Project Information Sheet Format for Wetland Value Assessment

Final for Phase II Request: December 8, 2003

Project Name: Chaland Headland Restoration, BA -38

Project Type(s): Barrier Island/Marsh Creation

Sponsoring Agency:
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Project Area: The project area is located between Pass La Mer and Chaland Pass along the Plaquemines barrier shoreline, in Plaquemines Parish, Louisiana. The project boundary extends from the gulf shoreline to the -1.5 ft NAVD elevation on the bayside. The project area is based on 2002 bathymetry and topography surveys. The total acreage (FWOP) is 286.5 acres of land. Further land breakouts will be discussed below. See the draft revised boundary/feature map for the footprint and appended cross section for general features.

Problem: Wetlands, dune, and swale habitats withing the project area have undergone substantial loss due to oil and gas activities, subsidence, se-level rise, and marine and wind induced shoreline erosion. The short-term (1988-2000) land loss rate for the Chaland Headland area averages -46.6 acres per year or 3.36%/yr.

Goals: (revised from original fact sheet and spring 2003 prioritization) Design approach is to maximize planform area per unit volume for island stabilization and habitat creation by providing sufficient protection to prevent breaching with a 20-year or lesser storm event.

1. Nourish the gulf shoreline and create approximately 90 acres of dune and 90 acres of supratidal habitat with sand and create 264 acres of back-barrier marsh platform settled to an elevation with unrestricted tidal exchange within three years after construction.
2. To establish marsh vegetation (both planted and natural colonization). There would be approximately 27% vegetation cover of the dune and supratidal acreage at the end of TY3 and 52% at the end of TY5. Approximately 80% of more cover of planted marsh acres at TY3 and 80% cover of 100% of all created acres at TY5.
3. Fill breaches, restore and create dune and marsh to increase island longevity and maintain integrity of the sub-reach.
4. Create tidal creeks post construction.

Project Features:
Specific design details over those listed below can be found in the 30% design report and the final plans and specifications. Also, see revised boundary and feature map appended and permit plats for representative plan views and cross sections.

<u>Phase I Analysis - Design Alternatives</u>

During Phase I, alternatives that were evaluated changed from those during Phase 0 (planning level). Alternatives for Chaland Headland evaluated under Phase I include Alternative 1 (seaward), Alternative 2 (landward), and Alternative 3 (hybrid)(see Section 17.2 of the 30% design report). Crest width was varied to provide an overall island design volume greater than the required sediment budget values.

<u>Preferred Alternative Proposed: Alternative 2 (Landward)</u>

The following describes the construction template for the preferred alternative which includes advanced fill for initial consolidation. The construction template is higher and wider than the design template which addresses subgrade compression and RSL rise. Acres listed are those as-built and reflect both constructed and existing.

Dune

As-built, 110.7 acres of dune would be constructed +6.0 ft NAVD with 276.1 acres from +2 ft NAVD to +5.9 ft NAVD 88 in foreshore and backshore slope. The dune crown averages approximately 260 ft. In comparison to phase 0, there no longer is an additional dune feature on top of a berm because SBEACH modeling suggested such a feature is not necessary to attain the no breaching design requirement.

Overtopping and post-storm dune elevation were selected as two criteria to evaluate performance of design alternatives for the dune cross-sections. Dune screening of overtopping suggested breaching could occur with a dune elevation of 4.1 ft or less and damage to landward structures with a dune of 7.3 ft or less. Based on the results from SBEACH modeling a minimum elevation of +6 ft NAVD was selected. A 1:45 foreshore and backshore slope was adopted based on the attained profile slope (for sand) as measured at the constructed Holly Beach project. Construction will be with semi-containment at the discretion of the contractor which will allow selective sorting of the placed material with the coarser sand remaining within the fill template. All dikes will be graded into the construction cross-section prior to fill acceptance. Sand (mean grain size of 0.09 with both clean areas, <10% silt and variable beds, 10-40% silt) will be mined from the Quatre Bayou borrow area, 4.5 southwest of the Chaland Headland project area. A vertical tolerance restriction of ± 0.5 ft will be allowed on the construction grade.

Intertidal Elevations (marsh and surf zone)

Approximately, 64.9 acres of marsh would be constructed (as-built) with 246.1 at TY3 by an initial fill placement up to +2.5 ft NAVD on the marsh platform and gulfside slope. The width of the marsh platform ranges from 600 ft to 1,000 ft wide. Surveys determined healthy marsh on Chaland Headland to be an average of +1.01 ft NAVD. Significant post-construction consolidation and dewatering are anticipated, and a final long term elevation of +1.5 ft NAVD is targeted. Evaluations on post construction elevation loss from dessication and consolidation by geotechnical evaluations of the borrow material and existing sediment in the disposal area determined a target initial fill elevation of +2.5 ft NAVD. Geotechnical investigations of the disposal areas (i.e., marsh platform) also were conducted to more accurately estimate long term performance by evaluating subgrade consolidation under overburden of material to be placed. A vertical tolerance restriction of ± 0.3

ft will be allowed on the construction grade of + 2.5 ft NAVD. The Quatre Bayou borrow area also will be mined for the marsh fill material.

Extensive primary (bayside) and secondary diking will be constructed with all secondary (internal) diking being degraded following completion. Also, excavation of approximately 3,374 ft long canal is included to maintain access to existing oil and gas infrastructure that could not be modified or plugged and abandoned. There will be at least four plugs constructed to close the "W" canal. Existing spoil will be used for containment as much as possible with some breaching necessary to allow fill material. Additional gapping will occur post-construction to allow tidal exchange within the constructed marsh.

A 41.7 acre area adjacent to the planned access canal will be nourished with effluent discharge from the contained disposal areas with a spill box. *At the time of drafting this WVA, final design on this nourishment area was not complete and sediment volume discharged with effluent is unknown. Therefore benefits will not be claimed other than the % cover timing under V1 of the marsh model.*

Creating tidal creeks is not included with the initial construction. Differential settlement of fill material in the W canal and already existing ponds is expected. Post construction gapping at strategic locations will allow tidal creeks to develop by linking the project area to tidal forcing.

Sand Fencing
Sand fencing component consists of installing 29,000 ft of fencing along the dune crest concurrent with project construction and prior to final acceptance of the dune. Fencing will consist of two, shore parallel rows with no to minimal gaps. Any gaps will be staggered to minimize any gully formation from overwash as observed by DNR monitoring on other barrier island projects. Row layout will be based on dividing the dune with into approximate thirds to allow sufficient space for future fence rows to be installed during maintenance events without being in the wind shadow of the TY 1 fences (per S. Khalil at the 95% meeting.) Fences will be constructed with wooden rather than steel posts to aid in maintenance and aesthetics. Fence will be installed approximately 6" off the ground to maximize trapping in front of the fence (per 95% meeting revision).

Planting
Planting of the dune and marsh platforms is planned to take place over three years. A portion of the dune plants would be installed during the Fall of the same year the project is being constructed to assist in sand trapping and retention with the sand fencing. The remainder of the dune plants and a portion of the marsh plants would be installed in the first year following construction. This time lag should allow for soil salinities to decrease provided there is adequate rainfall. All remaining marsh plants would not be installed two years after construction to allow for changes in elevations and shorelines from settlement and equilibration or erosion of the dikes. Dune plantings will consist of 4-inch containers of bitter panicum (Fourchon germplasm), gulf cordgrass, and marshhay cordgrass (some of which will be the recently released Gulfcoast cultivar), and gallon containers of seaoats (Caminada germplasm). Marsh plantings will consist of smooth cordgrass (Vermilion cultivar) multi-stem plugs, 4-inch containers of matrimony vine, and tube-tainers of black mangrove (Pelican).

The intent is to vegetate all available acreage in a somewhat uniform manner. The layout will be relatively uniform where the dune and marsh platforms are relatively uniform. Layout and density will be adjusted as needed for the tidal creeks. See the appendix for a draft plan on numbers of plants by species and unit for each platform. **Note: the planting plan was revised for the 95% meeting, but remains a draft (appended too). Although the revised plan includes a substantial increase in plants from the draft distribution of this document, these Final WVA estimates were NOT updated with the revised plan.**

Dune	Marsh
Bitter panicum - 4" Containers	Smooth cordgrass - plugs, Rows 10' apart, plants 5' o.c.
Gulf cordgrass - 4" Containers	Matrimony vine - 4" Container, Planted at foot of dune
marshhay cordgrass - 4" Containers	Black Mangrove - tube, Planted at higher areas
Caminada Seaoats - trade gallon	
Approximately 678 plants/acre (75,000/110.7ac)	Approximately 849 plants/acre (224,000/246.16ac)

Pass La Mer to Grand Bayou Pass, BA-35 (aka Bay Joe Wise), and the Equinox, Damage Assessment Restoration Program project, are the only adjacent projects. Neither of these have received construction or settlement funds. Through Federal and state management, this project is being coordinated with the ongoing design of Bay Joe Wise.

Monitoring Information: See those listed and appended in the Pelican Island Barrier Island WVA dated December 8, 2003.

<u>General Headland Assumptions:</u>

1. Assumes December 2002, elevations and area as baseline.
2. healthy RSL rise 0.61"/yr; subsidence 0.35"/yr is included in RSL rise- falls within trends – see 30% report
   - at TY 3, 5, 10, and 20 the grids for elevation were lowered 0.15, 0.26, 0.51, and 1.02 ft, respectively for both FWOP and FWP (See page A-4, Appendix A, Assessment of Planform Performance (Jenkins and Day 2003a).
3. FWOP - 12.45'/yr retreat*
   FWP - 14.8'/yr retreat* - higher rate due to diffusion and equilibration losses
   “*” denotes retreat rates derived from numerical modeling-Table 5 (Jenkins and Day 2003b)
4. FWOP - only TY1, TY10, and TY20 needed
5. FWP
   TY3 - due to equilibration + diffusion + retreat; consolidation occurs by TY3 for marsh platform (Jenkins and Day 2003b)
   TY5 - is included solely for percent vegetation variables.
   TY10- year 10 includes a synoptic, 10-yr storm event + 10 years of retreat as determined by GENESIS and SBEACH.
   TY20- year 20 includes a synoptic, 20-yr storm event + 10 years of retreat as determined by

GENESIS and SBEACH.

Variable V_1 - Percent of the total subaerial area that is classified as dune habitat.
See below Marsh Model section for Table 2, Jenkins and Day 2003b for the model projected acres.
FWOP
TY0 3.8/76.9 = 5%
TY1 0%
TY10 0%
TY20 0%

FWP
TY1 110.7/386.8 = 29%
TY3 89.5/179.3 = 50%
TY5 70/159.2 = 44%
TY10 41.5/131.9 = 31%
TY20 0/82.4 = 0%

Variable V_2 - Percent of the total subaerial area that is classified as supratidal habitat.
See below Marsh Model section for Table 2, Jenkins and Day 2003b for the model projected acres.
FWOP
TY0 73.1/76.9 = 95%
TY1 70.9/70.9 = 100%
TY10 15.2/15.2 = 100%
TY20 0%

FWP
TY1 276.1/386.8 = 71%
TY3 89.8/179.3 = 50%
TY5 89.2/159.2 = 56%
TY10 90.4/131.9 = 69%
TY20 82.4/82.4 = 100%

Variable V_3 - Percent vegetative cover of dune and supratidal habitats.
Based on 2001 WVA including 10/16/01, helicopter inspections from LCA, approximately 65% cover.

FWOP
TY0 75% based on September 2003, field inspection substantial amount of sand from the beach has been lost with reaches of no beach fronting pedalstaled supratidal marsh. Surveying plan views loosely confirm this.
TY1 75%
TY10 60% Previous Environmental Workgroup assumptions included a decreasing trend in vegetation due to denuding and burial with storm events with rebounding coverage in TY20. It appears substantial decreases may not occur from burial as the system

including the beach become more sediment starved.

TY20 60%

FWP

Note: for the 95% design meeting, but after release of the draft version of this document, the planting plan was revised by increasing the planting density. The following remains consistent with the earlier draft and does NOT include the increased number of plants. This should result in a conservative estimate of benefits. Both the draft and redrafted planting plans are appended.

Planting densities: dune 678/ac

TY1 2% (25%)(75,000 plants) = 18750 plants/678 plants/acre = 28 ac
(25%)(28ac)/386.8 = 2%

25% coverage claimed for planted acreage with 25% of dune plants installed in TY1 @ a low density of 678/acre. No credit claimed for all other acres.

