

TE-47- Ship Shoal: Whiskey West Flank Restoration

CWPPRA
Ship Shoal: Whiskey West Flank
Restoration (TE-47)
Phase II Request

Technical Committee Meeting

December 6, 2006

New Orleans, LA

Project Overview

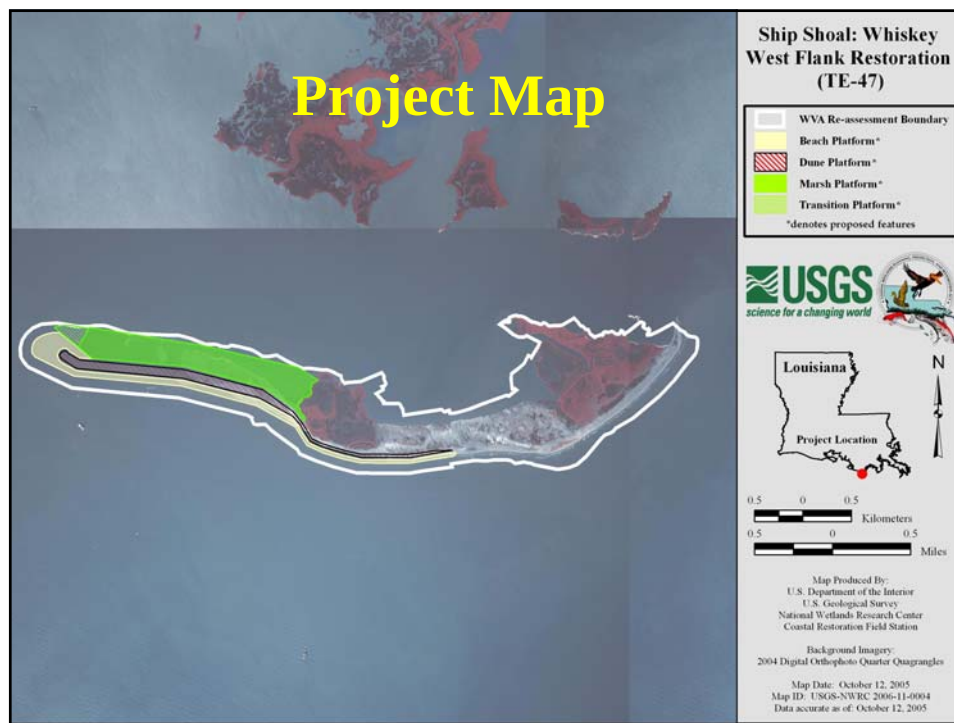
Project Location: Region 3 - Terrebonne Basin, Terrebonne Parish, west spit area Whiskey Island.

Problem: The Isles Dernieres Chain, which has been considered one of the most rapidly deteriorating barrier shorelines in the U.S., is losing its structural framework functions for the coastal/estuarine ecosystem including storm buffering capacity and protection for inland bays, estuary and wetlands, human populations and infrastructure. Whiskey Island changes from 1978 to 1988 include loss of 31.1 acres per year.

Project Overview (cont.)

Goals:

- Demonstrate feasibility of mining Ship Shoal
- Restore the integrity of the West Flank
- Add offshore sediment
- Rebuild the natural structural framework
- Create a continuous protective barrier
- Reduce wave energies
- Strengthen the long-shore sediment transport
- Provide sustainable barrier island habitat, and
- Restore roughly 500 acres of barrier island



Project Features Overview

West Flank –

- 415 Acres of intertidal, supratidal, and dune habitat
- 134 Acres of subtidal habitat.

Project Extension -

- 85 Acres of intertidal, supratidal, and dune habitat
- 69 Acres of subtidal habitat



Total Acreage -

- 500 Acres of intertidal, supratidal, and dune habitat
- 203 Acres of subtidal habitat
- 3.85 million cubic yards of sand, in place

Project Benefits & Costs

- Benefits include evaluation of the feasibility of using Ship Shoal sand for coastal restoration as well as, adding sediment to the longshore transport system. The project would benefit a total of 703 acres of barrier island and shallow water habitat. At the end of 20 years, there would be a net of 195 acres of island over the without-project condition.
- The Fully Funded Cost for the project is: \$52,925,372
- The Prioritization Score is: 60

Project Comparison/Contrast

The Present vs. PPL # 11

Ship Shoal: Whiskey West Flank (TE-47)

	Phase 1 Authorization	Current Phase 2	Percent Difference
Net Acres	182	195	7.10%
AAHUs	191	269	40.80%
Fully Funded First Cost	\$38,985,100	\$52,603,881	34.90%
Total Fully Funded Cost (millions)	\$39,302,900	\$52,925,372	34.70%

Why Should You Fund this Project Now?

- **Barrier Islands are first line of defense against storm surge**
- **Determine the feasibility of mining Ship Shoal for future restoration projects**
- **Potential use of Ship Shoal Sand for levee base material**
- **Rapidly changing shoreline of the Isle Dernieres**
- **Infuses new sediment into system**
- **Limited Plans and Specifications shelf life**

Questions?



Brad Crawford, P.E.
US Environmental
Protection Agency
(214) 665 - 7255



Brad Miller,
Project Manager
LA Dept. of Natural
Resources
(225) 342 - 4122



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6

1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

November 21, 2006

Mr. Greg Breerwood, P.E.
Deputy District Engineer
U.S. Army Corps of Engineers, New Orleans District
Office of the Chief
P.O. Box 60267
New Orleans, Louisiana 70160-0267

Dear Mr. Breerwood:

The Environmental Protection Agency (EPA) and the Louisiana Department of Natural Resources (LDNR) hereby resubmit our request for Phase 2 approval and funding of the Ship Shoal: Whiskey West Flank project (TE-47). The project was authorized by the Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) Task Force to proceed with Phase 1, Engineering and Design on Priority Project List 11. A summary of information required for the Phase 2 Authorization Request including the Phase 2 Checklist is included in Enclosure A.

The project is substantively the same as submitted last year with the exception that the cost estimate has been updated to reflect current market conditions. EPA and LDNR re-surveyed the island in August 2006 to verify the validity of the current design. While the island has rolled back on itself slightly, the quantity of sediment needed for the design is still within design parameters.

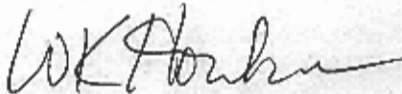
As noted in last year's request, because project modeling indicated a difference in the project's estimated performance coupled with the increase in scope with the inclusion of the dune extension, EPA performed a revised Wetland Value Assessment (WVA) using the information obtained thru the E&D process. A summary of the project benefits and cost, both Phase 1 and Phase 2, are as follows:

	Phase 1 Authorization	Current Phase 2	Percent Difference
Net Acres	182	195	+7.1%
AAHUs	191	269	+40.8%
Fully Funded First Cost (millions)	\$38,985,100	\$52,604,450	+34.9%
Total Fully Funded Cost (millions)	\$39,302,900	\$52,925,941	+33.8%

Also enclosed herein are the original Fact Sheet and Project Map, the revised Fact Sheet and Project Map, and, the revised Cost estimate spreadsheet required in Appendix C of the CWPPRA Standard Operating Procedures.

If you have any questions or need additional information, please contact Brad Crawford, P.E., at (214) 665-7255.

Sincerely,

A handwritten signature in black ink, appearing to read 'WK Honker', with a stylized flourish at the end.

William K. Honker, P.E.
Deputy Director
Water Quality Protection Division

Enclosures:

cc: (See Next Page)

c: via electronic copies

Mr. Troy Constance (Acting Chairman)
Chief, Restoration Branch
U.S. Army Corps of Engineers, New Orleans District
Office of the Chief
P.O. Box 60267
New Orleans, Louisiana 70160-0267

Mr. Darryl Clark
Senior Field Biologist
U.S. Fish and Wildlife Service
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

Mr. Gerry Duszynski
Acting Asst. Secretary
Dept. of Natural Resources
P.O. Box 44027, Capital Station
Baton Rouge, Louisiana 70804-4027

Mr. Rick Hartman
Fishery Biologist
Chief, Baton Rouge Field Office
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
c/o Louisiana State University
Baton Rouge, Louisiana 70803-7535

Ms. Sharon Parrish
Acting Chief, Marine & Wetlands Section
Environmental Protection Agency, Region VI
Water Quality Protection Division (6WQ-EM)
1445 Ross Avenue
Dallas, Texas 75202-2733

Mr. Britt Paul, P.E.
Assistant State Conservationist/Water Resources
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Ms. Julie Z. LeBlanc, P.E.
Senior Project Manager
U.S. Army Corps of Engineers, New Orleans District
Planning & Project Management - Coastal Restoration
Branch
P.O. Box 60267
New Orleans, Louisiana 70160-0267

Mr. Kevin Roy
Senior Field Biologist
U.S. Fish and Wildlife Service
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

Mr. Tim Landers
CWPPRA Team Leader (Acting)
Environmental Protection Agency, Region VI
Water Quality Protection Division (6WQ-EMC)
1445 Ross Avenue
Dallas, Texas 75202-2733

