor.

Response: The REP was resent to USACE-HQ.

HQUSACE Assessment: The issue is resolved. The REP was received on May 9, 2011.

4. HQUSACE comments on the January 2012 Final Report

1. Adaptive Assessment and Monitoring. HQUSACE notes that although it is evident that specific time frames were given for O&M (re-nourishment), the documents notes that these specific time frames may need altering due to actual conditions. This is evidenced on page 3-76 where the report states:

> *For the Caminada Headland, when the distance between the dunes and the water decreases to 50 feet, O&M would be required. For Shell Island, the monitoring results may indicate the need to change the timing or quantities estimated for the renourishment. The timing of the O&M can be either pushed up or moved back dependent upon the achievement of the desired outcomes. Should the island narrow to approximately 300 feet in width prior to year 20, O&M would be scheduled.*

This statement provides specific triggers (performance measures) for both islands for O&M, however, this are not listed as performance measures. In addition, it is not evident is how the monitoring plan ties into these triggers. The monitoring plan is key to applying adaptive management appropriately and in a timely manner. If only three post-construction aerial surveys will be done – how often will they be done and between those three surveys how will it be known if O&M needs to occur earlier or later than originally scheduled? How does the monitoring (aerial survey) frequency match to the schedule for the LCA Medium Diversion at Myrtle Grove and any other coastal restoration projects? Will the frequency be revised to account for significant storm events? The cost for the aerial surveys is listed at $150,000. Is this for a single aerial survey – or for all three? The report states that the USGS is doing surveys, can we partner with them or utilize their data- or does the cost already include partnering with them?

What about monitoring the sand fences? What efforts are included in the yearly monitoring that will occur? What actions will be performed? Can results from the annual monitoring trigger any further monitoring? A written monitoring plan, detailing what, where, when and how (including SOPs), should be developed as soon as possible.

Although Section 2039 of WRDA 2007 allows for 10 years worth of monitoring, the August 31, 2009 implementation guidance notes that the scope and duration include the minimum monitoring actions needed to ensure success. The proposed 10 year

monitoring period should be justified. "Ecological success" is a central criterion and needs precise definition in individual project contexts. It is difficult to see how the definitions given on p 3-76 could be measured given the information provided on the monitoring plan.

Response: Concur. Per Memorandum for the Record dated 5 March 2012, based on teleconference dated 2 March 2012, the vertical team concurred that the report addresses Section 2039 of WRDA 2007 and that further refinements to address the above concerns will be completed during Preconstruction Engineering and Design.

HQUSACE Assessment: The issue is resolved.

2.Use of NAVD88 vertical datum. The report uses the vertical datum NAVD88, however ER 1110-2-8160 states that ecosystem restoration activities shall be defined to a current NSRS, MLLW, or MHW datum, as appropriate to local, state, and federal requirements. Since page 3-11 states that the goal of the marsh restoration was +/- 0.1 ft of MHW, and that MHW was approximated at 1.6 ft NAVD88, suggest using the MHW datum, unless local, state or federal requirements require NSRS or MLLW. In addition, with subsidence and sea level rise, NAVD88 is likely not the right datum for the elevation goal. These levels may not be appropriate in 10, 20, 30 or so years. Suggest using MHW, NSRS or MLLW datum instead as discussed above.

Response: Concur. The requirements outlined in ER 1110-2-8160 and EM 1110-2-6056 specify that ecosystem restoration projects must be referenced to a current National Spatial Reference System (NSRS), Mean Lower Low Water (MLLW) or Mean High Water (MHW) datum, as appropriate to local, state, and federal requirements. For this report we are referencing the North American Vertical Datum of 1988 (NAVD88), which is the current vertical datum referenced to the NSRS. However, per Memorandum for the Record dated 5 March 2012, based on teleconference dated 2 March 2012, it was agreed that the vertical datum could be addressed during PED because the response would not impact plan formulation and selection or the CWRB decision.

HQUSACE Assessment: The issue is resolved.