TY3 27%

(75%)(75,000 plants) = 56,250/678 plants/acre = 82.9 ac
[(50%)(28ac) + (30%)(82.9 ac) + (15%)(68.4ac)]/179.3 = 27%

Assume:

1. 75% of plants installed in TY2.
2. Insufficient number of plants in the October 7, 2003, draft planting plans in the appendix to plant all acres. *Note the insufficient number of plants may be an oversight and potentially will be corrected to the maximum extent allowable by the phase 0 planting budget and during installation layout (i.e., additional funds will not be requested for plants).*
3. 50% credit for acreage planted in TY1; 30% credit for acres planted in TY2; and 15% credit for natural colonization of remaining acres. Natural colonization of high quality sand is limited.

TY5 52%

(65%)(28) + (65%)(82.9) + (25%)(48.3)/159.2 = 52%

Assume:

1. 65% credit of dune/supratidal acres planted (110.9 acres)
2. 25% credit of remaining dune/supratidal based on natural colonization.
3. Based on Lee 2003, there has been substantial time delays to achieve reasonable plant coverage.

Assume: 100% cover of the dune and swale is never attained based on planting densities and physicochemical factors.

TY10 65%

TY20 65%

Variable V_4 - Percent vegetative cover by woody species.
In 2001, there was 10% cover of woody species estimated from a LCA helicopter inspection.

FWOP
TY0 5% estimated based on a September 2003, inspection
TY1 5%
TY10 4% Only 15.2 ac or 8% is supratidal; assume 50% of that acreage is woody
TY20 0% Based on elimination of the dune and supratidal in TY20

FWP
TY1 - TY5 2% some pre-project woody species get buried
Assumption: Only 3,000 mangrove plants installed (< 1 acre) at TY3

TY10 4% Based on existing and natural recruitment on the substantial dune and supratidal elevations.
TY20 2% Based on elimination of dune and decreasing acreage within the supratidal elevation range.

Variable V_5 - Beach/surf zone features.
FWOP and FWP - 100% Class 1; unconfined natural beach with no shore parallel structures. Containment built for construction will be graded into the template for a more natural slope as-built.

Project Area
FWOP and FWP

	WITHOUT-PROJECT CONDITIONS (9/2002) Acres at elevation within fill area & canal area at year ……				WITH-PROJECT CONDITIONS Acres at elevation within fill area & canal area at year ……					
NAVD ELEV. (feet)	0	1	10	20	0	1	3	5	10	20
> +5'	3.8	0.0	0.0	0.0	3.8	110.7	89.5	70.0	41.5	0.0
+2' to +5'	73.1	70.9	15.2	0.0	73.1	276.1	89.8	89.2	90.4	82.4
Total Project Area	76.9	70.9	15.2	0	76.9	386.8	179.3	159.2	131.9	82.4

Saline Marsh Model
V1 - Emergent Vegetation

UNO habitat analysis and vegetative maps of coastal Louisiana show the project area was saline marsh from 1968 to present. Emergent wetlands in the project area are primarily vegetated with smooth cordgrass, black mangrove, and salt grass. The barrier shoreline is vegetated with marshhay cordgrass, roseau cane, and marsh elder. Woody vegetation in the project areas includes primarily marsh elder and wax myrtle. Acreage included in the saline marsh model is based on topography and elevational surveys from 2002. All acreage within +0.48 ft to +1.9 ft 88 is classified as intertidal and included in the saline marsh model (Table 2, Jenkins and Day 2003b). Water acres included are those falling within existing intertidal marsh or within the FWP marsh platform and range < 0 ft and between -1.5 ft and 0 ft. These data closely matches the independent analysis conducted by the USGS of 1998 habitat derived from interpretation of 1998 DOQQ imagery using the 2002 elevation surveys by CPE. Water acres are based on using acres of water less than 0 ft (Table 2, Jenkins and Day 2003b) and subtracting the Gulf of Mexico water (Table 3, Jenkins and Day 2003b).

The boundary specifically includes the open water of the "W" canal, 7.8 acres of broken marsh and open water that would be dredged for an access canal FWP, and interior areas out to the -1.5 ft water depth. Including water depths out to -1.5 ft represents a departure from the typical marsh model boundary standards. However, inclusion of those water acres produces water acreages in the ballpark of those previously developed from the 2000, UNO habitat data which had 189 ac of open water for the landward alternative (which since has been modified).

Marsh: 152.7 ac
Water: 157.4 ac <0 ft - GOM H_20 = 257 - 99.6 = 157.4 ac @ TY0
Total: 310.1 ac

Assume: FWOP and FWP loss rates based on application of coastal modeling results including RSL rise losses. The engineering based FWOP modeling projections for TY0 through TY5 closely matches the UNO, short term loss rate of 3.4%/yr used in the 2001 WVA.

FWOP
TY0 49% 152.7/310.1 = 49%

TY1 48% 148.7/310.1 = 48%
Based on coastal modeling and application of RSL rise which is similar to 3.4%/yr UNO loss

TY10 31% 97.6/310.1 = 31%
Based on modeling and RSL rise losses.

TABLE 2 (Jenkins and Day 2003b)
WETLAND VALUE ASSESSMENT, CHALAND HEADLAND, LA
OCTOBER 2003 PERMIT DESIGN

NAVD ELEV. (feet)	WITHOUT-PROJECT CONDITIONS (9/2002) Acres at elevation within fill area & canal area at year ……						WITH-PROJE… Acres at elevat… & canal are…		
	0	1	3	5	10	20	0	1	3
> +5' Dune	3.8	0.0	0.0	0.0	0.0	0.0	3.8	110.7	89.5

+2' to +5' Supra	73.1	70.9	59.0	47.3	15.2	0.0	73.1	276.1	89.8	89.2	90.4	82.4
Headland land	76.9	70.9	59.0	47.3	15.2	0.0	76.9	386.8	179.3	159.2	131.9	82.4
0' to +2'	209.6	206.2	198.3	189.5	169.6	64.4	209.6	79.4	263.6	264.2	262.6	237.9
+0.48 to +1.9' marsh model	152.7	148.7	139.6	128.7	97.6	19.4	152.7	64.9	246.1	243.5	229.7	216.8
< 0'	257.0	266.4	286.2	306.7	358.7	479.1	257.0	77.3	100.6	120.0	149.0	223.2
-1.5 to 0 (marsh only)	85.4	89.4	97.8	107.1	125.6	158.0						

NOTES:
1. The fill area includes the 41.7 acre discharge area.
2. The with-project conditions assume that the amount of fill in the discharge area is negligible.
3. Acres based on 9/2002 and 12/2003 surveys

TABLE 3 (Jenkins and Day 2003b)
GULF ACRES BELOW 0' NAVD

CHALAND HEADLAND, LA

PROFILE LINE	Without Project Conditions										
	Land Changes due to Long Term Retreat (acres)					ACRES BELOW 0' NAVD WITHIN ISLAND (SAND) FILL AREA					
	Year 0 to Year 1	Year 0 to Year 3	Year 0 to Year 5	Year 0 to Year 10	Year 0 to Year 20	Year 0	Year 1	Year 3	Year 5	Year 10	Year 20

CG01											
CG1.5CM2											
CG02	-0.1	-0.2	-0.4	-1.2	-3.1	**2.3**	**2.4**	**2.5**	**2.7**	**3.5**	**5.4**
CG03PLM3	-0.4	-1.3	-2.1	-3.6	-5.9	-	**0.1**	**1.0**	**1.8**	**3.3**	**5.6**
						0.3					
CG04	-0.4	-1.1	-1.8	-3.4	-5.8	**2.6**	**2.9**	**3.6**	**4.4**	**5.9**	**8.3**
CG05	-0.2	-0.7	-1.2	-2.7	-5.2	**2.9**	**3.2**	**3.6**	**4.1**	**5.6**	**8.1**
CG06PLM4	-0.2	-0.6	-1.0	-2.4	-4.9	**2.7**	**2.9**	**3.3**	**3.7**	**5.1**	**7.6**
CG07	-0.2	-0.5	-0.9	-2.2	-4.6	**2.4**	**2.6**	**2.9**	**3.3**	**4.6**	**7.0**
CG08	-0.2	-0.5	-0.8	-2.0	-4.4	**2.8**	**3.0**	**3.3**	**3.6**	**4.9**	**7.2**
CG09PLM5	-0.2	-0.6	-1.0	-2.1	-4.4	**2.6**	**2.8**	**3.2**	**3.6**	**4.7**	**6.9**
CG10	-0.2	-0.6	-1.1	-2.1	-4.3	**1.9**	**2.1**	**2.5**	**2.9**	**4.0**	**6.2**
CG11	-0.2	-0.7	-1.1	-2.1	-4.2	**2.2**	**2.4**	**2.9**	**3.3**	**4.3**	**6.4**
CG12PLM6	-0.1	-0.4	-0.7	-1.7	-3.7	**3.0**	**3.1**	**3.4**	**3.7**	**4.7**	**6.7**
CG13	-0.1	-0.4	-0.6	-1.6	-3.5	**2.4**	**2.5**	**2.8**	**3.1**	**4.0**	**5.9**
CG14	-0.2	-0.5	-0.8	-1.6	-3.5	**2.9**	**3.1**	**3.4**	**3.7**	**4.5**	**6.4**
CG15PLM7	-0.1	-0.4	-0.6	-1.5	-3.3	**2.6**	**2.7**	**3.0**	**3.2**	**4.1**	**5.8**
CG16	-0.2	-0.6	-1.0	-1.9	-3.5	**1.9**	**2.1**	**2.5**	**2.9**	**3.7**	**5.4**
CG17	-0.2	-0.5	-0.8	-1.6	-3.1	**1.7**	**1.8**	**2.1**	**2.4**	**3.2**	**4.8**
CG18PLM8	-0.1	-0.3	-0.5	-1.3	-2.8	**3.8**	**3.9**	**4.1**	**4.4**	**5.1**	**6.6**
CG19	-0.1	-0.4	-0.6	-1.4	-2.8	**4.7**	**4.8**	**5.0**	**5.3**	**6.0**	**7.4**
CG20	-0.2	-0.5	-0.8	-1.5	-2.8	**5.1**	**5.2**	**5.5**	**5.8**	**6.5**	**7.8**
CG21PLM9	-0.1	-0.4	-0.7	-1.4	-2.6	**5.8**	**5.9**	**6.2**	**6.5**	**7.2**	**8.4**
CG22	-0.1	-0.3	-0.5	-1.2	-2.2	**6.3**	**6.4**	**6.6**	**6.8**	**7.5**	**8.5**
CG23	-0.2	-0.7	-1.1	-1.7	-2.5	**5.9**	**6.1**	**6.5**	**7.0**	**7.5**	**8.4**
CG24PL10	-0.2	-0.5	-0.8	-1.1	-1.6	**4.3**	**4.5**	**4.8**	**5.1**	**5.4**	**5.9**
CG24.5	-0.1	-0.3	-0.5	-0.6	-0.9	**2.8**	**2.9**	**3.1**	**3.3**	**3.5**	**3.7**
CG25	-0.1	-0.2	-0.4	-0.5	-0.7	**2.8**	**2.9**	**3.1**	**3.2**	**3.3**	**3.5**
CG25.5	0.0	-0.1	-0.2	-0.3	-0.4	**2.9**	**2.9**	**3.0**	**3.1**	**3.2**	**3.3**
CG26	0.0	-0.1	-0.1	-0.1	-0.3	**4.3**	**4.3**	**4.4**	**4.4**	**4.4**	**4.6**
CG27PL11	0.1	0.3	0.5	0.7	0.7	**4.9**	**4.8**	**4.6**	**4.4**	**4.2**	**4.2**
CG28	0.1	0.4	0.7	0.9	1.1	**3.3**	**3.1**	**2.8**	**2.6**	**2.3**	**2.2**
CG28.5	0.1	0.3	0.5	0.7	0.8	**2.1**	**2.0**	**1.8**	**1.6**	**1.4**	**1.2**
CG29	0.2	0.5	0.8	1.1	1.4	**3.0**	**2.8**	**2.5**	**2.2**	**1.9**	**1.6**
CG30PL12	0.0	0.0	0.1	0.4	0.7	**1.8**	**1.8**	**1.8**	**1.8**	**1.4**	**1.1**
CG30.5	0.0	-0.1	-0.2	0.1	0.3	-	**-0.5**	**-0.4**	**-0.4**	**-0.6**	**-0.8**
						0.5					
CG31											
TOTAL	-4.0	-11.9	-19.9	-41.0	-81.7	**99.6**	**103.6**	**111.6**	**119.6**	**140.7**	**181.4**

TY20 6% 19.4/310.1 = 6%

FWP

Note: for the 95% design meeting, but after release of the draft version of this document, the planting plan was revised by increasing the planting density. The following remains consistent with the earlier draft and does NOT include the increased number of plants. This should result in a conservative estimate of benefits. Both the draft and redrafted planting plans are appended.