Mr. John Jurgensen, P.E.
Civil Engineer
Natural Resources Conservation Service
3737 Government Street
Alexandria, Louisiana 71302

Mr. Dan Llewellyn
Coastal Restoration Scientist Supervisor
DNR/Coastal Restoration Division
P.O. Box 44027, Capital Station
Baton Rouge, Louisiana 70804-4027

Ms. Rachel Sweeney
Ecologist
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
c/o Louisiana State University
Baton Rouge, Louisiana 70803-7535

Enclosure

Phase 2 Authorization Information

(Appendix C of the SOP)

PHASE 2 CHECKLIST

Phase 1 Project Description

Phase 1 was authorized by the CWPBRA Task Force on January 16, 2002, as part of Priority Project List 11. The candidate project included mining and placing Ship Shoal sand from the Minerals Management Service (MMS) Block 88 by cutterhead or hopper dredge to rebuild the west flank of Whiskey Island, a distance of about 8-10 miles. The area to be restored included 57 acres of dunes, 7 feet high and 150 feet wide, 114 acres of supratidal habitat at 4 feet in elevation, 208 acres of intertidal habitat at a 2 foot elevation, and 8 acres of subtidal habitat from 0 to minus 1.5 feet in elevation. All areas would be planted and sand fencing placed to trap wind-blown sediment. The original Phase 1 fact sheet, map, fully funded cost estimate and Wetland Value Assessment (WVA) results are included in Enclosure 1.

Overview of Phase 1 Tasks, Process and Issues

LDNR contracted with the company of DMJM Harris for the Engineering and Design (E&D). DMJM Harris conducted the following tasks:

- Delineated a borrow area on Ship Shoal by conducting a geophysical investigation.
- Surveyed the project area.
- Applied the appropriate modeling to optimize the cross section and to ensure the project does not have a negative impact on adjacent areas.
- Developed project Plans, Specifications, Permit Drawings and Design Report.

Compliance with the National Environmental Policy Act (NEPA) is being addressed in two separate tracks. To address potential impacts to the dredging borrow site, the MMS completed an Environmental Assessment (EA) dated April 2004 addressing both this project and the Morganza to the Gulf Levee project. That EA included information regarding cultural resources obtained from the remote sensing survey completed by EPA in December 2003. NEPA compliance regarding the island fill site is being addressed in a separate EA developed by EPA. The Draft EA was posted along with the 95% E&D documents, and the NEPA documentation was completed with the issuance of a Finding of No Significant Impact dated December 1, 2005. LDNR and EPA investigated the potential for cultural resource areas and determined there are not any in the delineated borrow area or the project footprint.

The project site was affected by hurricanes Katrina and Rita in 2005. EPA and LDNR performed an aerial survey of the island after each event and re-surveyed the island in August 2006. While the storms disturbed the existing sediments, the quantities were not significantly affected. However, the cost estimates based on current market conditions have been revised.

Description of the Phase 2 Project

The overall project objectives as enumerated in the 95% E&D report are:

- Demonstrate the feasibility of moving Ship Shoal sand to the Isles Dernieres for future restoration projects;
- Restore the integrity of the West Flank of Whiskey Island to retain its structural function;
- Add offshore sediment to the West Flank of Whiskey Island from Ship Shoal to increase sediment supply and strengthen island formation;
- Rebuild the natural structural framework within the coastal ecosystem to provide for separation of the gulf and the estuary;
- Create a continuous protective barrier for back bays and inland marshes;
- Reduce wave energies thereby helping to reduce land loss;
- Strengthen the longshore transport system of sediment for continuous island building;
- Provide a unique and sustainable barrier island habitat for numerous biological species;
- Restore roughly 500 acres of barrier island habitat on the island's West Flank.

The proposed restoration template would restore the west flank of Whiskey Island through the

direct creation of approximately 415 acres of new intertidal, supratidal, and dune habitat plus 134 acres of subtidal habitat. Once the project data was gathered and computer models developed, we realized the project may concentrate over-wash toward existing marsh. We therefore decided to extend the dune feature to protect this existing marsh. The project extension to the east will create approximately 85 acres of additional new intertidal, supratidal, and dune habitat plus 69 acres of additional subtidal habitat. Therefore, the total acreage created for the preferred alternative (Alternate "B" Extended) will be 500 acres of new intertidal, supratidal, and dune habitat plus 203 acres of subtidal habitat. The estimated volume of sand needed, based on fill volume, is 3.85 million cubic yards. A revised fact sheet and project map are included in Enclosure 3.

Phase 2 Checklist:

A. List of Project Goals and Strategies.

- *Demonstrate the feasibility of moving Ship Shoal sands to the Isles Dernieres for future restoration projects;*
- *Restore the integrity of the West Flank of Whiskey Island to retain its structural function;*
- *Add offshore sediment to the West Flank of Whiskey Island from Ship Shoal to increase sediment supply and strengthen island formation;*
- *Rebuild the natural structural framework within the coastal ecosystem to provide for separation of the gulf and the estuary;*
- *Create a continuous protective barrier for back bays and inland marshes;*
- *Reduce wave energies thereby helping to reduce land loss;*
- *Strengthen the longshore transport system of sediment for continuous island building;*
- *Provide a unique and sustainable barrier island habitat for numerous biological species; and,*
- *Restore roughly 400 acres of barrier island habitat into the island's West Flank*

B. A Statement that the Cost Sharing Agreement between the Lead Agency and the Local Sponsor has been executed for Phase I.

EPA and the LDNR entered into a cooperative agreement effective January 27, 2003, and revised on February 25, 2004.

C. Notification from the State or the Corps that landrights will be finalized in a short period of time after Phase 2 approval.

The project property is owned by the State of Louisiana and is managed by the Louisiana Department of Wildlife and Fisheries (LDWF). The landrights agreement between the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Natural Resources was sign and approved on October 26, 2005.

D. A favorable Preliminary Design Review (30% Design Level). The Preliminary Design shall include completion of surveys, borings, geotechnical investigations, data analysis review, hydrologic data collection and analysis, modeling (if necessary), and development of preliminary designs.

The 30% E&D review was held in LDNR offices on November 8, 2004. In an email dated January 12, 2005, EPA and LDNR informed the Technical Committee of the results of the 30% E&D and our intent to move forward with the project.

- E. Final Project Design Review (95% Design Level). Upon completion of a favorable review of the preliminary design, the Project plans and specifications shall be developed and formalized to incorporate elements from the Preliminary Design and the Preliminary Design Review. Final Project Design Review (95%) must be successfully completed prior to seeking Technical Committee approval.

The 95% E&D review was held in LDNR offices on September 28, 2005. The 95% concurrence letter from LDNR was transmitted to the Technical Committee and P&E Subcommittee on October 25, 2005.

- F. A draft of the Environmental Assessment of the Project, as required under the National Environmental Policy Act must be submitted thirty days before the request for Phase 2 approval.

The NEPA documentation was completed with the issuance of a "Finding of No Significant Impact" dated December 1, 2005.

- G. A written summary of the findings of the Ecological Review.

The final ER was posted as required prior to the 95% Design review. The document stated the following:

Based on information gathered from similar restoration projects, engineering designs and related literature, the proposed strategies in the Ship Shoal: Whiskey West Flank Restoration project will likely achieve all of the desired goals. It is therefore recommended that this project progress towards construction following a favorable 95% Design Review. However, prior to construction the following needs to be addressed.

It is believed that the sandy material used to create the back barrier marsh component will experience minimal settlement and consolidation over the life of the project. However, a settlement analysis may be useful to determine how long the restored area will remain at the intertidal target elevation range of 1.0-2.0 feet NAVD-88.

- *Answer: The marsh construction elevation ranges from +2' NAVD 88 to a +1' NAVD. Instantaneous settlement of this high quality sand will occur prior to construction being complete. If the material settles beyond the range of marsh elevation more material can be placed to offset this settlement. Other barrier island processes such as island rollover and cross shore sediment transport will far out weigh settlement of the underlying materials. The question concerning settlement was raised after the field data was collected. The design team did not feel the cost to remobilize equipment out weighted the benefits from the data. Permitting and regulations prevent LDNR from constructing marsh platforms at significantly higher elevations than +2' in the anticipation of settlement of the underlying materials. Also, with no money for maintenance or re-nourishment, settlement of the marsh can not be addressed once it settles out of the healthy marsh range. Based on the quality of material being placed, and the minimal amount of material being placed (less than 2' on average) the design team did not feel a geotechnical investigation on the marsh platform was warranted.*

- H. Application for and/or issuance of the public notices for permits. If a permit has not been received by the agency, a notice from the Corps of when the permit may be issued.

The LDWF will be the permit holder and LDNR will act as their agent. The permit has been sent

for processing and should be approved within 3 months.

- I. A hazardous, toxic and radiological waste (HTRW) assessment, if required, has been prepared.

An HTRW survey was not required.

- J. Section 303(e) approval from the Corps.

EPA sent the approval request along with the appropriate documentation to the USACE in a letter dated October 17, 2005. A Response is pending.

- K. Overgrazing determination from the NRCS (if necessary).