3.Section 3.5.3.3 – Vegetative Plantings. Page 3-43 of this section states, in part, "The vegetative plantings plan and cost estimates were developed by NMFS and NRCS…" However, the paragraphs below that statement seem to present an indecisive plan that lacks information about the succession of plantings and success rates expected. There is even mention of planting a non-native species, despite objections from other agencies. In the appendices, it states that "Complete design details are located in appendix A, annex 2 of the integrated construction report and draft EIS." If more details are available in that annex, a copy of it in the final report would be helpful. In addition, a brief summary of the plan, how it addresses the possibility of invasive species and the adaptive management considerations for the plantings would be helpful (e.g. at what success rate is re-planting considered, what investigations might be done if success rates are very low). Note that a June 2009 memo establishing the USACE policy on invasive species

states "Civil Works planning documents will address invasive species concerns in their analysis of project impacts." Lastly, will any monitoring of the vegetation and its success be done? (The reviewer does note that section 5.7.3 (page 5-68) states that previous barrier island restoration projects have not reported invasive species. Is this project using similar procedures? What about invasive animals?)

Response: Concur. Brief summary of the vegetation planting plan: The vegetative plantings plan and cost estimates were developed by NMFS and NRCS, who have expertise and experience with plantings in coastal Louisiana. Herbaceous dune and supratidal plants would consist of a variety of dune species including bitter panicum (Panicum amarum var amarum 'Fourchon'), sea oats (Uniola paniculata 'Caminada'), marshhay cordgrass (Spartina patens 'Gulf Coast'), and gulf cordgrass (Spartina spartinae). Plants would be grown mainly in 4-inch containers (sea oats in a slightly larger container). These are general recommendations that may change due to soil properties and conditions, elevation after final construction, salinity, available soil moisture, and other site conditions. Woody species that would be considered for planting on the dune and supratidal swale areas include, but are not limited to matrimony vine, wax myrtle, iva, baccharis, and hercules club. It has been suggested that more woody vegetation be included on the Caminada Headland than Shell Island. Planting of woody species should be delayed until Target Year (TY) 3 to allow for stabilization and leaching of salt from deposited material. Plants on the dune, supratidal, and marsh platforms would be installed in variable density patterns based on site conditions. For quantity and cost estimating purposes, it was assumed that plants would be installed on 8-foot centers throughout 100 percent of appropriate dune and supratidal acreage at the certain target years. For estimating purposes, woody vegetation also was assumed to be planted on 8-foot centers throughout 15 percent of the dune, swale, and marsh acreage. Herbaceous marsh plants would consist of mainly smooth cordgrass (Spartina alterniflora 'Vermilion'). A smaller planting of black mangrove (Avicennia germinans 'Pelican') may be incorporated to add a larger seed bank for black mangroves. Plants would mainly consist of vegetative plug material or 4-inch containers (smooth cordgrass), or tube-tainers (mangroves). All vegetation planted will be native stock. Planted areas will be monitored for success. Feedback from the monitoring will be used to adjust planting plans over time. The planting design is based upon previous coastal projects and uses the best available information for species selection and application to Louisiana barrier islands.

More details responding to the comment are provided below:

1. On vegetative plantings: Unit cost of sand fencing and vegetative planting was provided by LDNR (page C-9-3) and included in Ch. 9, Cost Estimate sections C-9-1 through C-9-7 of the Engineering Appendix. Refinement of the Adaptive Management Plan will take into account additional considerations for vegetative plantings and will be in compliance with Federal and state agency recommendations. Previous monitoring procedures used in successful CWPPRA projects will be used similarly in this study and will occur throughout the planting durations. Vegetative plantings would include a variety of native plant species as identified in Ch. 4 table 4.13.

To ensure successful plantings and the development a thriving vegetative community on the Caminada Headland and Shell Island, the recommended planting density and replanting periods for these species of vegetation are no greater than 8-feet at their centers, with an estimated duration of plantings at 750 days over a 3-year period on each island. The planting schedule can be found in Table 4 (page 21) of the Engineering Introduction). With such high density plantings and long planting periods (average of 6-8 months), over a 3 year period, it is highly likely that a successful vegetative community will flourish in the project area.