Marsh will be planted at the rate of approximately 910 plants/ac on 7 ft on center derived from 224,000 plants in the appended draft divided by 246.1 ac at TY3. *As noted above for the dune and supratidal areas, planting plans will be updated based on advanced designs and as allowable within the phase 0 budget to plant as much acreage as possible by increasing the total number of plants.*

TY1 11% (80%)(41.7)/310.1 = 11%; 33.36 ac

Burial and associated plant mortality is expected to be minimal in the nourished area. Therefore, 80% cover for "nourished area" because method of nourishment is not via direct discharge from a dredge pipe; rather, effluent will be discharged from a spill box (i.e., decant). Represents a 30% increase over the standard workgroup assumption used for nourishment via direct discharge

TY3 35% [(100%)(41.7 ac) + (100%)(66)] = 107.7/310.1 = 35%; 107.7 ac

Note: did not apply the Landers/Boe factor - subtracting out the unvegetated portion from the project area [e.g., (246.1 - 41.7) - (246.1 - 41.7 - 66)] = 138.4
PA = 310.1 - 138.4 = 171.7 107.7/171.7 = 63% - this does not seem reasonable

1. 100% credit for nourish area due to enhanced nutrients and thin layer placement.
2. 100% credit for the planted marsh acres - 25% of marsh acres planted in TY2 at a moderate density 849 plants/acre (7 ft o.c. and 5 ft apart) [25%(224,000)/849 = 66] + natural recruitment from buried plants within the construction footprint and adjacent marsh.

TY5 56% [(100%)(41.7) + (66%)(243.5 - 41.7)]/310.1 = 56%; 174.9

1. 100% credit of nourished area
2. 66% credit for marsh platform - 75% of marsh platform planted in TY3 credit). Based on using organic sediment and allowing the platform to compact prior to planting, the density of plants/acre, and natural recruitment, success should mimic that observed on Grand Terre (BA-28) (Campbell and Benedet 2003a).

Assume 100% credit for all model determined acres at TY10 and TY20 (Table 2, Jenkins and Day 2003b).

TY10	74%	229.7/310.1 = 74%
TY20	70%	216.8/310.1 = 70%

V2 - Submerged Aquatic Vegetation

No SAV exists or has historically existed in the project area.
FWOP and FWP - 0% SAV

V3 - Interspersion

FWOP	(No change from 2001 WVA)	
TY0 - TY1	50% - Class 3; 50% - Class 4	49% and 48% land, respectively
TY10	25% - Class 3; 75% - Class 4	31% land

TY20	100% - Class 4	6 % land

FWP

TY1 100% - Class 1

Note: you cannot compare marsh acres to open water because the majority of the open water in the marsh model is actually filled to supratidal captured in the headland model and is a solid, contiguous land mass. This remains until consolidation by TY3.

TY5	75% - Class 1; 25% - Class 2	243.5/310/1 = 79% land
TY10	70% - Class 1; 30% - Class 2	74% land
TY20	65% - Class 1; 35% - Class 3	70% land

V4 - Shallow Open Water Habitat

FWOP

Acres based on modeling - includes water acres of only -1.5 ft to 0 ft NAVD. Water acres should also include 0.1 up to +0.46, but portions of that range includes sand and mudflats. Additionally, model runs breaking water acres out in that upper range for only those areas falling within the marsh were not provided.

TY0	28%	85.4/157.4 = 54%
TY1	29%	89.4/161.4 = 55%
TY10	41%	125.6/212.5 = 59%
TY20	51%	158/290.7 = 54%

FWP

Modeling runs were not available for water acres shallower than -1.5 ft only within the WVA marsh boundary. However, -1.5 ft to 0 ft water acres within the overall construction footprint (which includes gulfside shallow water) were provided and showed an increasing trend: TY1 38.6; TY3 46.3; TY5 51.2; TY10 67.7; and TY20 83.2, but as a percent of water area it was relatively stable until TY20.

TY1 0.4/7.8 = 5%

based on the design slopes of the oil and gas canal we have to dig, 3' on either side will be less than a 1.5 ' deep x 3150' resulting in 0.4 ac

TY3 - TY10 assume a consistent 25% of all project area water less than 1.5 is on the gulf side. See Table 2, Jenkins and Day 2003b, to determine water acres less than 1.5 deep FWP.

TY3	(.75)(46.3)/64	54%	(310.1 - 246.1 = 64)
TY5	(.75)(51.2)/66.6	58%	(310.1 - 243.4 = 66.6)
TY10	(.75)(67.7)/80.4	63%	(310.1 - 229.7 = 80.4)

By TY20 frequent overwash, but most of material is retained as overwash fans within the marsh platform.
TY20 60%

V5 - Salinity
DHH data provided by E. Swenson show a mean salinity of 16.2 ppt for Lake Washington, 16.9 ppt for Bastian Bay West, 17.5 ppt for Garden bay, and 17.9 ppt for Bastian Bay East (see 2001 WVA). There are no significant trends in the means, but there is a significant difference between the minimum and maximum.

FWOP and FWP 17 ppt

V6 - Fish Access
FWOP
TY0 - TY20 1 100% a 1; unrestricted access to all marsh

FWP

TY1	0.0001	Due to the advance fill for compaction and primary and secondary diking, assumed there is not fish access.
TY3 - TY20	1	Settlement and gapping of dikes will occur by TY3.

Future Without Project		
TY	**Marsh Acres**	
0	152.7	
1	148.7	
10	97.6	
20	19.4	

Table 2, Jenkins and Day 2003b

Future Without Project	
TY	**Water Acres**
0	157.4 = 257 - 99.6
1	161.4 = 310.1 - 148.7
10	212.5 = 310.1 - 97.6
20	290.7 = 310.1 - 19.4

Future With Project	
TY	**Marsh Acres**
0	153
1	33.4
3	107.7
5	174.9
10	229.7
20	216.8

Future With Project	
TY	**Water Acres**
0	157
1	7.8
3	64 = 310.1 - 246.1
5	66.6 = 310.1 - 243.5
10	80.4 = 310.1 - 229.7
20	93.3 = 310.1 - 216.8

Literature cited

Jenkins, M. and C. Day. 2003a. Appendix A: assessment of planform performance. Report submitted by Coastal Planning and Engineering, for the National Marine Fisheries Service. 6 pp. Plus tables.

Jenkins, M. and C. Day. 2003b. Assessment of project planform performance; update of reported values based on revised permit design, 10/28/2003. Report submitted by Coastal Planning and Engineering, for the National Marine Fisheries Service. 2 pp. Plus tables.

Lee, D.M. 2003. Barrier Island Information. Louisiana Department of Natural Resources, Coastal Restoration Division, Thibodaux Field Office. Six compact disk set.

Lee, D.M., and S. M. Khalil. 2003. Paradigm shift: the use of sand fences in "whole" barrier island restoration in Louisiana. Environmental State of the State VIII - Habitat Conservation and Restoration. Environmental Research Consortium of Louisiana. Lindy Boggs International Conference Center, Univ. of New Orleans. New Orleans, LA.

Appendix

PELICAN ISLAND
AND
PASS CHALAND TO PASS LA MER (BA-38)
VEGETATION PLANTINGS
7 OCTOBER 2003

DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT

Preliminary Planting Schedule

Pelican Island

Dune Planting: Based on 15,000 l.f. dune, approximately 210-280 feet wide with two parallel sand fences on the dune.

Bitter Panicum	60,000	4" Containers, 20 Rows
Gulf Cordgrass	10,500	4" Containers, 3.5 Rows
Spartina patens	3,000	4" Containers, 1 Row
Sea Oats	1,500	Gallon, .5 Row

Marsh Planting: Based on 220 acres of created marsh, with tidal creek features.

Spartina alterniflora	190,000	Plugs, Rows 10' apart, plants 5' o.c.
Matrimony Vine	6,000	4" Container, Planted at foot of dune
Mangrove	3,000	Tube, Planted at higher areas

Pass Chaland to Pass La Mer

Dune Planting: Based on 15,000 l.f. dune, approximately 210-280 feet wide with two parallel sand fences on the dune.

Bitter Panicum	60,000	4" Containers, 20 Rows
Gulf Cordgrass	10,500	4" Containers, 3.5 Rows
Spartina patens	3,000	4" Containers, 1 Row
Sea Oats	1,500	Gallon, .5 Row

Marsh Planting: Based on 248 acres of created marsh, with tidal creek features.

Spartina alterniflora	215,000	Plugs, Rows 10' apart, plants 5' o.c.
Matrimony Vine	6,000	4" Container, Planted at foot of dune
Mangrove	3,000	Tube, Planted at higher areas

PELICAN ISLAND
AND
CHALAND HEADLAND TO PASS LA MER (BA-38)
VEGETATION PLANTINGS
(12/4/03 - 95% Design Meeting)

DRAFT DRAFT DRAFT DRAFT DRAFT

DRAFT BUDGET

PELICAN ISLAND

307,500 PLANTS	$1,085,000
Inspector 100 @ $850/day	(7.8%) 85,000
	$1,170,000

CHALAND HEADLAND

303,600 PLANTS	$1,165,800
Inspector 100 @ $850/day	(7.3%) 85,000
	1,251),800

WORKSHEET

PELICAN ISLAND

Dune:
12,500 If, 2,500 plants per row. Plants 5 ft on center, rows 15 ft on center
27,300 If sand fencing

1 row Salt Grass	2,500
1 row Matrimony Vine	2,500
1 row Black Mangrove	2,500
12 rows Bitter Panicum	30,000
8 rows Marshhay Cordgrass	20,000
7 rows Gulf Cordgrass	17,500
	75,000 x $5/plant = $375,000
1 row Sea Oats	2,500 x $8/plant = $20,000

Marsh:
Plants 5 ft on center, rows 10 ft on center, 264 acres
230,000 Smooth Cordgrass plugs $3/plant = $690,000
Total Pelican Island: 307,500 plants, $1,085,000

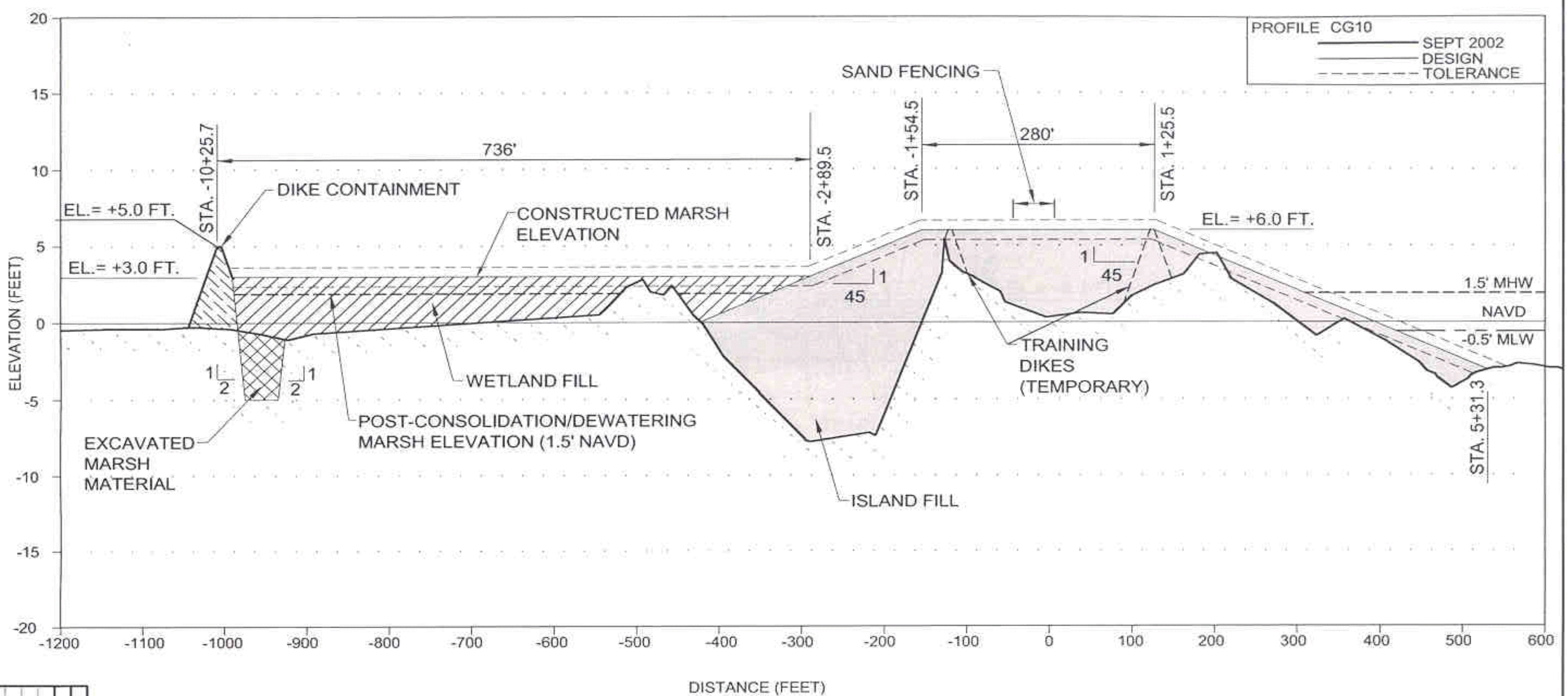
CHALAND HEADLAND

Dune:
13,0001f, 2,600 plants per row. Plants 5 ft on center, rows 15 ft on center 29,900 If sand fencing