In a letter dated August 26, 2005, NRCS concluded that overgrazing is not of concern in this area.

- L. Revised cost estimate of Phase 2 activities, based on the revised Project design.

The island was re-surveyed in August 2006 and a revised cost estimate developed based on current conditions. The Fully Funded Cost (FFC) estimate was received from USACE on November 17, 2006. Attached as Enclosure 4L is the revised spreadsheet from Appendix C of the CWPPRA standard operating procedures (SOP). The revised estimate did not change the prioritization score.

- M. A Wetland Value Assessment reviewed and approved by the Environmental Work Group.

A revised WVA was completed by EPA and reviewed by the Environmental Work Group. As a result of that effort, EPA received revised benefit numbers from the chairman of the Environmental Work Group in an email dated August 25, 2005.

- N. A breakdown of the Prioritization Criteria ranking score, finalized and agreed upon by all agencies during the 95% design review.

A revised draft Prioritization Criterion ranking fact sheet and score was provided to the Engineering and Environmental Workgroups for review on October 5, 2005, less the fully funded cost information which had not yet been returned from the Economic Workgroup. The FFC estimate was received on October 21, 2005, and the Prioritization Fact Sheet was finalized and transmitted to the TC and P&E on October 25, 2005.

Enclosure 1

Ship Shoal/Whiskey West Flank (TE-47)

**Phase 1 - Fact Sheet, Map,
Fully Funded Cost Estimate, and WVA**



11TH PRIORITY PROJECT LIST REPORT

PREPARED BY:

**LOUISIANA COASTAL WETLANDS CONSERVATION AND RESTORATION
TASK FORCE**

JULY 2003

Project Name - Ship Shoal: Whiskey West Flank Restoration

Coast 2050 Strategy - Regional Ecosystem Strategy #14: Restore and maintain the Isles Dernieres barrier island chain.

Project Location - Region 3 - Terrebonne Basin, Terrebonne Parish, west spit area Whiskey Island.

Problem - The Isles Dernieres Chain, which has been considered one of the most rapidly deteriorating barrier shorelines in the U.S., is losing its structural framework functions for the coastal/estuarine ecosystem including storm buffering capacity and protection for inland bays, estuary and wetlands, human populations and infrastructure. Chain breakup has resulted from both major storm actions and from loss of nourishing sediment from the natural system due to human alterations. Whiskey Island changes from 1978 to 1988 include loss of 31.1 acres per year.

Goals - 1) restore the integrity of the west flank of Whiskey Island to retain its structural function to the coastal/estuary ecosystem; 2) add new offshore prime quality sediment into the west flank; 3) initially restore approximately 387 acres of barrier island habitat to the western flank.

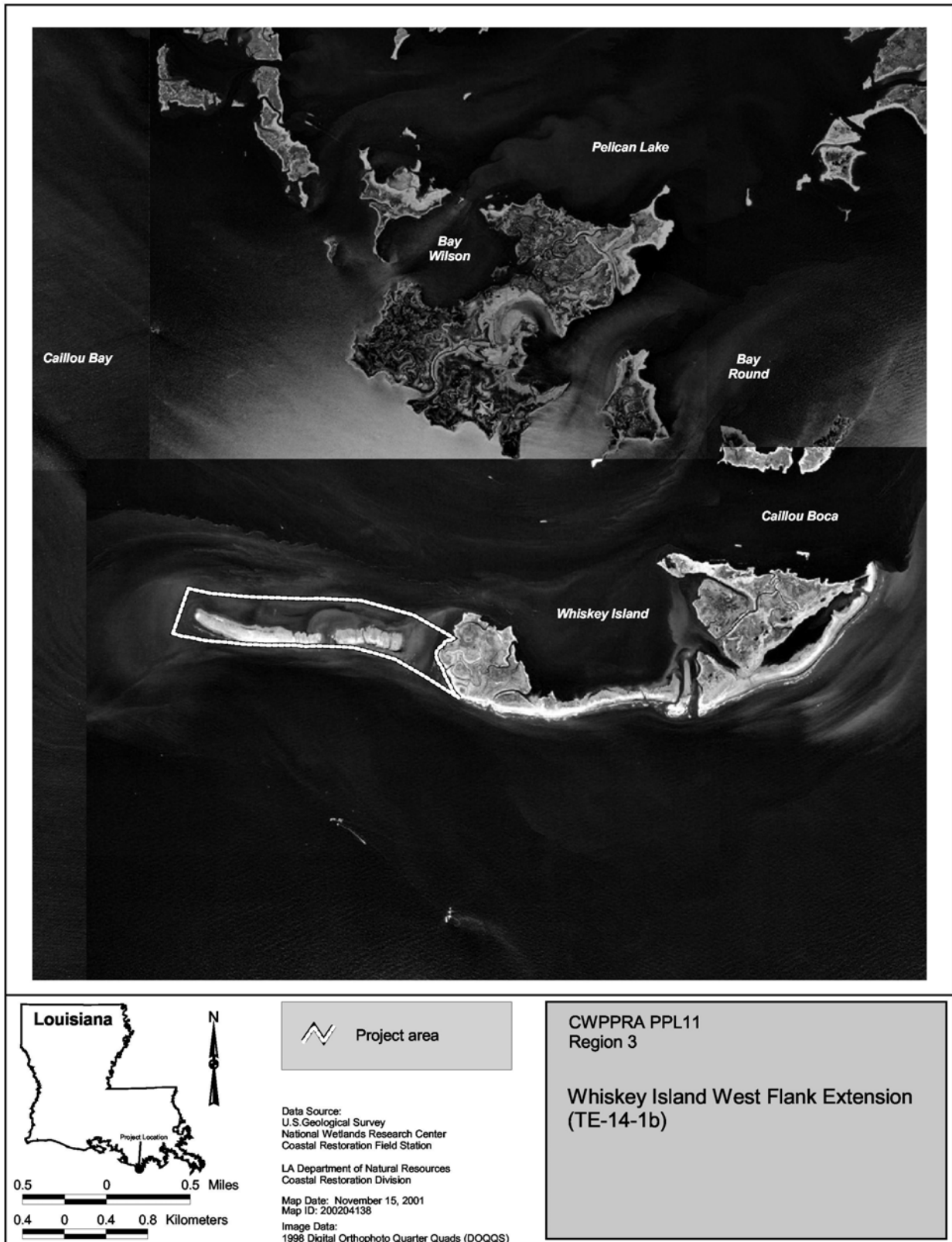
Proposed Solution - The project entails mining and placing Ship Shoal sand from the Minerals Management Service Block 88 by cutterhead or hopper dredge to rebuild the west flank of Whiskey Island, a distance of about 8 miles. The area to be restored includes 57 acres of dunes 7 feet high and 150 feet wide, 114 acres supratidal habitat at 4 feet in elevation, 208 acres intertidal habitat at a 2-foot elevation, and 8 acres subtidal habitat from 0 to minus 1.5 feet in elevation. All areas would be planted and sand fencing placed to trap wind-blown sediment.

Project Benefits - Benefits include prevention of loss of sediment from the system into deeper Gulf waters or into bayside deeper water. The project would benefit a total of 398 acres of barrier island and shallow water. At the end of 20 years, there would be a net of 182 acres of island over the without-project condition.

Project Costs - The fully funded first cost is \$38,985,100 and the total fully funded cost is \$39,302,900.

Risk/Uncertainty and Longevity/Sustainability - There is a moderate degree of risk associated with this project due to greater storm effects in this area of the coast and difficulty in engineering and construction. Benefits should continue for more than 20 years due to the high quality and compatibility of Ship Shoal sand.

Sponsoring Agency/Contact Persons - U.S. Environmental Protection Agency
Jeanene Peckham (225) 389-0736; peckham.jeanene@epa.gov
Wes Mcquiddy (214) 665-6722; mcquiddy.david@epa.gov
Brad Crawford (214) 665-7255; crawford.brad@epa.gov



WETLAND VALUE ASSESSMENT

Benefits Summary Sheet

Project Ship Shoal: West Flank Restoration

The WVA for this project includes 1 area. Total benefits for this project are as follows:

$\frac{\text{Area}}{A}$

$\frac{\text{AAHUs}}{191}$

TOTAL BENEFITS =	191	AAHUS
-------------------------	------------	--------------

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Barrier Island

Project: Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank
West Flank Area

Condition: Future Without Project

Variable		TY 0		TY 1		TY 10	
		Value	SI	Value	SI	Value	SI
V1a	% Dune	0	0.10	0	0.10	0	0.10
V1b	% Dune Vegetated	0	0.10	0	0.10	0	0.10
V2a	% Supratidal	47	0.90	47	0.90	47	0.90
V2b	% Supratidal Vegetated	5	0.17	5	0.17	30	0.49
V3a	% Intertidal	53	1.00	53	1.00	53	1.00
V3b	% Intertidal Vegetated	5	0.18	5	0.18	20	0.40
V4	% Subtidal	59	1.00	58	1.00	47	1.00
V5	% Woody Cover	0	0.10	0	0.10	0	0.10
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	% 100	0.40	% 100	0.40	% 100	0.40
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.525		HSI = 0.525		HSI = 0.564	