2. On invasive species: Invasive Species are documented in Ch. 4 of the report and address the invasive species of Plant, Wildlife and Fisheries that can be found in the project area. Studies have shown that invasive species are so few on Louisiana barrier islands that they are not able to thrive and compete with the more robust native species who have adapted to the unique environmental conditions found along the Louisiana coast. See references to specific species below.

-Invasive Plant Species:
Although Chinese tallow (Triadica sebifera) and other potentially invasive species (e.g., cogongrass, Imperata cylindrica) that are infesting gulf coast wetlands, savannas, and forests have been sighted on rare occasions, no problems caused by encroachment of invasive plant species have been reported on Louisiana's barrier islands (personal communications C. Steyer, NRCS; K. Bahlinger, LDNR; M. Hester, LSUNO; M. Materne, LSU Agcenter; I. Mendelssohn, LSU; C. Reid, LDWF; J. Visser, LSU). This is likely due to the extreme environmental conditions, such as higher salinities, shifting substrates, and frequent storm disturbance that severely limit suitability of the habitat for colonization.

HQUSACE Assessment: The issue is resolved.

4.New sea level rise guidance , page 3-77. There is new Civil Works guidance for sea level rise, EC 1165-2-212; this document replaces EC 1165-2-211 that is referenced throughout the January 2012 final report. Please confirm that the final report is in compliance with the new guidance, and update the document to cite EC 1165-2-212.

Response: Concur. The sea level rise guidance in EC 1165-2-212 was followed. The report was updated to cite EC 1165-2-212.

HQUSACE Assessment: The issue is resolved.

5. Effects of saltwater intrusion. A discussion is held in Chapter 5 (e.g. p 5-44) that the selected plan "would have an undetermined impact on retarding saltwater intrusion into more northern portions of the Barataria Basin." However, in the salinity section (p 5-57), this is not mentioned. In fact, it is stated that there would be no effect on salinity. The report should be consistent.

Formerly Standard Form (SF) 71

Response: Concur. Following revision has been made to both referenced sections to indicate undetermined, likely minimal impacts on salinity:

> "The Caminada Headlands and Shell Island restoration projects alone would have an undetermined, likely minimal, if any impact on retarding saltwater intrusion influence on regional salinities with or without implementation, due to the fact that inlets to the coastal bay areas of the Barataria basin would allow for substantial saltwater to enter the basin, with or without these project features."

HQUSACE Assessment: The issue is resolved.

6. Air Quality, Table 5-9. There is no indication in the text before or after the table or in the table as to what the numbers in the table mean with respect to whether the project would cause an impact to air quality or not. It is not until Section 7.1.7 that the read is told the conclusion – suggest using similar text:
"Consideration of total emissions for each work item separately (or even when all work items are summed) generally do not exceed the threshold limit applicable to VOCs for parishes where the most stringent requirement (50 tons per year in serious non-attainment parishes) is in effect, (see General Conformity, State Implementation Plan, section 1405 B.2). The VOC emissions for the Recommended Plan would be classified as de minimus and no further action would be required."

Response: Concur. Sections 5.20.2.1.1 (following table 5-9) and section 7.1.7 has been revised with the following:

> "Compliance with the Clean Air Act has been fully coordinated with the Air Quality Section of the LDEQ (see Section 4.23 Air Quality). As required by Louisiana Administrative Code, Title 33 (LAC 33:III.1405 B), a general conformity determination for air quality is required for projects that affect non-attainment areas (personal communication Mr. Zia Yasoob, Louisiana Department of Environmental Quality). In Louisiana, the non-attainment area currently consists of Ascension, East Baton Rouge, Iberville, Livingston, and West Baton Rouge parishes. However, an air quality determination was made for the Recommended Plan. This included consideration of the Recommended Plan for the category of general conformity, in accordance with the Louisiana General Conformity, State Implementation Plan (LDEQ 1994). Consideration of total emissions for each work item separately (or even when all work items are summed) generally do not exceed the threshold limit applicable to VOCs for parishes where the most stringent requirement (50 tons per year in serious non-attainment parishes) is in effect, (see General Conformity, State Implementation Plan, section 1405 B.2). The VOC emissions for the Recommended Plan would be classified as de minimus and no further action would be required."