1 row Matrimony Vine	2,600
1 row Salt Grass	2,600
1 row Black Mangrove	2,600
17 rows Bitter Panicurn	44,200
8 rows Marshhay Cordgrass	20,800
7 rows Gulf Cordgrass	18,200
	91,000 x $5/plant = $455,000
1 row Sea Oats	2,600 x $8/plant = $20,800

Marsh:
Plants 5 ft on center, rows 10 ft on center, 264 acres
230,000 Smooth Cordgrass plugs @ $3/plant = $690,000
Total Chaland Headland: 323,600 plants, $1,165,800

H:\Louisiana\726107\PERMITS\CHALAND PERMIT X-SECTIONS.dwg



SCALE: 1"= 200' HORIZONTAL
1"=10' VERTICAL

LEGEND:

- DENOTES WETLAND FILL
- DENOTES ISLAND FILL
- DENOTES DIKE CONTAINMENT
- DENOTES EXCAVATED MARSH MATERIAL TO BE USED FOR DIKE CONTAINMENT

NOTE:

1. ELEVATIONS SHOWN HEREON ARE IN FEET BASED ON NAVD 1988.

REVISIONS

DATE	BY	DESCRIPTION
9/2/03	TW	DESIGN, CANAL, TITLE AND SECTIONS
9/16/03	TW	PLAN VIEWS, SECTIONS

COASTAL PLANNING & ENGINEERING, INC.
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2481 N.W. BOCA RATON BLVD.
BOCA RATON, FL 33431
PH. (561) 391-8102 FAX (561) 391-9116

DATE: 7/29/03
BY: TW
COMM NO.: 7261.07
SHEET: 6

TITLE:
CHALAND HEADLAND RESTORATION (BA-38-2) CWPPRA PROJECT BEACH FILL CROSS SECTION CG10

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Headland

Project: Chaland Headland Restoration, BA-38, 11/24/03

Condition: Future Without Project

Variable		TY 0		TY 1		TY 10	
		Value	SI	Value	SI	Value	SI
V1	% Dune	5	0.40	0	0.10	0	0.10
V2	% Supratidal	95	0.67	100	0.50	100	0.50
V3	% Vegetative Cover	75	1.00	75	1.00	60	0.88
V4	% Woody Cover	5	0.40	5	0.40	4	0.34
V5	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI =	0.677	HSI =	0.570	HSI =	0.538

Project....... Chaland Headland Restoration, BA-38, 11/24/03
FWOP

Variable		TY 20		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Dune	0	0.10				
V2	% Supratidal	0	0.10				
V3	% Vegetative Cover	60	0.88				
V4	% Woody Cover	0	0.10				
V5	Beach/surf Zone	1	1.00				
		HSI =	0.402	HSI =		HSI =	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Headland

Project...... Chaland Headland Restoration, BA-38, 11/24/03

Condition: Future With Project

Variable		TY 0		TY 1		TY 3	
		Value	SI	Value	SI	Value	SI
V1	% Dune	5	0.40	29	1.00	50	0.28
V2	% Supratidal	95	0.67	71	1.00	50	0.75
V3	% Vegetative Cover	75	1.00	2	0.13	27	0.45
V4	% Woody Cover	5	0.40	2	0.22	2	0.22
V5	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI =	0.677	HSI =	0.702	HSI =	0.538

Project....... Chaland Headland Restoration, BA-38, 11/24/03

FWP

Variable		TY 5		TY 10		TY 20	
		Value	SI	Value	SI	Value	SI
V1	% Dune	44	0.50	31	0.96	0	0.10
V2	% Supratidal	56	0.83	69	1.00	100	0.50
V3	% Vegetative Cover	52	0.78	65	0.95	65	0.95
V4	% Woody Cover	2	0.22	4	0.34	2	0.22
V5	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI =	0.664	HSI =	0.862	HSI =	0.528

AAHU CALCULATION

Project: Chaland Headland Restoration, BA-38, 11/24/03

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	76.9	0.677	52.08	
1	70.9	0.570	40.41	46.14
10	15.2	0.538	8.17	215.92
20	0	0.402	0.00	37.43
			AAHUs =	**14.97**

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	76.9	0.677	52.08	
1	386.8	0.702	271.64	160.57
3	179.3	0.538	96.41	356.66
5	159.2	0.664	105.68	202.93
10	131.9	0.862	113.74	553.06
20	82.4	0.528	43.48	758.51
			AAHUs	**101.59**

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	101.59
B. Future Without Project AAHUs =	14.97
Net Change (FWP - FWOP) =	**86.61**

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Saline Marsh

Project: Chaland Headland, BA-38, 11/24/03 Project Area: 310

Condition: Future Without Project

Variable		TY 0 Value	TY 0 SI	TY 1 Value	TY 1 SI	TY 10 Value	TY 10 SI			
V1	% Emergent	49	0.54	48	0.53	31	0.38			
V2	% Aquatic	0	0.30	0	0.30	0	0.30			
V3	Interspersion	%		%		%				
	Class 1		0.30		0.30		0.25	0	0	0
	Class 2							0	0	0
	Class 3	50		50		25		0.4	0.4	0.4
	Class 4	50		50		75		0.2	0.2	0.2
	Class 5									
V4	%OW <= 1.5ft	54	0.79	55	0.81	59	0.86			
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00			
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00			
	Emergent Marsh HSI =		**0.64**	**EM HSI =**	**0.63**	**EM HSI =**	**0.51**			
	Open Water HSI =		**0.71**	**OW HSI =**	**0.71**	**OW HSI =**	**0.71**			

Project: Chaland Headland, BA-38, 11/24/03
FWOP

Variable		TY 20 Value	TY 20 SI	Value	SI	Value	SI			
V1	% Emergent	6	0.15							
V2	% Aquatic	0	0.30							
V3	Interspersion	%		%		%				
	Class 1		0.20					0	0	0
	Class 2							0	0	0
	Class 3							0	0	0
	Class 4	100						0.2	0	0
	Class 5									
V4	%OW <= 1.5ft	54	0.79							
V5	Salinity (ppt)	17	1.00							
V6	Access Value	1.00	1.00							
		EM HSI =	**0.32**	**EM HSI =**		**EM HSI =**				
		OW HSI =	**0.70**	**OW HSI =**		**OW HSI =**				

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Saline Marsh

Project: Chaland Headland, BA-38, 11/24/03 Project Area: 310

Condition: Future With Project

Variable		TY 0 Value	TY 0 SI	TY 1 Value	TY 1 SI	TY 3 Value	TY 3 SI			
V1	% Emergent	49	0.54	11	0.20	35	0.42			
V2	% Aquatic	0	0.30	0	0.30	0	0.30			
V3	Interspersion	%		%		%				
	Class 1		0.30	100	1.00	100	1.00	0	1	1
	Class 2							0	0	0
	Class 3	50						0.4	0	0
	Class 4	50						0.2	0	0
	Class 5									
V4	%OW <= 1.5ft	54	0.79	5	0.16	54	0.79			
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00			
V6	Access Value	1.00	1.00	0.00	0.10	1.00	1.00			
	Emergent Marsh HSI =		**0.64**	**EM HSI =**	**0.35**	**EM HSI =**	**0.62**			
	Open Water HSI =		**0.71**	**OW HSI =**	**0.27**	**OW HSI =**	**0.76**			

Project: Chaland Headland, BA-38, 11/24/03
FWP

Variable		TY 5 Value	TY 5 SI	TY 10 Value	TY 10 SI	TY 20 Value	TY 20 SI			
V1	% Emergent	56	0.60	74	0.77	70	0.73			
V2	% Aquatic	0	0.30	0	0.30	0	0.30			
V3	Interspersion	%		%		%				
	Class 1	75	0.90	70	0.88	65	0.86	1	1	1
	Class 2	25		30		35		0.6	0.6	0.6
	Class 3							0	0	0
	Class 4							0	0	0
	Class 5									
V4	%OW <= 1.5ft	58	0.85	63	0.91	60	0.87			
V5	Salinity (ppt)	17	1.00	17	1.00	17	1.00			
V6	Access Value	1.00	1.00	1.00	1.00	1.00	1.00			
		EM HSI =	**0.74**	**EM HSI =**	**0.85**	**EM HSI =**	**0.82**			
		OW HSI =	**0.75**	**OW HSI =**	**0.76**	**OW HSI =**	**0.75**			

AAHU CALCULATION - EMERGENT MARSH

Project: Chaland Headland, BA-38, 11/24/03

Future Without Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	152.7	0.64	96.98	
1	148.7	0.63	93.52	95.25
10	97.6	0.51	50.22	638.09
20	19.4	0.32	6.30	257.83
			AAHUs =	**49.56**

Future With Project			Total	Cummulative
TY	Marsh Acres	x HSI	HUs	HUs
0	153	0.64	96.98	
1	33.4	0.35	11.78	48.76
3	107.7	0.62	67.25	72.29
5	174.9	0.74	130.12	194.69
10	229.7	0.85	194.26	806.32
20	216.8	0.82	177.98	1860.66
			AAHUs	**149.14**

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Emergent Marsh AAHUs =	149.14
B. Future Without Project Emergent Marsh AAHUs =	49.56
Net Change (FWP - FWOP) =	**99.58**

AAHU CALCULATION - OPEN WATER

Project: Chaland Headland, BA-38, 11/24/03

Future Without Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	157.4	0.71	111.21	
1	161.4	0.71	114.19	112.70
10	212.5	0.71	150.36	1190.48
20	290.7	0.70	203.24	1769.11
			AAHUs =	153.61

Future With Project			Total	Cummulative
TY	Water Acres	x HSI	HUs	HUs
0	157	0.71	111.21	
1	7.8	0.27	2.08	45.68
3	64	0.76	48.54	41.41
5	66.6	0.75	50.27	98.81
10	80.4	0.76	60.95	278.01
20	93.3	0.75	70.32	656.46
			AAHUs	56.02

NET CHANGE IN AAHUs DUE TO PROJECT	
A. Future With Project Open Water AAHUs =	56.02
B. Future Without Project Open Water AAHUs =	153.61
Net Change (FWP - FWOP) =	**-97.60**

TOTAL BENEFITS IN AAHUs DUE TO PROJECT	
A. Emergent Marsh Habitat Net AAHUs =	99.58
B. Open Water Habitat Net AAHUs =	-97.60
Net Benefits= (3.5xEMAAHUs+OWAAHUs)/4.5	**55.76**

Project Information Sheet Format for Wetland Value Assessment

Final for Phase II Request: December 8, 2003

Project Name:
Pelican Island Restoration, BA-38

Project Type(s):
Barrier Island Restoration (dune creation, marsh creation, vegetative planting)

Sponsoring Agency:
National Marine Fisheries Service
Rachel Sweeney, Project Manager
Patrick Williams, Environmental and Engineering Workgroup representative
patrick.williams@noaa.gov; 225/389-0508

Project Area:
The project area is located between Fontanelle Pass (Empire Waterway) and Scofield Bayou along the Plaquemines Barrier Shoreline, in Plaquemines Parish, Louisiana. The project boundary extends from the Gulf shoreline to the -1.5 ft NAVD 88 depth on the bayside. The project area and associated habitat zones for Barrier Island WVA use is based on 2002 bathymetry and topography surveys. The total acreage is 359.8 acres with 0.1 acre of dune, 40.3 acres of supratidal, and 176.2 acres of intertidal habitat. See the revised project boundary/feature map.