Project..... Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank
FWOP

Variable		TY 11		TY 20		TY	
		Value	SI	Value	SI	Value	SI
V1a	% Dune	0	0.10	0	0.10		
V1b	% Dune Vegetated	0	0.10	0	0.10		
V2a	% Supratidal	47	0.90	47	0.90		
V2b	% Supratidal Vegetated	27	0.45	5	0.17		
V3a	% Intertidal	53	1.00	53	1.00		
V3b	% Intertidal Vegetated	18	0.37	5	0.18		
V4	% Subtidal	48	1.00	63	1.00		
V5	% Woody Cover	0	0.10	0	0.10		
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	% 100	0.40	% 100	0.40	%	
V7	Beach/surf Zone	1	1.00	1	1.00		
		HSI = 0.559		HSI = 0.525		HSI =	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Barrier Island

Project: Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank
Area A

Condition: Future Without Project

Variable		TY 0		TY 1		TY 3	
		Value	SI	Value	SI	Value	SI
V1a	% Dune	0	0.10	15	1.00	15	1.00
V1b	% Dune Vegetated	0	0.10	25	0.48	60	1.00
V2a	% Supratidal	47	0.90	30	1.00	30	1.00
V2b	% Supratidal Vegetated	5	0.17	25	0.43	70	1.00
V3a	% Intertidal	53	1.00	55	1.00	55	1.00
V3b	% Intertidal Vegetated	5	0.18	25	0.48	60	1.00
V4	% Subtidal	59	1.00	5	0.33	5	0.33
V5	% Woody Cover	0	0.10	5	0.55	5	0.55
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	% 100	0.40	% 100	0.60	% 100	0.60
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.525		HSI = 0.754		HSI = 0.861	

Project..... Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank
FWP

Variable		TY 5		TY 10		TY 11	
		Value	SI	Value	SI	Value	SI
V1a	% Dune	15	1.00	15	1.00	15	1.00
V1b	% Dune Vegetated	65	1.00	70	1.00	70	1.00
V2a	% Supratidal	30	1.00	29	1.00	29	1.00
V2b	% Supratidal Vegetated	75	1.00	50	0.75	70	1.00
V3a	% Intertidal	55	1.00	56	1.00	56	1.00
V3b	% Intertidal Vegetated	65	1.00	60	1.00	70	1.00
V4	% Subtidal	5	0.33	5	0.33	5	0.33
V5	% Woody Cover	10	1.00	10	1.00	10	1.00
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	% 20 80	0.68	% 50 50	0.90	% 50 50	0.90
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.918		HSI = 0.939		HSI = 0.951	

Project.....
FWP

Variable		TY 20		TY		TY	
		Value	SI	Value	SI	Value	SI
V1a	% Dune	13	1.00				
V1b	% Dune Vegetated	60	1.00				
V2a	% Supratidal	27	1.00				
V2b	% Supratidal Vegetated	60	0.88				
V3a	% Intertidal	60	1.00				
V3b	% Intertidal Vegetated	65	1.00				
V4	% Subtidal	6	0.37				
V5	% Woody Cover	10	1.00				
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	% 100	0.80	%		%	
V7	Beach/surf Zone	1	1.00				
		HSI = 0.933		HSI =		HSI =	

AAHU CALCULATION

Project: Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank
West Flank Area

Future Without Project		x HSI	Total HUs	Cumulative HUs
TY	Acres			
0	242	0.525	127.08	
1	246	0.525	129.18	128.13
10	280	0.564	157.89	1289.82
11	276	0.559	154.26	156.07
20	234	0.525	122.88	1245.01
AAHUs =			140.95	

Future With Project		x HSI	Total HUs	Cumulative HUs
TY	Acres			
0	242	0.525	127.08	
1	398	0.754	299.99	207.59
3	387	0.861	333.30	633.69
5	379	0.918	348.02	681.47
10	372	0.939	349.22	1743.20
11	369	0.951	351.01	350.12
20	345	0.933	321.71	3026.58
AAHUs			332.13	

NET CHANGE IN AAHU'S DUE TO PROJECT		
A. Future With Project AAHUs	=	332.13
B. Future Without Project AAHUs	=	140.95
Net Change (FWP - FWOP)	=	191.18

Enclosure 3

Ship Shoal/Whiskey West Flank (TE-47)

Revised Fact Sheet and Map

Ship Shoal: Whiskey West Flank Restoration

Eleventh Priority Project List of the Coastal Wetlands Planning, Protection and Restoration Act



Proposed by

U.S. Environmental Protection Agency

and

LA Department of Natural Resources

Contacts: Brad Crawford - US EPA - (214) 665-7255

Kenneth Teague - US EPA - (214) 665-6687

Chris Williams - LDNR - (225) 342-7549

Project Name - Ship Shoal: Whiskey West Flank Restoration

Coast 2050 Strategy - Regional Ecosystem Strategy #14: Restore and maintain the Isles Dernieres barrier island chain.

Project Location - Region 3 - Terrebonne Basin, Terrebonne Parish, west spit area Whiskey Island.

Problem - The Isles Dernieres Chain, which has been considered one of the most rapidly deteriorating barrier shorelines in the U.S., is losing its structural framework functions for the coastal/estuarine ecosystem including storm buffering capacity and protection for inland bays, estuary and wetlands, human populations and infrastructure. Chain break up has resulted from both major storm actions and from loss of nourishing sediment from the natural system due to human alterations. Whiskey Island changes from 1978 to 1988 include loss of 31.1 acres per year.

Goals - 1) Demonstrate the feasibility of moving Ship Shoal sands to the Isles Dernieres for future restoration projects; 2) Restore the integrity of the West Flank of Whiskey Island to retain its structural function; 3) Add offshore sediment to the West Flank of Whiskey Island from Ship Shoal to increase sediment supply and strengthen island formation; 4) Rebuild the natural structural framework within the coastal ecosystem to provide for separation of the gulf and the estuary; 5) Create a continuous protective barrier for back bays and inland marshes; 6) Reduce wave energies thereby helping to reduce land loss; 7) Strengthen the long shore transport system of sediment for continuous island building; 8) Provide a unique and sustainable barrier island habitat for numerous biological species; and, 9) Restore roughly 500 acres of barrier island habitat into the island's West Flank.

Proposed Solution - The proposed conceptual restoration template would restore the west flank of Whiskey Island through the direct creation of approximately 415 acres of new intertidal, supratidal, and dune habitat plus 134 acres of subtidal habitat. In order to control flow training effects on the western most existing marsh lobe, the project footprint includes an extension the dune feature eastward. The project extension to the east would create approximately 85 acres of additional new intertidal, supratidal, and dune habitat plus 69 acres of additional subtidal habitat. Therefore, the total acreage created for the preferred alternate (Alternate "B"-Extended) would be 500 acres of new intertidal, supratidal, and dune habitat plus 203 acres of subtidal habitat.

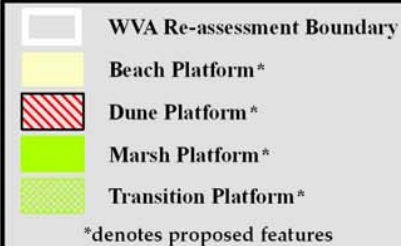
Project Benefits - Benefits include evaluation of the feasibility of using Ship Shoal sand for coastal restoration as well as, adding sediment to the longshore transport system. The project would benefit a total of 703 acres of barrier island and shallow water. At the end of 20 years, there would be a net of 195 acres of island over the without-project condition.

Project Costs - The fully funded first cost is \$42,613,143 and the total fully funded cost is \$42,918,821.

Risk/Uncertainty and Longevity/Sustainability - There is a moderate degree of risk associated with this project due to greater storm effects in this area of the coast and difficulty in construction. Benefits should continue for more than 20 years due to the high quality and compatibility of Ship Shoal sand.

Sponsoring Agency/Contact Persons - U.S. Environmental Protection Agency
Brad Crawford, P.E., (214) 665-7255; crawford.brad@epa.gov
Kenneth Teague (214) 665-6687; teague.kenneth@epa.gov
Chris Williams P.E. (225)342-7549

Ship Shoal: Whiskey West Flank Restoration (TE-47)



Map Produced By:
 U.S. Department of the Interior
 U.S. Geological Survey
 National Wetlands Research Center
 Coastal Restoration Field Station

Background Imagery:
 2004 Digital Orthophoto Quarter Quadrangles

Map Date: October 12, 2005
 Map ID: USGS-NWRC 2006-11-0004
 Data accurate as of: October 12, 2005

Enclosure 4C

Ship Shoal/Whiskey West Flank (TE-47)

Landrights Agreement

State of Louisiana



KATHLEEN BABINEAUX BLANCO
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

DEPARTMENT OF NATURAL RESOURCES OFFICE OF COASTAL RESTORATION AND MANAGEMENT

December 28, 2005

Mr. Wes McQuiddy
U. S. Environmental Protection Agency
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Ship Shoal - Whiskey Island West Flank Project TE-47
DWF Letter Agreement
Terrebonne Parish, Louisiana

Dear Mr. McQuiddy:

Enclosed for your records is a certified original of the captioned document between the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Natural Resources for the above captioned project. This document has been recorded and certified by the Terrebonne Parish Clerk of Court.