HQUSACE Assessment: The issue is resolved.

7. Project cost update. The costs provided in the final report cite the FY 11 (October 2010) price level. Decision documents are required to use current price levels when processing for CoE or Director Reports, per ER 1105-2-100, D-4b which states that "It is current policy to report and maintain current estimates of project benefits, costs, and economic justification... (emphasis added)". An addendum should be prepared to bring the FY11 price levels up to current price level and discount rate (FY12, October 2011).

Response: Concur. The report has been revised to cite the updated FY 12, October 2011 costs.

8. Miscellaneous.

a. IEPR. The package should include the Draft Agency Response to IEPR. This will need to be processed at the same time as the Director's Report.
b. Recommendation. The Recommendation (Section 8) has not been signed by the District Engineer. A signature page should be provided and the page added or swapped in the document in order to process for approval.
c. Although an updated 6 Jan 2012 sponsor letter of intent and 12 January 2012 certification of financial capability were included in the transmittal materials, these documents were not included within the final report itself. The final report states in section 3.10.5 on page 3-86 that the financial certification is "in this section" and in part 3.10.7 on page 3-91 that the "letter of intent has been provided by the non-Federal sponsor." But the only document included in the report appears to be an outdated sponsor letter dated 13 June 2011. Looks like perhaps just an oversight that could be easily fixed by inserting a copy of the certification into part 3.10.5 of the report and replacing the letter in part 3.10.7 with the updated one.

Response: Concur.
a. Draft Agency Response to IEPR is under development and will be provided prior to the end of the S&A review.
b. The recommendation page has been replaced to one that included the Commander's signature.
c. The financial certification and the new letter of intent have been added to the report.

HQUSACE Assessment: The issue is resolved.

5. Civil Works Review Board

The Civil Works Review Board for the project was held on March 22, 2012. The board members members voted unanimously to send the report out for State and Agency review.

6. State and Agency review comments

The State and Agency review was conducted 30 March 2012 through 30 April 2012. A number of letters were received pursuant to State and Agency review; all letters expressed support for, or no objections to, the project . Only one letter, from the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, transmitted comments that required responses. The NMFS comments and the USACE responses are summarized below.

1. The USACE concurs with conservation National Marine Fisheries Service (NMFS) essential fish habitat (EFH) conservation recommendation to further examine during preconstruction engineering and design (PED) phase, additional means to minimize adverse impacts to existing intertidal habitats on both the Caminada Headland and Shell Island which will be coordinated with the NMFS and other natural resource agencies.

2. The USACE concurs with NMFS EFH conservation recommendation stipulating that containment dikes on the marsh platforms be gapped or degraded no later than three years after construction in an acceptable manner to be developed during PED through coordination with the NMFS.

3. The USACE concurs with NMFS EFH conservation recommendation that during the PED phase, refinement of the sand fencing plan and vegetative species to be planted will be coordinated with the NMFS and other natural resource agencies.

4. The USACE concurs with the NMFS recommendation to supplement the FEIS and EFH assessment to assess potential environmental impacts of establishing a specific nearshore dump site and transporting sediments to the Caminada Headland as well as assessing potential environmental impacts if other borrow sites are later determined during PED to be necessary for project construction.

5. The USACE commits to further analyze the potential impacts of the Empire jetties on Shell Island during the PED phase of project implementation to determine if it is possible to remove the jetties and extend the longevity of Shell Island.

The above responses have been included in the Record of Decision for the Final Environmental Impact Statement.