Problem: Wetlands, dune, and swale habitats within the project area have undergone substantial loss due to oil and gas activities (e.g., pipeline construction), subsidence, sea-level rise, and marine and wind induced erosion. Coastal processes acting on the abandoned headland include rapid landward transgression and more recently breakup. Two locations on the island have breached with recent decrease in elevation and overwash. The UNO short term(1988 - 2000) land loss rate for Pelican Island which includes shoreline recession rates, averaged -20.79 acres per year or 4.36%. Relative sea level (RSL) rise is 0.61"/yr which includes subsidence.

Goals:(revised from original fact sheet and spring 2003 prioritization) Design approach is to maximize surface area per planform unit volume for island stabilization and dune, supratidal (i.e., swale), and intertidal marsh creation by preventing a breach with a 20-year or lesser storm event.

1. Nourish the gulf shoreline and create 57 acres of dune and 71 acres of supratidal habitat with sand and create 264 acres of back-barrier marsh platform settled to an elevation with unrestricted tidal exchange within three years after construction.
2. Nourish 36 acres of existing saline marsh with effluent discharge.
3. To establish marsh vegetation (both planted and natural colonization). There would be approximately 35% vegetation cover of the total subaerial acreage at the end of TY3 and 65% at the end of TY5.
4. Fill breaches, restore and create dune and marsh to increase island longevity and maintain integrity of the sub-reach.

5. Create 5.5 acres of tidal creeks with unimpeded tidal exchange by TY3.

Project Features:
Specific design details in addition to those listed below can be found in the 30% design report and the final plans and specifications. Also, see the draft revised boundary for the footprint and appended cross sections for general features.

Phase I Analysis - Design Alternatives
During Phase I, alternatives that were evaluated changed from those during Phase 0 (planning level). Alternatives for Pelican Island evaluated under Phase I include Alternative 1 (marsh only), Alternative 2 (seaward), and Alternative 3 (hybrid) (see Section 17.1 of the 30% design report). Crest width was varied to provide an overall island design volume greater than the required sediment budget values.

Preferred Alternative Proposed: Alternative 3 (Hybrid)
The following describes the construction template of the preferred alternative which includes advanced fill for initial consolidation. The construction template is higher and wider than the design template which addresses subgrade compression and RSL rise. Acres listed in this section are those as-built and reflect both constructed and existing.

Dune and Supratidal
As-built, 73.1 acres of dune would be constructed +6.0 ft NAVD with 237.5 acres from +2 ft NAVD to +5.9 ft NAVD 88 in foreshore and backshore slope. Note that these acreages will be substantially reduced between TY1 and TY3 due to advance fill included for diffusion and equilibration losses on the gulfside and compaction for the targeted marsh elevations. The dune crown averages approximately 280 ft. In comparison to phase 0, there no longer is an additional dune feature on top of a berm (which is now called the dune) because it was determined to be a sacrificial feature with construction difficulties. SBEACH modeling suggested that a sacrificial feature is not necessary to attain the no breaching design requirement.

Overtopping and post-storm dune elevation were selected as two criteria to evaluate performance of design alternatives for the dune cross-sections. Dune screening of overtopping suggested breaching could occur with a dune elevation of 4.1 ft or less and damage to landward structures with a dune of 7.3 ft or less. Based on the results from SBEACH modeling a minimum elevation of +6 ft NAVD was selected. A 1:45 foreshore and backshore slope was adopted based on the attained profile slope (for sand) as measured at the constructed Holly Beach project. Construction will be with semi-containment at the discretion of the contractor which will allow selective sorting of the placed material with the coarser sand remaining within the fill template. All dikes will be graded into the construction cross-section prior to fill acceptance. Sand (mean grain size of 0.11 to 0.12 mm with average percent silt from 9% to 13.7%) will be mined from Sandy Point, approximately 8 to 9.5 miles offshore Pelican Island. A vertical tolerance restriction of ± 0.5 ft will be allowed on the construction grade. A recent (9/03) design revision was made to include an additional 100,000 cyds of sediment placement to repair a breach at the eastern Empire jetty so the structure would not be stranded and the island could continue benefitting from trapping of sediment in the longshore drift.

Intertidal Elevations (marsh)
Approximately, 61.1 acres of marsh would be constructed (as-built construction grade) by an initial fill placement to +2.6 ft NAVD. Advanced fill is included in the construction grade to achieve settlement to the design grade resulting in 264 acres of intertidal marsh by TY3. The width of the marsh platform ranges from 600 ft to 1,000 ft wide. Surveys determined healthy marsh on Pelican Island to an average of +1.34 ft NAVD. Significant post-construction consolidation and dewatering are anticipated, and a final long term elevation of +1.5 ft NAVD is targeted. Evaluations on post construction elevation loss from dessication and consolidation by geotechnical evaluations of the borrow material and existing sediment in the disposal area determined a target initial fill elevation of +2.6 ft NAVD (i.e., construction grade). A vertical tolerance restriction of ± 0.3 ft will be allowed on the construction grade of +2.6 ft NAVD. The Empire borrow area primarily will be mined for the marsh fill material, although the overburden from Sandy Point may also be used. The mean grain size for the Empire borrow area ranges from 0.09 mm to 0.15 mm and is composed primarily of silts and fine clays. Geotechnical investigations of the disposal areas (i.e., marsh platform) also were conducted to more accurately estimate long term performance by evaluating subgrade consolidation under overburden of material to be placed.

Construction will employ complete confinement with primary and secondary (internal) dikes with the exception of the area to be nourished on the west end of the platform near the Empire Waterway. Nourishment will be achieved by less than 6-inches of fill placement from strategically locating a spill-box and managing discharge of effluent. *At the time of drafting this WVA, final design on this nourishment area was not complete and sediment volume discharged with effluent is unknown. Therefore benefits other than under the % vegetative cover variable will not be claimed.* Elsewhere, secondary dikes will be constructed at the discretion of the contractor. Gapping of existing spoil banks will be required during construction to allow adequate flotation access, distribution of fill material, and post construction tidal exchange within the constructed marsh.

Creation of tidal creeks will occur with differential settlement of fill material in the flotation canal (excavated to - 8 ft) and the existing pipeline canal. Additionally, specific tidal creeks will be pre-dredged to -9 ft towards the eastern end of the island. All creeks (including the flotation canal) will remain plugged during compaction and planting to allow stabilization. The constructed bayside containment dike will be breached no later than year three to establish tidal exchange at strategic locations including the constructed tidal creeks.

Sand Fencing
Sand fencing component consists of installing 27,300 ft of fencing along the dune crest concurrent with project construction and prior to final acceptance of the dune. Fencing will consist of two, shore parallel rows with no to minimal gaps. Any gaps will be staggered to minimize any gully formation from overwash as observed by DNR monitoring on other barrier island projects. Row layout will be based on dividing the dune with into approximate thirds to allow sufficient space for future fence rows to be installed during maintenance events without being in the wind shadow of the TY 1 fences (per S. Khalil at the 95% meeting. Fences will be constructed with wooden rather than steel posts to aid in maintenance and aesthetics. Fence will be installed approximately 6" off the ground to maximize trapping in front of the fence (per 95% meeting revision).

Planting

Planting of the dune and marsh platforms is planned to take place over three years. A portion of the dune plants would be installed during the Fall of the same year the project is being constructed to assist in sand trapping and retention with the sand fencing. The remainder of the dune plants and a portion of the marsh plants would be installed in the first year following construction. This time lag should allow for soil salinities to decrease provided there is adequate rainfall. All remaining marsh plants would not be installed two years after construction to allow for changes in elevations and shorelines from settlement and equilibration or erosion of the dikes. Dune plantings will consist of 4-inch containers of bitter panicum (Fourchon germplasm), gulf cordgrass, and marshhay cordgrass (some of which will be the recently released Gulfcoast cultivar), and gallon containers of seaoats (Caminada germplasm). Marsh plantings will consist of smooth cordgrass (Vermilion cultivar) multi-stem plugs, 4-inch containers of matrimony vine, and tube-tainers of black mangrove (Pelican).

The intent is to vegetate all available acreage in a somewhat uniform manner. The layout will be relatively uniform where the dune and marsh platforms are relatively uniform. Layout and density will be adjusted as needed for the tidal creeks. See the appendix for a draft plan on numbers of plants by species and unit for each platform. **Note: the planting plan was revised for the 95% meeting, but remains a draft (appended too). Although the revised plan includes a substantial increase in plants from the draft distribution of this document, these Final WVA estimates were NOT updated with the revised plan.**

Dune	Marsh
Bitter panicum - 4" Containers	Smooth cordgrass - plugs, Rows 10' apart, plants 5' o.c.
Gulf cordgrass - 4" Containers	Matrimony vine - 4" Container, Planted at foot of dune
marshhay cordgrass - 4" Containers	Black Mangrove - tube, Planted at higher areas
Caminada Seaoats - trade gallon	
Approximately 1027 plants/acre (75,000/73ac)	Approximately 754 plants/acre (199,000/264)

No CWPPRA projects are located within or nearby the project area at this time. The eastern Empire Waterway Jetty is located at the western limits of the project. That structure is aiding in trapping some of the longshore sediment and has maintained the shoreline to some degree. However, insufficient longshore sediment or the limited trapping efficiency of the leaky jetty has not allow sediment to accrete subaerially. Additionally, traditional end around scour plus recent overwash during 2003 has resulted in tidal exchange that is stranding the structure. Project design is being coordinated with Corps of Engineers Operations Division to maximize island longevity while preventing the risk of introducing too much sediment adjacent to the jetty that could migrate through the jetty into the Federally maintained navigation channel. Recent design revisions have been incorporated to close that breach.

Monitoring Information/Adaptive Management Recommendations:

Appended are tables on monitoring results for planting and sand fencing and a list of adaptive management recommendations provided by LDNR.

Fill Placement

Templates

too high or too low

Campbell and Benedet (2003a) found the long term volume estimates recommended with the design elevations and templates in the Barrier Shoreline Feasibility Study may be up to three times greater than what actually is needed based on overestimating the depth of closure for sand and use of overfill factors overestimated volumetric needs.

lower and wider

island width has been shown to be the critical factor in maintaining islands during overwash or inundation regimes caused by wave heights associated with Category 2 storms. Isle Dernieres - shown up to a one kilometer landward translation during the inundation event with Hurricane Andrew. (Sallenger et al. ?). If the priority is creating island area, the optimal template is wide and low (Campbell and Benedet 2003b).

CPE

SBEACH and post storm results
5', 1.49 overtopping cfs - breaching threshold
8', 0.56 overtopping cfs - damage to landward structures with 1.07 cfs
10', 0.1 overtopping cfs - dune damage

Achieving design elevations (vert. tolerance):

Both ± 0.5 ft and ± 0.3 ft have been used as vertical tolerance restrictions on dedicated dredging projects in Louisiana. More recently mitigation projects have used the tighter restriction with the trend to include tighter constraints being adopted by some CWPPRA projects. Project success has as much to do with compliance with these restrictions as it does establishment of a restriction.

Examples:

West Belle Pass Headland Restoration Lake Chapeau	failed to meet the final target elevations with portions of the fill areas subsiding/dewatering below the average water level
LaBranche, Port Fourchon mitigation, Big Island, and Isle Dernieres (portions of each)	final elevations exceeded the target elevations.
COE beneficial use	created large acreage of land with large percentages consisting of supra-tidal elevations (i.e., exceeded the desired environmental result (e.g., Grand Terre - areas have subsided to marsh elevation with intermixed bird “shell mounds”)
East Timbalier (TE-25/30)	marsh creation platform was within the target elevation of 2.0 ft NGVD ±0.75 vertical tolerance.

More recent focus has been on the optimal environmental functional performance for as long as possible without a maintenance lift. Settlement curves (borrow and file areas), subsidence rate, and sea level rise are thought to be the primary factors contributing to created platforms remaining above the mean low water line as long as possible. Campbell and Benedet (2003a) identify three modes of vertical adjustment that should be considered in design and construction: 1) initial consolidation (one to 12 months); 2) subgrade compression and settlement under overburden of placed material (10% to 20% consolidated overburden thickness occurring in one to five years); and 3) RSL rise. They suggest the concepts of design and construction templates. Design grade addresses compression and RSL rise and construction grade addresses intial consolidation. Construction templates will be higher and wider than the design grade and include advanced fill. They further recommend designing to achieve intertidal elevation at the midpoint of the project life.

Maintenance

Campbell and Benedet (2003b) recommends including project maintenance: 1) smaller volume on the beach-dune and 2) reconstructing the marsh areas that equal the deficit between volume and area loss due to erosion.