Should you have any questions, please contact me at 225-342-5068.

Sincerely,

A handwritten signature in cursive script, reading "Joyce M. Montgomery".

Joyce M. Montgomery
CRD Land Specialist III

JMM

c:(w/o attachment) Chris Williams, CRD Project Manager

Final distribution letter agreement dwf.wpd

Terrebonne Parish Recording Page

I. Robert "Bobby" Boudreaux
Clerk Of Court
P.O. Box 1569
Houma, La 70361-1569
(985) 868-5660

Received From :
COLLINS, DAN S CPL & ASSOCIATES INC
P.O. BOX 66773
BATON ROUGE, LA 70896

First VENDOR

LOUISIANA DEPARTMENT OF NATURAL RESOURCES

First VENDEE

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

Index Type : Conveyances

File # : 1224363

Type of Document : Agreement

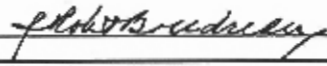
Book : 1944

Page : 639

Recording Pages : 13

Recorded Information

I hereby certify that the attached document was filed for registry and recorded in the Clerk of Court's office for
Terrebonne Parish, Louisiana


Clerk Of Court

On (Recorded Date) : 11/23/2005

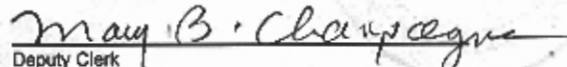
At (Recorded Time) : 11:11:34:000 AM



Doc ID - 004420600013

CLERK OF COURT
I. ROBERT "BOBBY" BOUDREAUX
Parish of Terrebonne
I certify that this is a true copy of the attached
document that was filed for registry and
Recorded 11/23/2005 at 11:11:34
Recorded in Book 1944 Page 639
File Number 1224363




Deputy Clerk

Return To :

COLLINS, DAN S CPL & ASSOCIATES INC
P.O. BOX 66773
BATON ROUGE, LA 70896

State of Louisiana



KATHLEEN BABINEAUX BLANCO
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

DEPARTMENT OF NATURAL RESOURCES OFFICE OF COASTAL RESTORATION AND MANAGEMENT

August 23, 2005

Mr. Dwight Landreneau, Secretary
Department of Wildlife and Fisheries
Post Office Box 98000
Baton Rouge, La. 70898-9000

RE: Letter Agreement
Ship Shoal – Whiskey Island West Flank Project TE-47
Isles Dernieres Barrier Islands Refuge
Terrebonne Parish, Louisiana

Dear Mr. Landreneau:

When executed by you, this letter shall constitute an agreement (the "Agreement") by and between the Louisiana Department of Natural Resources ("DNR") and the Louisiana Department of Wildlife and Fisheries ("DWF") whereby DWF authorizes DNR to conduct construction and monitoring operations for the Ship Shoal – Whiskey Island West Flank Project TE-47 ("Project") being a portion of the Isles Dernieres Barrier Islands Refuge ("IDBIR") as shown on Exhibit B attached hereto and made a part hereof.

DWF has no objection to DNR, or its assigns, proceeding with the proposed Project for the purposes authorized by Federal (16 U.S.C. 3951, et seq.) and State (R.S. 49:213-214) law within the Project area shown on Exhibit A and pursuant to the Project Activity Summary on Exhibit C, both attached hereto and made a part hereof, provided however, that DNR complies with the following stipulations:

1. This Agreement pertains to the IDBIR as shown on Exhibit B.
2. Prior to any activities on the IDBIR, DNR shall contact Mr. Ed Mouton, or his assignee (Programs Manager), at (337) 373-0032 to coordinate Project details.
3. DNR shall abide by the IDBIR regulations as set forth in Exhibit B, attached hereto and made a part hereof, unless otherwise agreed to by DWF.

4. All equipment and routes shall be approved by the Programs Manager.
5. No activities will be allowed within 1500 feet of nesting bird colonies unless approved by the Programs Manager.
6. It shall be the responsibility of DNR to repair any damages which may occur as a result of the Project.
7. DNR agrees to defend, indemnify and hold DWF harmless from and against any and all claims, demands, expense and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur or in any way grow out of the proposed Project.
8. This agreement allows DNR to make minor modifications to the Project, but only insofar as changes pertain to materials for project features and minor changes to project features locations, as may be deemed necessary to fully and properly implement and maintain the Project. Further, DNR will notify DWF of such modifications and allow DWF to comment on the modifications prior to the implementation of such modifications, and shall, when practicable, consider and include any comments by DWF.
9. DNR is responsible for all maintenance and repair of all project features. In the event DWF notifies DNR that project features require maintenance or repair, DNR will provide such maintenance or repair in a time frame that ensures that the objectives of the Project are not compromised.
10. DNR agrees that any use of mechanized equipment must be pre-approved by the DWF Programs Manager referenced in number 2 above.
11. DNR will provide a fulltime, onsite construction inspector to ensure compliance with the project plans, specs, and the terms and conditions of this Agreement. If, in the opinion of DWF, DNR's operations conflict with the plans, specs and/or the terms of this Agreement, DWF shall contact DNR fully describing what is in conflict. DNR will immediately contact the contractor to remedy said conflict. If the conflict is not remedied to DWF's satisfaction within 2 days, DWF may suspend DNR's operations until such time that conflict can be appropriately addressed and remedied.

12. In the event any change or condition should develop that affects IDBIR and that would affect DNR's ability to perform the activities granted under this Agreement, DWF agrees to notify DNR at the following address:

Department of Natural Resources
Coastal Restoration Division
P. O. Box 44027
Baton Rouge, LA 70804-4027
Phone: 225-342-7308
Fax: 225-342-9417

13. The final plans will require approval by DWF and DNR, prior to construction.

The terms of this Agreement, where applicable, and except for Paragraph 7 above, are subject to the availability of funds as stated in the CWPPRA Task Force Standard Operation Procedures. Should funds not be available to comply with the terms of this Agreement, DNR agrees to use its best efforts to secure funding to meet the terms stated herein.

This Agreement shall become effective upon the signature of DWF and shall remain in effect for twenty (20) years from the date hereof unless sooner terminated by the mutual consent of DNR and DWF.

DNR may assign or transfer, in whole or in part, any or all of its rights hereunder, but only to the extent necessary to implement the purposes of the Project on the said Lands.

This Agreement shall be binding upon, and inure to the benefit of, the parties hereto, their successors in interest, transferees and assigns.

If the foregoing accurately reflects your understanding of the agreement between DNR and DWF relative to the referenced Project activities on the IDBIR, please evidence your approval by signing the three (3) originals and returning the executed originals to this office. The documents will be recorded in the public records of Terrebonne Parish, and a certified duplicate will be returned to your office upon completion. Thank you for your cooperation in this matter.

Very truly yours,

WITNESSES:

Twana A. Bowman

Print Name: Twana A. Bowman

Brandi Rogers

Print Name: BRANDI ROGERS

SCOTT A. ANGELLE
SECRETARY
DEPARTMENT OF NATURAL
RESOURCES

ACCEPTED AND APPROVED THIS 26th DAY OF October 2005.

WITNESSES:

Cathy S. Greeson

Print Name: Cathy S. Greeson

Susan C. Falcon

Print Name: Susan C. Falcon

LOUISIANA DEPARTMENT OF
WILDLIFE AND FISHERIES

By: Dwight Landreneau

DWIGHT LANDRENEAU
Title: SECRETARY

ACKNOWLEDGMENTS

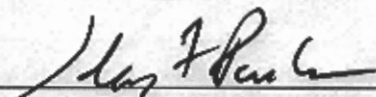
STATE OF LOUISIANA

PARISH OF EAST BATON ROUGE

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for said Parish and State aforesaid, on this 3rd day of October, 2005, personally came and appeared Scott A. Angelle, to me known, who declared that he is the Secretary of the **Department of Natural Resources**, State of Louisiana, that he executed the foregoing instrument on behalf of said State Agency and that the instrument was signed pursuant to the authority granted to him by said State Agency and that he acknowledged the instrument to be the free act and deed of said State Agency.

Identification Number: 01117
My commission expires: with life
(SEAL)

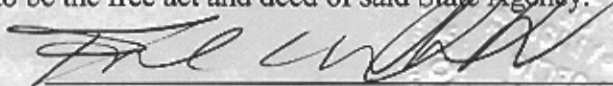
Print Name:


John F. Parker
NOTARY PUBLIC

STATE OF LOUISIANA

PARISH OF EAST BATON ROUGE

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for said Parish/County and State aforesaid, on this 26th day of October, 2005, personally came and appeared Dwight Landreneau, to me known, who declared that he is the Secretary of the **Department of Wildlife and Fisheries**, State of Louisiana, that he executed the foregoing instrument on behalf of said State Agency and that the instrument was signed pursuant to the authority granted to him by said State Agency and that he acknowledged the instrument to be the free act and deed of said State Agency.