Plants

Based on monitoring to date on barrier islands constructed under CWPPRA, a substantial amount of time lapses prior to getting high percent vegetation cover from planting and/or natural colonization with few exceptions (Lee 2003). Mean percent cover observed on all Isle Dernieres projects from 1999 indicated less than 20% vegetation cover within 2 years suggests the Environmental Workgroup Standard of 25% credit within one year may not be valid. Note that the Isle Dernieres and East Timbalier projects represent the first funded and constructed barrier island projects under CWPPRA. Often funding was insufficient for planting all created acres or planting funds were absorbed into construction funds to get as much land as possible or to counter bids exceeding the government estimates. Since then, more accurate cost estimates have been prepared during phase 0 to allow planting all acreage as well as gaining a better understanding of the effectiveness of the past efforts through monitoring. However, numerous factors such as, planting species on improper elevations, drought, insufficient planting density, insufficient funding for planting, erosion, poor installation methods by contractors (e.g., plant with root ball exposed, install inferior plants), planting too soon after construction prior to settlement, are associated with poor plant survival and coverage.

Generally, including fertilizer is beneficial and can greatly improve vegetation success by creating a positive feedback loop improving survival, stress resistance, growth and spread and associated sand trapping (Campbell et al. 2003; Mendelssohn and Hester 1988). Planting contractors frequently indicate fertilization is not necessary based on observations of initial plant performance or tablet removal by sand crabs. The cost effectiveness of fertilization is unknown.

Campbell et al. (2003) offers a formula for vegetation restoration success.

Sand Fencing

Lee and Khalil 2003:

Shore Parallel – no gaps or smallest possible gaps
Multiple rows – during operation and maintenance phases, additional dunes should be built as a backup for the first dune. Studies recommended distance between 2 fences should be = 4x height of fence [Savage and Woodhouse 1969] which can be applied by dividing the dune crest into thirds for the TY1 construction for fence rows to allow room for maintenance rows.

Offset fence rows and use several rows of vegetation only for first (installed and gulfward most) dune to allow maximum trapping and stabilization prior to possible storm impacts.

all literature suggests shore parallel and straight fence design
substantial elevation gains possible in localized areas

Examples:
TE-20 fence section - dune accreted on southeast side of fence indicating northerly winds moving sand and deposit on southeast side

TE-20 Design - with large, non-shore parallel dunes, scouring (gullies) occurred indicating focusing of water during overwash and that dunes could not act as levees to storm waves

TE-20, TE-25, ... - angled fences (e.g., spurs etc) stacks sand in wrong place (not in position to provide sand to foreshore during storms) and does not provide continuous levee to protect back shore areas

<u>Performance Estimating</u>
A whole suite of standard and modern analytical models and engineering calculations are available for evaluating project performance. Those used identify that the standard Environmental Workgroup practice of solely using shoreline recession rates and applying some reduction of the FWOP rate for the FWP is not accurate. Similarly, design performance estimates based on historical retreat rates related to volumetric losses overestimate the time to disappearance (Campbell and Benedet 2003a). FWP loss rates are higher due to recession including diffusion and equilibration losses. Similar differences in with and without losses occur applying an area loss rate verses a shoreline erosion rate. The area loss rate determined from aerial infrared imagery, includes shoreline erosion and interior loss in addition to or combination with RSL rise.

In an acreage sense, losses due solely to bayside erosion should be small. There is still recession of the shoreline on the bay side but it is a function of RSL sea level rise (including subsidence) and can be used for acreage projections by applying RSL rise to accurately surveyed elevations in lieu of a linear application of an erosion rate to a measured shoreline length (Mike Jenkins, Personal Communication).

Site Characteristics
Soil types in the project area:
Based on soil survey data from the Natural Resources Conservation Service, the project area consists

of Felicity loamy fine sand (frequently flooded) and Scatlake muck.

Survey data from the fall of 2002 was used to determine area within the dune ($\geq$ 5 ft. NAVD88), supratidal (2.0 ft. NAVD88 to 4.9 ft. NAVD88), intertidal (0.0 ft. NAVD88 to 1.9 ft. NAVD88), and subtidal habitats. *Engineering and agency inspections and limited re-surveying in 2003, have verified some changes in elevation and alignments including breaches of the shoreline near Scofield Bayou.*

Analyses Conducted:

Volumetric and planform performance were evaluated from sediment budgets calculated including RSL rise (i.e,. eustatic change and subsidence), aeolian transport, overwash, and longshore transport (Section 8.1 30% Design Report). Specific modeling conducted included SBEACH (cross shore), CEDAS-ACES (fetch limited wave analysis of back bay erosion), GENESIS (longshore), STWAVE (borrow area focused only), RCPWAVE (wave refraction module of GENESIS i.e., in combo with entire island). SBEACH model was calibrated for Pelican Island using pre and post Hurricane Lili and Isidore survey data taken on September and December 2002, respectively. See both the March 2003 Technical Memorandum (Spadoni et al. 2003) and 30% Design Report for model theory and input values. Historic shoreline erosion (i.e., representing a range of storms) was applied annually as part of the SBEACH model runs prior addition to synoptic storm events plus deflation from RSL rise. Overwash rates were annualized and also include in SBEACH (Table 3, 30% Design Report). Diffusion and equilibration losses were calculated and applied to the proposed post-construction planform to determine primary post project performance.

See the document titled, "Appendix A, Assessment of Planform Performance" (amendment to 30% Design Report Appendix H) (Jenkins and Day 2003a) and work product titled, "Assessment of Project Planform Performance, Update on Reported Values Based on Revised Permit Design, 10/28/03" (Jenkins and Day 2003b). These two documents include the revised FWOP and FWP planform performance based on all analytical methods completed. Surfer 8.0 was used to map the elevational changes. Note that sediment volumes may be relocated within the project area while not resulting in net acreage changes within Barrier Island WVA defined elevation ranges (i.e., volumetric and area changes not equivalent). Also, recession rates FWP are higher than FWOP. See Tables 5 (Jenkins and Day 2003b) for retreat rates derived from SBEACH and GENESIS modeling applied with and without the project.

General Barrier Island WVA Assumptions:

1. Assumes December 2002, elevations and area as baseline.
2. healthy RSL rise 0.61"/yr; subsidence 0.35"/yr is included in RSL rise- falls within trends – see 30% report

    at TY 3, 5, 10, and 20 the grids for elevation were lowered 0.15, 0.26, 0.51, and 1.02 ft, respectively for both FWOP and FWP (See page A-4, Appendix A, Assessment of Planform Performance (Jenkins and Day 2003a).
3. FWOP - 11.8'/yr retreat*

    FWP - 13.9'/yr retreat* - higher rate due to diffusion and equilibration losses

    "*" denotes retreat rates derived from numerical modeling-(Table 7 in Jenkins and Day 2003b)

4. See acreage data listed in Table 6 of Jenkins and Day (2003b), based on modeling and RSL rise adjustments
5. FWOP - only TY1, TY10, and TY20 needed
6. FWP
   - TY3 - dune equilibration + diffusion + retreat; consolidation occurs by TY3 for marsh platform (10/28/03, Report)
   - TY5 - is included solely for percent vegetation variables.
   - TY10- year 10 includes a synoptic, 10-yr storm event + 10 years of retreat as determined by GENESIS and SBEACH.
   - TY20- year 20 includes a synoptic, 20-yr storm event + 10 years of retreat as determined by GENESIS and SBEACH.

Variable V_1 - Percent of the total subaerial area that is classified as dune habitat.

FWOP
Note: data is not rolled forward at all. Is based on 2002 survey data taken in September and updated with a partial survey in December. Since authorization and previous evaluation in 2001, tropical events have resulted in the continued decrease in average elevation of the shoreline (with losses of up to 2 ft), narrowing and rollback of the shoreline, and breaching near Scofield Bayou and the eastern Empire Jetty.

TY0 0.1/216.5 = 0%
TY1 - TY20 0%

FWP
The construction template is robust enough to address additional losses from December 2002 to the planned 2004 construction, as being verified with spot re-surveying taken in the fall of 2003. Use of 2002 data for baseline allows for a conservative estimate of benefits because decrease in acreage and habitat types from decreasing elevations during the 2003 are not captured FWOP, but are addressed by the design FWP.

Applied annual changes due primarily to retreat rates derived from modeling and deflation from RSL rise; retarded overwash in short term with the selection of +6 ft dune height.

At the recommendation of CPE, no claim of credit for aeolian transport (gain or losses), trapping from sand fencing and vegetation that could offset some of the short term RSL losses. The amount of acreage shifts from aeolian transport relative to the overall acreage would be negligible. Sand fences will be built in accordance to standard guidelines and adaptive management findings to maximize trapping. Although acreage may be negligible, fences with a 50% porosity (4 ft high)

TABLE 6 (Jenkins and Day 2003b)

WETLAND VALUE ASSESSMENT, PELICAN ISLAND, LA

OCTOBER 2003 PERMIT DESIGN

	WITHOUT-PROJECT CONDITIONS (9/2002)	WITH-PROJEC

NAVD ELEV. (feet)	Acres at elevation within fill area & canal area at year ……						Acres at elevation within fill area & canal area at year ……					
	0	1	3	5	10	20	0	1	3	5	10	20
> +5' Dune	0.1	0.0	0.0	0.0	0.0	0.0	0.1	73.1	57.1	41.1	16.9	0.0
+2' to +5' Supra	40.3	31.8	25.0	14.8	0.0	0.0	40.3	273.5	71.2	72.3	75.6	51.1
0' to +2' Intertidal	176.2	165.2	165.2	158.5	130.8	43.8	176.2	61.1	263.8	263.1	260.4	246.9
< 0'	271.9	291.5	298.3	315.2	357.7	444.7	271.9	80.9	96.5	111.9	135.7	190.5
Subaerial land	216.5	197.0	190.2	173.3	130.8	43.8	216.5	407.7	392.1	376.1	352.9	298.0
-1.5 to 0 (marsh only)	127.2	138.1	138.1	143.8	153.6	132.4						
<-1.5 and -1.5 to 0' (marsh only)	143.3	159.7	160.0	170.4	195.5	247.7	143.3	12.9	15.1	17.7	25.2	47.5

NOTES:
1. The fill area includes 5.51 acres of tidal creeks within the marsh platform and the 36.4 acre discharge area.
2. The with-project conditions assume that the amount of fill in the discharge area is negligible.
3. With-project conditions assume the tidal creek elevations to be below 0' NAVD.

usually fill to capacity within 1-2 years as observed on Trinity TE-24 (shore parallel fence) and isolated location on East Island TE-20 (Khalil and Lee 2003; Lee and Khalil 2003).

TY1 - An initial 73.1 acres of dune would be constructed at +6 ft NAVD.

73.1/407.7 = 18%

TY3 - equilibration + diffusion+ retreat; note: based on use of quality sands used to construct the beach, little consolidation is expected as indicated by the little difference between the construction and design template sections (representative section view appended)
57.1/392.1 = 15%

TY5 - is included solely for percent vegetation variables.
41.1/376.5 = 11%

see above under General Barrier Island WVA Assumptions for TY10 and TY20
TY10 16.9/352.9 = 5%
TY20 0/298 = 0%

Variable V_2 - Percent of the total subaerial area that is classified as supratidal habitat.
FWOP
Based on modeling results and application of RSL rise, no supratidal would remain after TY10 due to recession and flattening with overwash.

TY0 40.3/216.5 = 19%
TY1 31.8/197 = 16%
TY10 0/130.8 = 0%
TY20 0/43.8 = 0%

FWP
TY1 237.5/407.7 = 67%
TY3 71.2/392.1 = 18%
TY5 72.3/376.1 = 19%
TY10 75.6/352.9 = 21%
TY20 51.1/298 = 17%

The large amount of losses from TY1 and TY3 are associated with diffusion and equilibration losses of the gulfside slope of the dune and compaction of the advanced fill in the marsh platform that falls within the supratidal elevations ranges defined in the Barrier Island WVA.

In TY3 - TY20, gains or losses within the +2' to +5' range from aeolian transport and trapping with vegetation are negligible within this broad range in terms of gross acreages and overriding cross shore (e.g., overwash) and RSL rise processes. Supratidal acreages remain fairly constant from TY3 - TY10 due to the majority of the acreage being at the upper end of the +2' to +5' range. Elevations at the upper end of the range allow overwash consistent with historic geomorphological processes in Louisiana.

Variable V_3 - Percent of the total subaerial area that is classified as intertidal habitat.