Print Name: _____

Notary Number: _____
My commission expires: with life
(SEAL)

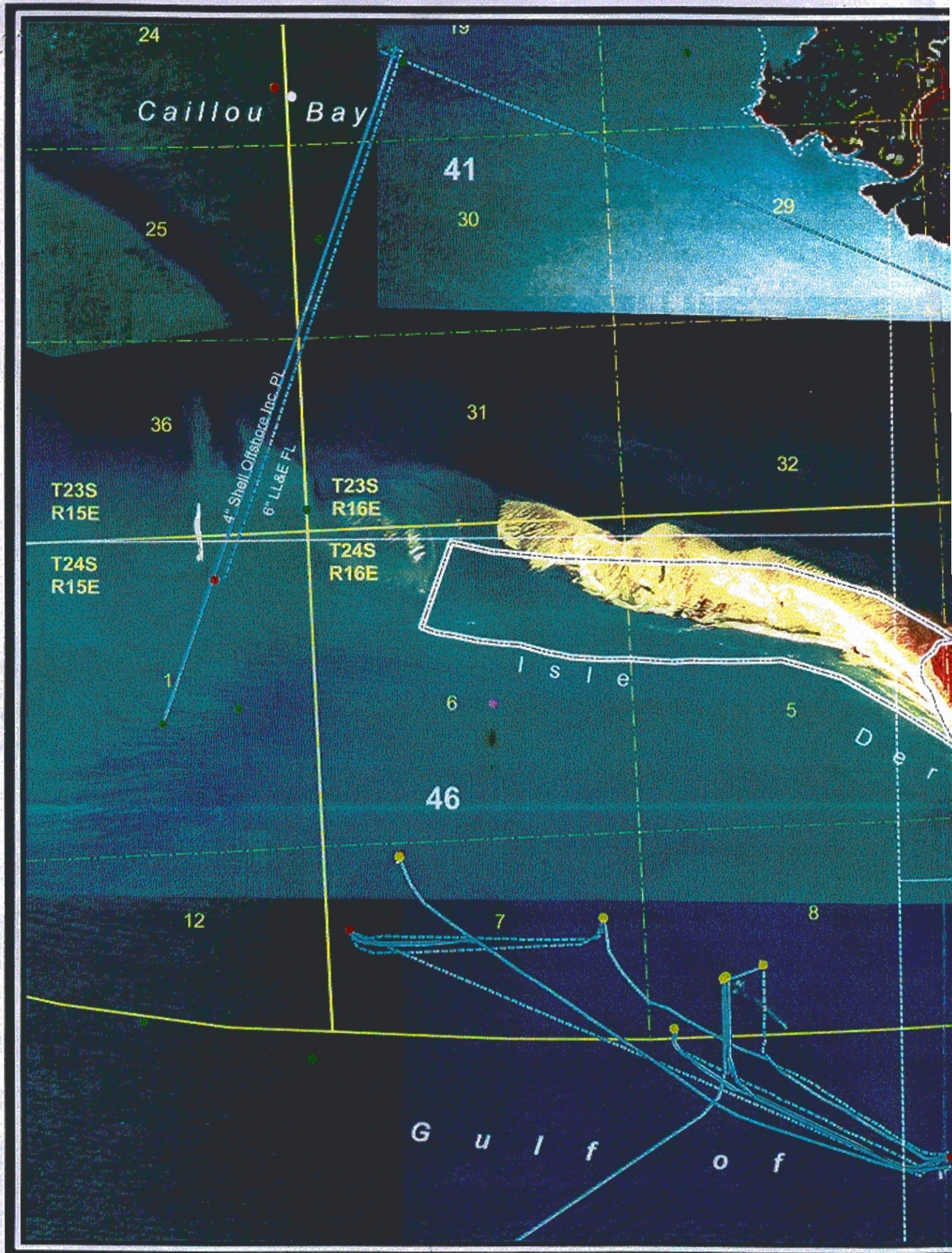
FREDERICK C. WHITROCK
Notary Public
State of Louisiana
State Bar Roll #18042
My Commission Expires At Death

NOTARY PUBLIC
FREDERICK C. WHITROCK
Notary Public
State of Louisiana
State Bar Roll #18042
My Commission Expires At Death

c: DWF: Greg Linscombe
DNR: Herbert Juneau, Helen Hoffpauir

List of Exhibits

Exhibit A	Project Area
Exhibit B	Regulations for Isles Dernieres Barrier Islands Refuge
Exhibit C	Project Summary



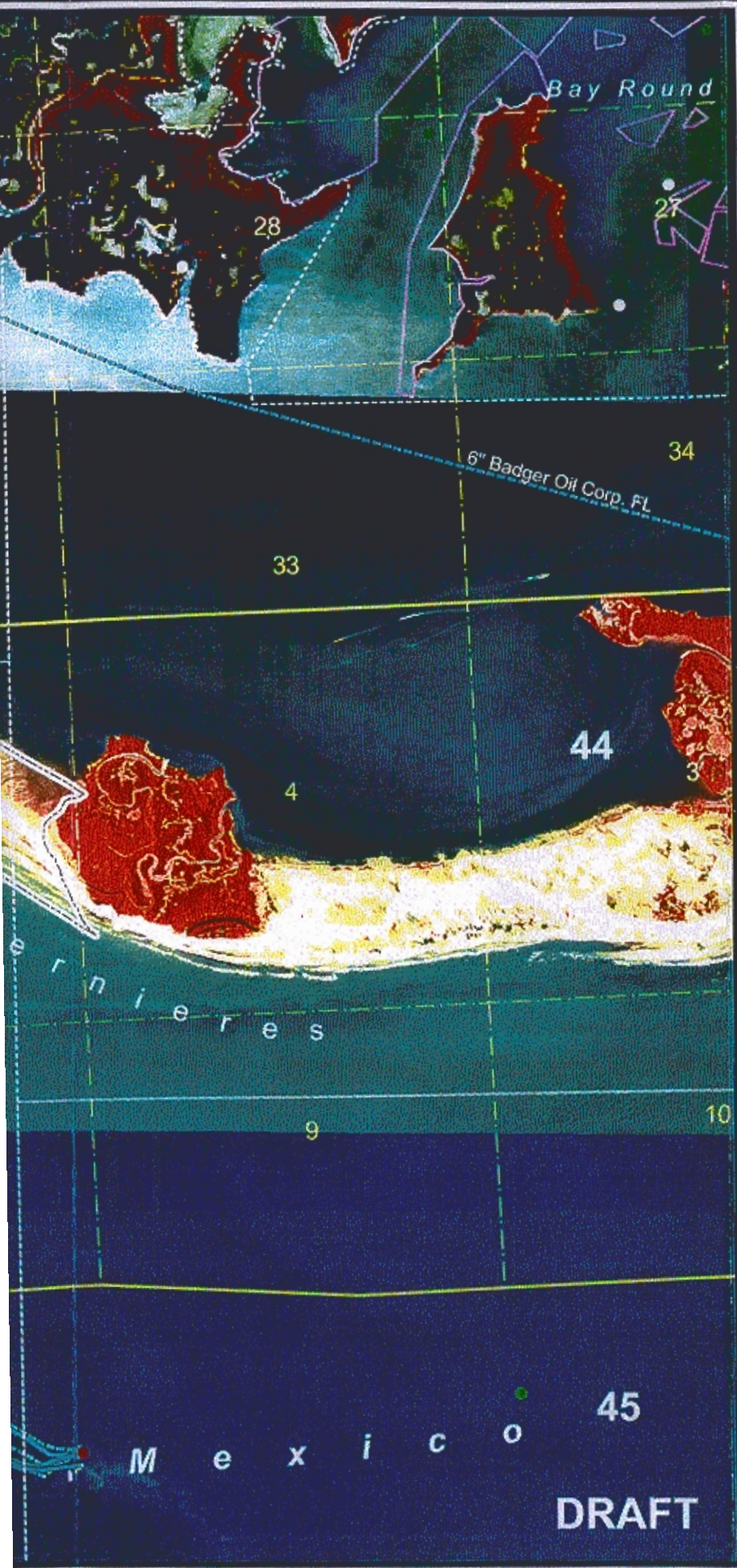


Exhibit A

Ship Shoal: Whiskey West Flank Restoration (TE-47)

Terrebonne Parish, Louisiana

Legend

- Project Boundary
- Township/Range Line
- Section Line
- Pipeline (CMD)
- Flowline (CMD)
- Oyster lease (04/04)
- Inactive Well
- Shut-In Well
- Active Well
- Other Well
- SWD Well
- Orphan Well
- Well without status code (Tobin data)

All features are graphical representations only and may not reflect true location or dimension.

0.2 0.1 0 0.2 0.4 Miles



Data Source:
 U.S. Department of the Interior
 U.S. Geological Survey
 National Wetlands Research Center
 Coastal Restoration Field Station
 Louisiana Department of Natural Resources
 Coastal Restoration Division
 Baton Rouge, LA
 2002 CIR Aerial Photograph
 Map Date: June 30, 2004
 Map ID: USGS-NWRC 2004-04-01

EXHIBIT B

Louisiana Register Vol. 25, No. 5 May 20, 1999 {PAGE }

DECLARATION OF EMERGENCY Department of Wildlife and Fisheries Wildlife and Fisheries Commission

**Isles Dernieres Barrier Islands Refuge
(LAC 76:III.321 and 331)**

The Wildlife and Fisheries Commission does hereby establish emergency regulations for the management of the Isles Dernieres Barrier Islands Refuge which includes Wine Island, East Island, Trinity Island, Whiskey Island, and Raccoon Island. Formerly, three of these islands, i.e., Wine, Whiskey, and Raccoon Islands, were included within the Terrebonne Barrier Islands Refuge and were regulated under provisions of LAC 76:III.321. By promulgation of this declaration of emergency, the Terrebonne Barrier Islands Refuge regulations found at LAC 76:III.321 are hereby repealed.

A declaration of emergency is necessary to regulate public access to the Isles Dernieres Barrier Islands Refuge in order to ensure that those members of the public utilizing the public use area on Trinity Island enjoy a clean and healthful environment and in order to minimize contact with the numerous species of colonial seabirds that utilize the islands as nesting habitat in the spring and summer months. This declaration of emergency will become effective on May 6, 1999 and shall remain in effect for the maximum period allowed under the Administrative Procedure Act or until adoption of the final rule.

Title 76

WILDLIFE AND FISHERIES

Part III. State Game and Fish Preserves and Sanctuaries

Chapter 3. Particular Game and Fish Preserves and Commission

§321. Terrebonne Barrier Islands Refuge Repealed.

AUTHORITY NOTE: Promulgated in accordance with R.S. 56:6(18), R.S. 56:761 and R.S. 56:785.

HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 19:910 (July 1993), repealed LR 25:

§331. Isles Dernieres Barrier Islands Refuge

A. Regulations for Isles Dernieres Barrier Islands Refuge

1. Regulations for Wine Island, East Island, Whiskey Island, and Raccoon Island a. Public access by any means to the exposed land areas, wetlands and interior waterways of these islands is prohibited.

c. Disturbing, injuring, collecting, or attempting to

Requests to access exposed land areas, wetlands and interior waterways shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands, or of planning and implementing island restoration projects.

b. Disturbing, injuring, collecting, or attempting to disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in writing by the Secretary or his designee for the uses provided for in Paragraph 1.a. above.

c. Boat traffic is allowed adjacent to the islands in the open waters of the Gulf and bays; however, boat traffic is prohibited in waterways extending into the interior of the islands or within any land-locked open waters or wetlands of the islands.

d. Fishing from boats along the shore and wade fishing in the surf areas of the islands is allowed.

e. Littering on the islands or in Louisiana waters or wetlands is prohibited.

f. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

2. Regulations for Trinity Island

a. Public access is allowed in a designated public use area. An area approximately 3,000 linear feet by 500 linear feet is designated as a public use area, the boundaries of which will be marked and maintained by the Department. The designated public use area shall extend westward from the western boundary of the servitude area reserved by Louisiana Land and Exploration Company in the Act of Donation a distance of approximately 3,000 linear feet and northward from the southern shoreline within this area by a distance of approximately 500 linear feet. Public recreation such as bird-watching, picnicking, fishing and overnight camping is allowed in this area. Travel on or across this area shall be limited to foot or bicycle traffic only. No use of all-terrain vehicles or other vehicles powered by internal combustion engines or electric motors shall be allowed.

b. Public access to all exposed land areas of Trinity Island, other than the public use area, is prohibited. Requests to access these exposed land areas shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee in the interest of conducting research on fauna and flora, of advancing educational pursuits related to barrier islands or of planning and implementing island restoration projects.

disturb, injure, or collect any flora, fauna, or other property is prohibited, unless expressly permitted in

writing by the Secretary or his designee for the uses provided for in Paragraph 2.b. above.

d. Any member of the public utilizing the designated public use area shall be required to have a portable waste disposal container to collect all human wastes and to remove same upon leaving the island. Discharge of human wastes, including that within the disposal container, onto the island or into Louisiana waters or wetlands is prohibited.

e. Littering on the island or in Louisiana waters or wetlands is prohibited.

f. Carrying, possessing, or discharging firearms, fireworks, or explosives in the designated public use area is prohibited.

g. Boat traffic is allowed adjacent to the island in open waters of the Gulf and bays and within the man-made canal commonly known as California Canal for its entire length to its terminus at the bulkhead on the

western end of the canal. No boat traffic is allowed in other man-made or natural waterways extending into the interior of the island or in any land-locked open waters or wetlands of the island.

h. Fishing from boats or wade fishing in the surf areas of the island is allowed.

i. Houseboats may be moored in designated areas along the California Canal. An annual permit shall be required to moor a houseboat in the canal. The required permit may be obtained from the Department of Wildlife and Fisheries New Iberia Office.

j. Proposals to conduct oil and gas activities, including seismic exploration, shall be considered on a case-by-case basis and may be permitted by the Secretary or his designee, consistent with provisions of the Act of Donation executed by the Louisiana Land and Exploration Company on July 24, 1997.

B. Violation of any provision of these regulations shall

be considered a Class Two Violation, as described in R.S.

56:115(D), 56:764, and 56:787.

AUTHORITY NOTE: Promulgated in accordance with R.S.

56:6(18), R.S. 56:109, and R.S. 56:781 et seq.

HISTORICAL NOTE: Promulgated by the Department of Wildlife and Fisheries, Wildlife and Fisheries Commission, LR 25:

Bill A. Busbice, Jr.
Chairman

9905#041

Exhibit "C"

Project Summary

Ship Shoal – Whiskey Island West Flank Project TE-47 Terrebonne Parish, Louisiana

Location

The project is located on Whiskey Island, a barrier island in the Isles Dernieres chain in south Terrebonne Parish, Louisiana. The Whiskey West Flank project will extend Whiskey Island westward.

Problems

The Isles Dernieres barrier island chain, which is considered one of the most rapidly deteriorating barrier shorelines in the United States, is losing its structural functions for the coastal/estuarine ecosystem. Chief among these is the chain's storm buffering capacity and the protection it provides human populations, oil and gas infrastructure, inland bays, estuaries, and wetlands. Chain breakup has resulted from both major storm actions and, due to human alterations, the loss of nourishing sediment from the natural system. Whiskey Island changes from 1978 to 1988 include the average loss of 31.1 acres per year.

Restoration Strategy

The project's objectives include: 1) restoring the integrity of the west flank of Whiskey Island to retain its structural function; 2) adding new offshore sediment into the west flank; and 3) restoring roughly 387 acres of barrier island habitat into the island's western flank.

One approach to the problem includes mining and importing offshore Ship Shoal sediment into the Louisiana coastal ecosystem to increase the sediment supply and strengthen island formation. Other approaches involve rebuilding the natural structural framework within the coastal ecosystem to provide for separation of the gulf and the estuary, and creating a continuous protective barrier for back bays and inland marshes to reduce wave energies, thereby helping to reduce land loss and restore the longshore transport system. One final approach towards meeting these goals is to provide a unique and sustainable barrier island habitat for numerous biological species, several of which are endangered, in areas that are presently open water.

Ship Shoal sand would be mined by a cutterhead hydraulic dredge and/or hopper dredge. It would then be transported approximately 8 miles to Whiskey Island. Restored areas will include: 1) 52 acres of 7-foot high, 150-foot wide dunes; 2) 114 acres of above-tide habitat at an elevation of 4 feet; 3) 208 acres of intertidal habitat at an elevation of 2 feet; 4) 8 acres of subtidal habitat. All areas will be planted and have sand fencing placed in order to trap wind-blown sediment.

Details for pipes and booster pumps or additional equipment for hopper dredge operations will be analyzed during engineering and design. Conventional equipment is expected to be used for earth moving to obtain island design elevations, widths, and slopes. Approximate design features for the west flank restoration include beach platform, dune, and marsh platform.

Maintenance is not proposed for this project. If a disastrous storm event should cause significant damage, a restoration project would be proposed.

Progress to Date

This project was selected for Phase I (engineering and design) funding at the January 2002 Breaux Act Task Force meeting. It is included as part of Priority Project List 11.

Enclosure 4D&E

Ship Shoal/Whiskey West Flank (TE-47)

30% & 95% E&D Reviews

State of Louisiana



KATHLEEN BABINEAUX BLANCO
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL RESTORATION AND MANAGEMENT

October 20, 2005

Mr. Wes McQuiddy
Team Leader
Marine and Wetlands Section (6WQ-EM)
Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202

Via Facsimile

(214) 665-6689

Re: 95% Design Review for Ship Shoal Whiskey Island West Flank, (TE-47)
Statement of Local Sponsor Concurrence

Dear Mr. McQuiddy:

We are in receipt of your October 11, 2005 letter regarding the captioned project. In that letter you indicated that EPA has concluded the project is still viable and is recommending the advancement of the project to construction.

Based on our review of the technical information compiled to date, the Ecological Review, the preliminary land ownership investigation, and the preliminary designs, we, as local sponsor, are in concurrence with proceeding to construction. We have instructed the engineering and design firm (DMJM+Harris) to generate the final construction bid documents.