FWOP
Losses included were attributed to RSL rise.
TY0 176.2/216.5 = 81%
TY1 165.2/197 = 84%
TY10 130.8/130.8 = 100%
TY20 43.8/43.8 = 100%

FWP
TY1 61.1/407.7 = 15%
TY3 263.8/392.1 = 67%
TY5 263.1/376.1 = 70%
TY10 260.4/352.9 = 74%
TY20 246.9/298 = 83%

Per Jenkins and Day (2003b), the marsh platform includes 5.51 acres of tidal creeks and 36.4 acre discharge area receiving effluent.

Assume
1. tidal creek elevations to be below 0' NAVD
2. Amount of fill in the discharge area receiving effluent is negligible (i.e., no initial elevation change)
3. Compaction and RSL rise were the only bay-side losses applied.
4. The containment diking will be left in place post construction (with gapping at TY3).

Diking should limit the amount of erosion on the bay side constructed marsh until colonized by vegetation. In an acreage sense losses due solely to erosion should be small. There is still recession of the shoreline on the bayside but it is a function of subsidence and relative sea level rise and is included within the acreage estimates. Within a 20-yr project life, overwash onto the bayside resulting in shoaling or accretion into the intertidal range does not occur (Mike Jenkins, Personal Communication).

Note the large change in marsh acres between TY1 and TY3 is based on the advanced fill in the construction template to account for consolidation down to the design elevation.

Variable V_4 - Percent vegetative cover of dune, supratidal, and intertidal habitats.
FWOP
Historical
In 2001, emergent wetlands in the project area primarily were vegetated by smooth cordgrass, black mangrove, and salt grass. The barrier shoreline including the dune and supratidal elevations was vegetated by marshhay cordgrass, substantial amounts of roseau cane and marsh elder. Substantial denuding of the gulf shoreline occurred in locations since 2001 due to tropical storms. Most noticeably is the reduction in amount of roseau cane and the continued retreat of the gulf shoreline leaving exposed stubble and organic soils in the surf zone.

FWOP

TY0 88% Best estimates based on recent aerial infrared photography and September 23/24, 2003, site visit: about 11% of the existing subaerial area is barren (washover flats, beach) and 88% is vegetated with dune or marsh vegetation

TY1 88%

TY10 75% Note that no supratidal elevations remaining, only intertidal. Majority of intertidal is vegetated, overwash flats, or denuded organics with stubble in the swash zone.

TY20 75%

Similar to the Env Wg adopted standard of showing a decreasing percent cover trend toward TY20. Modeling shows that all remaining elevations are intertidal. By TY20 the majority of sand will be lost from the island with no noticeable overwash flats and only denuded organics with stubble (i.e., similar the field observations of the headland west of the Empire Jetties during the Shell Island WVA inspection in 2002). No rebound in percent cover is expected at TY20 due to the occurrence of the TY20 storm event.

FWP

Note: for the 95% design meeting, but after release of the draft version of this document, the planting plan was revised increasing the planting density. The following remains consistent with the earlier draft and does NOT include the increased number of plants. This should result in a conservative estimate of benefits. Both the draft and redrafted planting plans are appended.

TY1 7%

(25%)(75,000 plants) = 18750 plants/1027 plants/acre + nourish area
[(0%)(18ac) + (80%)(36.4)]/407.7 = 7%

Assume:

1. No coverage claimed for planted acreage because only 25% of dune plants installed in TY1 @ a moderate density of approximately 1027/acre (acres based on TY1).
2. Burial and associated plant mortality is expected to be minimal. Therefore, 80% cover for "nourished area" because method of nourishment is not via direct discharge from a dredge pipe; rather, effluent will be discharged from a spill box (i.e., decant). Represents a 30% increase over the standard workgroup assumption used for nourishment via direct discharge.

TY3 35%

[(50%)(73 ac) + (100%)(36.4 ac) + (100%)(66)]/392.1 = 35%

Assume:

1. 25% of plants installed in TY1 and 75% in TY2. Only 50% credit of dune acres applied. Assumed some natural colonization. A portion of the 73 will be eroded by TY3, but plant species are appropriate for supratidal elevations.
2. No credit for 91.8 acres (57.1 + 71.2 -50% of 73 ac) of dune/supratidal

remaining at TY3 due to insufficient number of plants in the October 7, 2003, draft planting plans in the appendix. *Note the insufficient number of plants may be an oversight and potentially will be corrected to the maximum extent allowable by the phase 0 planting budget and during installation layout (i.e., additional funds will not be requested for more plants).*

3. 100% credit for nourish area due to enhanced nutrients and thin layer placement.
4. 100% credit for acres of marsh planted in TY2; 25% of marsh plants installed in TY2 at a "low" density of 754 plants/acre [(25%)(199,000 plants)/754 = 66ac](10 ft o.c. and 5 ft apart) + natural recruitment (possibly some from buried plants within the construction footprint).

TY5 65%

(65%)(73ac) + (25%)(40.4) + (100%)(36.4) + (66%)(263.8 - 36.4)/376.1 = 65%

Assume:

1. 65% credit of dune/supratidal (73 acres)
2. 25% credit of remaining dune/supratidal due to natural colonization.
3. 100% credit of nourished area
4. 66% credit for marsh platform (assumed roughly a 1/3 credit per year)- 75% of marsh platform planted in TY3. Based on using organic sediment and allowing the platform to compact prior to planting, the density of plants/acre, and natural recruitment, success should mimic that observed on Grand Terre (BA-28) (Campbell and Benedet 2003a). Note: similar credit would result if weighted: e.g., assign 100% credit for 25% of acres and 50% credit for the rest)
5. Based on Lee 2003, there has been substantial time delays to achieve low levels of plant coverage on CWPPRA barrier island projects.

TY10 65%
TY20 65%

Variable V_5 - Percent vegetative cover by woody species.
In 2001, woody vegetation in the project area included marsh elder, wax myrtle, and other woody vegetation primarily located at the western end of the island on spoil banks.

FWOP

TY0 Of the vegetated subaerial area, about 1% could meet the criteria for woody vegetation (based on September 2003, field inspection)

TY1 - TY20 1% Although no dune and supratidal beginning at TY10, marsh elder could persist on portions of the higher, remaining intertidal marsh.

FWP

TY1 - TY5	1%	some woody remaining closer to the jetty and on portions of spoil that will not be gapped at the western end of the pipeline canal. Assumption: Only 3,000 mangrove plants installed (< 1 acre) at TY3
TY 10	4%	Based on existing and natural recruitment on the substantial dune and supratidal elevations.
TY20	2%	Based on elimination of dune and decreasing acreage within the supratidal elevation range.

Variable V_6 - Edge and interspersion.
In 2001, the Environmental Workgroup classified the area as 20% Class 2 and 80% Class 3. Erosion, flattening, and breaching has occurred since then.

FWOP
(Note: TY0 -TY10 are the same values proposed in the 2001, Barrier Island WVA)

TY0 20% - Class 2; 80% - Class 3
216.6 land/143.3 water = 60%
40.4 (dune and supratidal)/359.9 = 11%

TY1 20% - Class 2; 80% Class 3
197 land/ 159.7 water = 55% land
approximately a 9% decrease in land vs TY0

TY10 10% - Class 2; 40% - Class 3; 50% Class 4
130.8 land/195.5 water = 40% land
approximately 40% decrease in land vs. TY0

TY20 10% - Class 3; 90% - Class 4
43.8 land/247.7 water = 15% land
approximately 80% decrease in land vs TY0
the only TY representing changes from the 2001, Barrier Island WVA assumption

FWP
TY1 100% - Class 3

i.e., confined carpet marsh similar to Grand Terre COE disposal with the exception of 12.9 acres of water in the tidal creeks contained in the project area. However, fish access will be prevented by the plugs remaining until gapped in TY3.

TY3 - TY5 100% - Class 1 Differential settlement will allow tidal ponds to develop in addition to the constructed creeks.

TY10 60% - Class 1; 40% - Class 2
352.9 land/ 25.2 water = 93% land

TY20 75% - Class 2; 25% - Class 3

298 land/47.5 water = 86% land
(Used 80% - Class 2; 20% - Class 3 in the 2001, Barrier Island WVA)

Variable V_7, Beach/Surf Zone Features
FWOP and FWP - 100% Class 1; unconfined natural beach with no shore parallel structures. Containment built for construction will be graded into the template for a more natural slope as-built.

Project Area (including subtidal -1.5 ft to 0 ft NAVD)

FWOP
FWP
Based on the project design and estimated performance, sediment losses bayward from overwash during the 20-year project life are insufficient to increase the subtidal acreage. Therefore, the future with project area is equivalent to the construction footprint. There is water <-1.5 ft NAVD retained in the project boundary because it is located within the marsh platform and is not open water "around" the island. These deeper water areas include portions of the pipeline canal FWOP and the tidal creeks FWP as referenced in the model. Water acres listed below and Table 6 obtained by subtracting out the gulfside water found in Tables 8 and 9 (Jenkins and Day 2003b).

NAVD ELEV. (feet)	WITHOUT-PROJECT CONDITIONS Acres at elevation within fill area & canal area at year ……				WITH-PROJECT CONDITIONS Acres at elevation within fill area & canal area at year ……					
	0	1	10	20	0	1	3	5	10	20
Land (dune, supra, inter)	216.5	197	130.8	43.8	216.5	407.7	392.1	376.1	352.9	298
<-1.5 and -1.5 to 0' (marsh only)	143.3	159.7	195.5	247.7	143.3	12.4	15.1	17.7	25.2	47.5
Total Acres	359.8	356.7	326.3	291.5	359.8	420.1	407.2	393.8	378.1	345.5

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Appendix

PELICAN ISLAND
AND
PASS CHALAND TO PASS LA MER (BA-38)
VEGETATION PLANTINGS
7 OCTOBER 2003

DRAFT DRAFT DRAFT DRAFT DRAFT DRAFT

Preliminary Planting Schedule

Pelican Island

Dune Planting: Based on 15,000 l.f. dune, approximately 210-280 feet wide with two parallel sand fences on the dune.

Bitter Panicum	60,000	4" Containers, 20 Rows
Gulf Cordgrass	10,500	4" Containers, 3.5 Rows
Spartina patens	3,000	4" Containers, 1 Row
Sea Oats	1,500	Gallon, .5 Row

Marsh Planting: Based on 220 acres of created marsh, with tidal creek features.

Spartina alterniflora	190,000	Plugs, Rows 10' apart, plants 5' o.c.
Matrimony Vine	6,000	4" Container, Planted at foot of dune
Mangrove	3,000	Tube, Planted at higher areas

Pass Chaland to Pass La Mer

Dune Planting: Based on 15,000 l.f. dune, approximately 210-280 feet wide with two parallel sand fences on the dune.

Bitter Panicum	60,000	4" Containers, 20 Rows
Gulf Cordgrass	10,500	4" Containers, 3.5 Rows
Spartina patens	3,000	4" Containers, 1 Row
Sea Oats	1,500	Gallon, .5 Row

Marsh Planting: Based on 248 acres of created marsh, with tidal creek features.

Spartina alterniflora	215,000	Plugs, Rows 10' apart, plants 5' o.c.
Matrimony Vine	6,000	4" Container, Planted at foot of dune
Mangrove	3,000	Tube, Planted at higher areas

PELICAN ISLAND
AND
CHALAND HEADLAND TO PASS LA MER (BA-38)
VEGETATION PLANTINGS
(12/4/03 - 95% Design Meeting)

DRAFT DRAFT DRAFT DRAFT DRAFT

DRAFT BUDGET

PELICAN ISLAND

307,500 PLANTS	$1,085,000
Inspector 100 @ $850/day	(7.8%) 85,000
	$1,170,000

CHALAND HEADLAND

303,600 PLANTS	$1,165,800
Inspector 100 @ $850/day	(7.3%) 85,000
	1,251),800

WORKSHEET

PELICAN ISLAND

Dune:
12,500 If, 2,500 plants per row. Plants 5 ft on center, rows 15 ft on center
27,300 If sand fencing

1 row Salt Grass	2,500
1 row Matrimony Vine	2,500
1 row Black Mangrove	2,500
12 rows Bitter Panicum	30,000
8 rows Marshhay Cordgrass	20,000
7 rows Gulf Cordgrass	17,500
	75,000 x $5/plant = $375,000
1 row Sea Oats	2,500 x $8/plant = $20,000

Marsh:
Plants 5 ft on center, rows 10 ft on center, 264 acres
230,000 Smooth Cordgrass plugs $3/plant = $690,000
Total Pelican Island: 307,500 plants, $1,085,000

CHALAND HEADLAND

Dune:
13,0001f, 2,600 plants per row. Plants 5 ft on center, rows 15 ft on center 29,900 If sand fencing

1 row Matrimony Vine	2,600
1 row Salt Grass	2,600
1 row Black Mangrove	2,600
17 rows Bitter Panicurn	44,200
8 rows Marshhay Cordgrass	20,800
7 rows Gulf Cordgrass	18,200
	91,000 x $5/plant = $455,000
1 row Sea Oats	2,600 x $8/plant = $20,800

Marsh:
Plants 5 ft on center, rows 10 ft on center, 264 acres
230,000 Smooth Cordgrass plugs @ $3/plant = $690,000
Total Chaland Headland: 323,600 plants, $1,165,800

Monitoring of Barrier Island Vegetative Plantings

Project	1 yr Post Construction	2 yrs Post Construction	3 yrs Post Constru
Queen Bess (BA-05b)	28% 8 months after construction		
East Timbalier (TE 25/TE-30)	<5% 10 months after construction with no plantings (excluding DARP plantings)		
Chandeleur PO-27	6 inches lateral in 6 months		
Whiskey TE-27			
East TE-20			

Trinity TE-24				
Grand Terre BA-28				
Grand Terre NRCS Field Trials	No reports completed thus far (brown marsh, aerial seeding) smooth cord at different elevations - couple of field releases expected this winter			
East Timbalier GH DARP				Cell 1 5 years <50% 7 years 75% of cell eroded Cell 2 5 years >80% cover
East Timbalier Texaco DARP	greater than 75% survival of smooth cordgrass 5 months post planting, plugs on 5-ft and 3-ft centers			
Timbalier (LSU/Texaco)	*S. alterniflora* 81.6% survival 17.2% cover after 14 months -transplants on 0.5-m spacing -lateral spread not measured -substantial herbivory impacts after 14 months		*S. patens* 43.8% 46 months after planting transplants on 1-m centers	

Trinity (LSU)*		High Overwash- (up to 100 cm) 75% cover Medium Overwash- (25-35 cm of sand) 30% 29 months post impact Low Overwash- (<10 cm of sand) 25% 29 months post impact both *S. alterniflora* and *S. patens*		
Galveston Island	24 ft and 36 ft spacings had 50% less cover than 3, 6, and 12 ft spacings	60% cover with no sign diff for 3 ft, 6 ft, 12 ft, 24 ft, and 36 ft spacings and no sign diff between single stem sprig, peat pot and one gallon containers		

Adaptive Management Recommendations from DNR
Adapted from data and presentations provided by Darin Lee

Design Template

1) What good is a large dune that is not shore parallel and allows areas to overwash with possible increased energy focus in certain areas?
2) What good is reservoir of sand that is not available to supply the foreshore (large dunes along backside)?
3) What good is a dune that does not act like a "levee" to backshore areas?

Plants

) Change design so that rows are shore parallel only
2) Use vegetation only on initial foredune to establish dune, but plant heavily to provide cover quickly
3) Spartina patens appears only successful on backside swale and should be limited to that area
4) Spartina alterniflora should only be planted after backside has time to adjust after pumping
5) Add organics/clays to provide nutrients to soils in limited cases

Vegetation

More, more, more - insufficient density on past projects
planting efficiency
add species for diversity and stabilization (3)
timing – give sand time to adjust before planting
Species – variety
Location

Fences

- Fences have two initial advantages over planting: 1) it can be installed during any season; 2) fence is fully effective as sand trap from the moment it is installed
- Fences are very effective in trapping windblown sand but once the fences are filled these fences have little or no effect on sand movement
- Fence built dunes must be stabilized (with vegetation) or will deteriorate and release sand
- Construction of dunes with fences alone is only the first step in a two-phase process
- Sand Fences Work But???? : need shore parallel fences only, need no gaps; need to consider sand sources from North; need to consider maintenance/biodegradable materials; Timing installation as soon after sand fill placement as possible; Orientation should be shore parallel; Design/Location - spacing should allow for maximum trapping and future maintenance installation; Source of Sand is not just from Beach - determined predominant wind directions which move sand are from the Bay and not the Gulf

- Shore Parallel – gaps should only be left if can't fence whole length (smallest possible gaps)
- Multiple rows – build additional dunes as backup for first dune 2 to 3 rows if possible (studies indicate
- Recommended distance between 2 fences should be = 4x height of fence [Savage and Woodhouse 1969])
- Offset fences and use several rows of vegetation only for first dune building to allow first fence to build and stabilize before possible impacts.

- Timing – since sand moves from the North. Best if we can build Gulfward fence and then wait for it to fill so that 2nd dune fence does not capture all the sand

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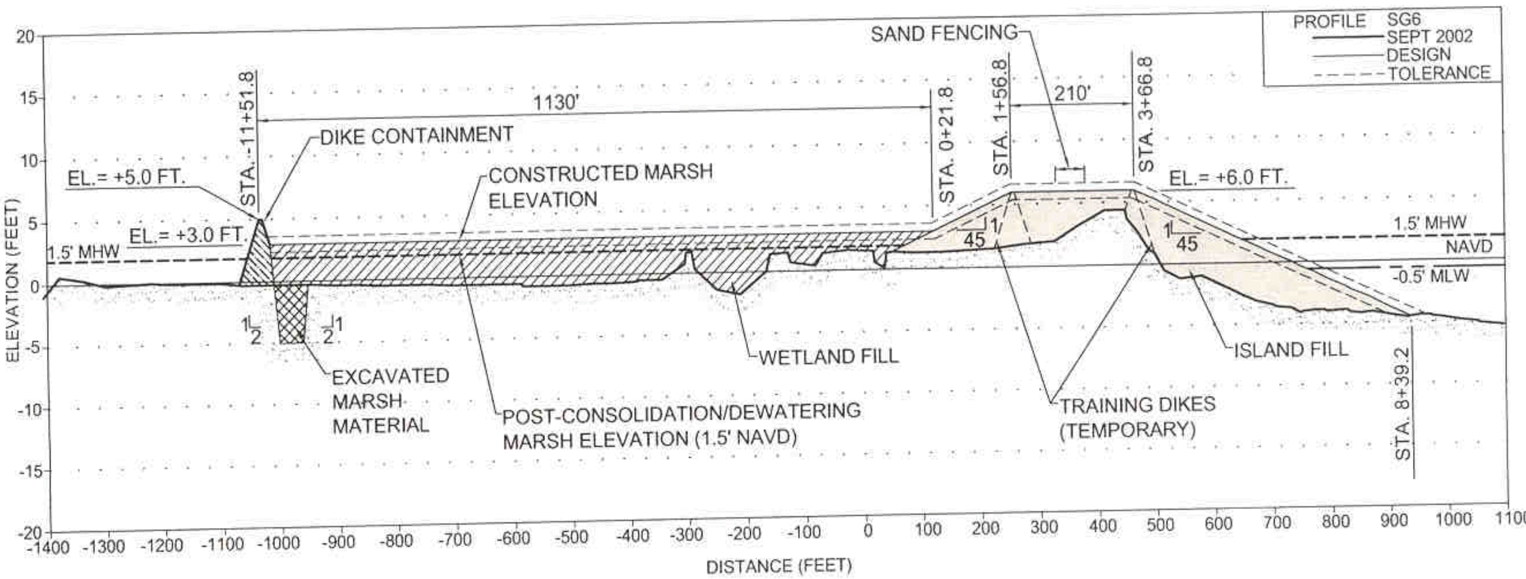

LEGEND:

- DENOTES WETLAND FILL
- DENOTES ISLAND FILL
- DENOTES DIKE CONTAINMENT
- DENOTES EXCAVATED MARSH MATERIAL TO BE USED FOR DIKE CONTAINMENT

NOTE:

1. ELEVATIONS SHOWN HEREON ARE IN FEET BASED ON NAVD 1988.

SCALE: 1"= 300' HORIZONTAL
1"=15' VERTICAL

REVISIONS		
DATE	BY	DESCRIPTION
9/2/03	TW	DESIGN, CANAL, TITLE AND SECTIONS
9/16/03	TW	PLAN VIEWS AND SECTIONS

DATE: 7/29/03
BY: RC
COMM NO.: 7261.07
SHEET: 8

COASTAL PLANNING & ENGINEERING, INC.
www.CoastalPlanning.net
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PH. (561) 391-8102 FAX (561) 391-9116

TITLE:
PELICAN ISLAND RESTORATION (BA-38-1) CWPPRA PROJECT BEACH FILL CROSS SECTION SG6

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Island

Project: Pelican Island, BA-38, 11/24/03

Condition: Future Without Project

Variable		TY 0 Value	TY 0 SI	TY 1 Value	TY 1 SI	TY 10 Value	TY 10 SI			
V1	% Dune	0	0.10	0	0.10	0	0.10			
V2	% Supratidal	19	0.96	16	0.82	0	0.10			
V3	% Intertidal	81	0.67	84	0.58	100	0.10			
V4	% Vegetative Cover	88	0.90	88	0.90	75	1.00			
V5	% Woody Cover	1	0.19	1	0.19	1	0.19			
V6	Interspersion	%	0.64	%	0.64	%	0.52			
	Class 1							0	0	0
	Class 2	20		20		10		0.8	0.8	0.8
	Class 3	80		80		40		0.6	0.6	0.6
	Class 4					50		0	0	0.4
	Class 5									
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00			
		HSI =	0.657	HSI =	0.622	HSI =	0.442			

Project....... Pelican Island, BA-38, 11/24/03

FWOP

Variable		TY 20 Value	TY 20 SI	TY Value	TY SI	TY Value	TY SI			
V1	% Dune	0	0.10							
V2	% Supratidal	0	0.10							
V3	% Intertidal	100	0.10							
V4	% Vegetative Cover	75	1.00							
V5	% Woody Cover	1	0.19							
V6	Interspersion	%	0.42	%		%				
	Class 1							0	0	0
	Class 2							0	0	0
	Class 3	10						0.6	0	0
	Class 4	90						0.4	0	0
	Class 5									
V7	Beach/surf Zone	1	1.00							
		HSI =	0.427	HSI =		HSI =				

WETLAND VALUE ASSESSMENT COMMUNITY MODEL
Barrier Island

Project: Pelican Island, BA-38, 11/24/03

Condition: Future With Project

Variable		TY 0		TY 1		TY 3				
		Value	SI	Value	SI	Value	SI			
V1	% Dune	0	0.10	18	0.89	15	1.00			
V2	% Supratidal	19	0.96	67	0.60	18	0.91			
V3	% Intertidal	81	0.67	15	0.10	67	1.00			
V4	% Vegetative Cover	88	0.90	7	0.20	35	0.58			
V5	% Woody Cover	1	0.19	1	0.19	1	0.19			
V6	Interspersion	%	0.64	%	0.60	%	1.00			
	Class 1					100		0	0	1
	Class 2	20						0.8	0	0
	Class 3	80		100				0.6	0.6	0
	Class 4							0	0	0
	Class 5									
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00			
		HSI =	0.657	HSI =	0.474	HSI =	0.823			

Project....... Pelican Island, BA-38, 11/24/03

FWP

Variable		TY 5		TY 10		TY 20				
		Value	SI	Value	SI	Value	SI			
V1	% Dune	11	1.00	5	1.00	0	0.10			
V2	% Supratidal	19	0.96	21	1.00	17	0.87			
V3	% Intertidal	70	1.00	74	0.88	83	0.61			
V4	% Vegetative Cover	65	1.00	65	1.00	65	1.00			
V5	% Woody Cover	1	0.19	4	0.46	2	0.28			
V6	Interspersion	%	1.00	%	0.92	%	0.75			
	Class 1	100		60				1	1	0
	Class 2			40		75		0	0.8	0.8
	Class 3					25		0	0	0.6
	Class 4							0	0	0
	Class 5									
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00			
		HSI =	0.913	HSI =	0.914	HSI =	0.679			

AAHU CALCULATION

Project: Pelican Island, BA-38, 11/24/03

Future Without Project			**Total**	**Cummulative**
TY	**Acres**	**x HSI**	**HUs**	**HUs**
0	359.8	0.657	236.22	
1	356.7	0.622	221.98	229.08
10	326.3	0.442	144.22	1639.71
20	291.5	0.427	124.47	1342.61
			AAHUs =	**160.57**

Future With Project			**Total**	**Cummulative**
TY	**Acres**	**x HSI**	**HUs**	**HUs**
0	359.8	0.657	236.22	
1	420.1	0.474	198.92	219.41
3	407.2	0.823	335.13	535.55
5	393.8	0.913	359.42	694.95
10	378.1	0.914	345.43	1762.15
20	345.5	0.679	234.70	2887.92
			AAHUs	**305.00**

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	305.00
B. Future Without Project AAHUs =	160.57
Net Change (FWP - FWOP) =	**144.43**