In accordance with the CWPPRA Project Standard Operating Procedures manual, we request that you forward this letter of concurrence along with the revised project cost estimate to the Technical Committee and the Planning and Evaluation Subcommittee.

Please do not hesitate to call if I may be of any assistance.

Sincerely,

Christopher P. Knotts, P. E.
Director

CPK:LCW:dpg

cc: John Hodnett, Engineer Manager
Chris Williams, Project Manager
Luke Le Bas, Engineer Manager

State of Louisiana



KATHLEEN BABINEAUX BLANCO
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

DEPARTMENT OF NATURAL RESOURCES OFFICE OF COASTAL RESTORATION AND MANAGEMENT

December 28, 2004

Mr. Wes McQuiddy
Acting Chief
Marine and Wetlands Section (6WQ-EM)
Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202

Via Facsimile

(214) 665-6689

Re: 30% Design Review for Ship Shoal Whiskey Island West Flank, (TE-47)
Statement of Local Sponsor Concurrence

Dear Mr. McQuiddy:

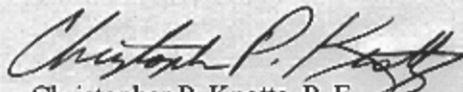
We are in receipt of your November 29, 2004 letter regarding the captioned project. In that letter you indicated that EPA has concluded the project is still viable and is recommending the advancement of the project to the 95 Percent level. Questions were asked in the Ecological Review concerning the projects goals and objectives; these issues will be addressed in the 95 Percent Design report prior to holding the 95 Percent Design Review.

Based on our review of the technical information compiled to date, the Ecological Review, the preliminary land ownership investigation, and the preliminary designs, we, as local sponsor, are in concurrence with proceeding to final design. We have instructed the engineering and design firm (DMJM+Harris) to bring the project to the 95 Percent level.

In accordance with the CWPPRA Project Standard Operating Procedures manual, we request that you forward this letter of concurrence along with the revised project cost estimate to the Technical Committee and the Planning and Evaluation Subcommittee.

Please do not hesitate to call if I may be of any assistance.

Sincerely,


Christopher P. Knotts, P. E.
Director

CPK:LCW:dpg

cc: John Hodnett, Engineer Manager
Chris Williams, Project Manager
Luke Le Bas, Engineer Manager

Enclosure 4F

Ship Shoal/Whiskey West Flank (TE-47)

Final FONSI



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

December 1, 2005

FINDING OF NO SIGNIFICANT IMPACT

To All Interested Agencies and Public Groups:

In accordance with the environmental review guidelines of the Council on Environmental Quality at 40 Code of Federal Regulations Part 1500, the U.S. Environmental Protection Agency (EPA) has performed a Supplemental Environmental Assessment for the following proposed action under the authority of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) of November 1990, House Document 646, 101st Congress (Public Law 101-646).

Project Name: Ship Shoal Whiskey Island West Flank Restoration (TE-47)

Sponsors: U.S. Environmental Protection Agency, Region 6
Louisiana Department of Natural Resources

Total estimated funding \$42,175,800

Phase 1 (Engineering and Design) funding \$ 2,999,000

Phase 2 (Construction) funding \$39,176,800

Location: The proposed project is located on Whiskey Island in the Isles Dernieres Barrier Island chain, centered at approximate coordinates 29° 03' 45" north latitude, and 90° 49' 41" west longitude. The proposed sand borrow site is located approximately 10 miles south-southwest of Whiskey Island in the Gulf of Mexico, entirely within Block 88 of Ship Shoal.

Introduction. The EPA prepared an Environmental Assessment (EA) in December 1993 for the restoration of Isles Dernieres Barrier Island which included Racoon Island, Whiskey Island, Trinity Island and East Island. On September 4, 1997, EPA issued an addendum to the EA and a Finding of No Significant Impact (FNSI) for the Whiskey Island Barrier Island Restoration and Coastal Wetland Creation (TE-27) project, addressing the direct creation of approximately 355 acres (ac) of emergent marsh platform, and four major breach closures, including the Coupe Nouvelle. The Statement of Findings was issued on November 6, 1997. In April 2004, the U.S. Department of the Interior, Minerals Management Service (MMS), prepared an EA analyzing the proposed action to dredge sand within Block 88 in the Ship Shoal area for placement on the west flank of Whiskey Island (TE-47). Based on the EA, the MMS concluded that the proposed action would not significantly affect the quality of the human environment and that preparation of an Environmental Impact Statement (EIS) was not warranted.

Proposed Action. The objective of project TE-47 is to continue the restoration of Isles Dernieres. Offshore Ship Shoal sand would be excavated and transported a distance of

approximately 10 miles to restore the west flank of Whiskey Island. The restoration includes a 600-foot (ft) wide berm at +3 ft North American Vertical Datum of 1988 (NAVD), and 300-ft wide at +6 ft NAVD, and will require about 2.8 million cubic yards (cy) of sand. There is an existing east flank restoration area which includes a 450-ft wide berm at +3 ft NAVD, and a 100-ft wide dune transitioning from the west flank's +6 ft NAVD to the east flank's +4 ft NAVD. Approximately 1.1 million cy of sand will be required for the transition. The existing back barrier marsh habitat will be protected during the transition into the adjacent east dune to mitigate overwash-breaching (i.e., western marsh lobe) and to retain the island structural function.

After the construction, the west flank would be restored to approximately 415 ac of intertidal, supratidal, and dune habitat, and the extension to the east would be restored to approximately 85 ac of additional intertidal, supratidal, and dune habitat, for a total of 500 ac. The total benefits from the project would be the direct creation of approximately 85 ac of dune platform, a net increase of 98 ac of supratidal and a net increase of 131 ac of intertidal habitats. All areas will be planted and sand fencing placed to trap wind-blown sediment.

The proposed TE-47 project is part of and consistent with the Louisiana Coastal Wetlands Conservation and Restoration Task Force, and the Wetlands Conservation and Restoration Authority ecosystem strategy to restore barrier islands and gulf shorelines. CWPPRA provides Federal funds for planning and implementing projects that create, protect, restore and enhance wetlands in coastal Louisiana. Under CWPPRA, the project cost is shared by the Federal sponsoring agency and the State of Louisiana. The Federal government provides 85 percent of the project cost and the Louisiana Department of Natural Resources (LDNR) provides the remaining 15 percent.

Finding. On the basis of this Supplemental EA performed by the EPA of the proposed project, and other findings and available information, the Regional Administrator has determined that the proposed project is not a major Federal action significantly adversely affecting the quality of the human environment, and that preparation of an EIS is not warranted. This preliminary FNSI will become final 30 days after the issuance of the public notice if no new information is received to alter this finding. No administrative action will be taken on this decision during the 30-day comment period. Comments regarding this preliminary decision not to prepare an EIS, requests for copies of the EA, or review of the Administrative Record containing the information supporting this decision, may be submitted in writing to the U.S. Environmental Protection Agency; Office of Planning and Coordination (6EN-XP); 1445 Ross Avenue, Suite 1200; Dallas, Texas 75202-2733, or by telephone at (214) 665-8150.

Responsible Official,

John Blevins

Director

Compliance Assurance
and Enforcement Division

Enclosure 4G

Ship Shoal/Whiskey West Flank (TE-47)

Ecological Review

E C O L O G I C A L R E V I E W

Ship Shoal: Whiskey West Flank Restoration

CWPPRA Priority Project List 11

(State No. TE-47)

August 2005

Mark A. Stead
Restoration Technology Section
Coastal Restoration Division
Louisiana Department of Natural Resources

Ecological Review

Ship Shoal: Whiskey West Flank Restoration (TE-47)

In August 2000, the Louisiana Department of Natural Resources (LDNR) initiated the Ecological Review to improve the likelihood of restoration project success. This is a process whereby each restoration project's biotic benefits, goals, and strategies are evaluated prior to granting construction authorization. This evaluation utilizes environmental data and engineering information, as well as applicable scientific literature, to assess whether or not, and to what degree, the proposed project features will cause the desired ecological response.

I. Introduction

The proposed Ship Shoal: Whiskey West Flank Restoration (TE-47) project is adjacent to the constructed Whiskey Island Restoration (TE-27) project located on the southernmost boundaries of Lake Pelto and Caillou Bay in the Terrebonne Basin (Figure 1). Whiskey Island is part of the Isles Dernieres barrier island chain which stretches for 20 miles along the Louisiana coast, approximately 63 miles west of the mouth of the Mississippi River and 75 miles southwest of New Orleans, Louisiana. The project area encompasses the western flank of Whiskey Island which is the second island from the western end of the Isle Dernieres barrier island chain. The total area of the Ship Shoal: Whiskey West Flank Restoration project is approximately 257 acres of open water and 152 acres of land (United States Environmental Protection Agency [EPA 2001]). Approximately 700 acres of dune, subtidal, intertidal, and subtidal habitat will be restored through the beneficial use of sand mined from the offshore bar known as Ship Shoal located 10 miles south of Whiskey Island.

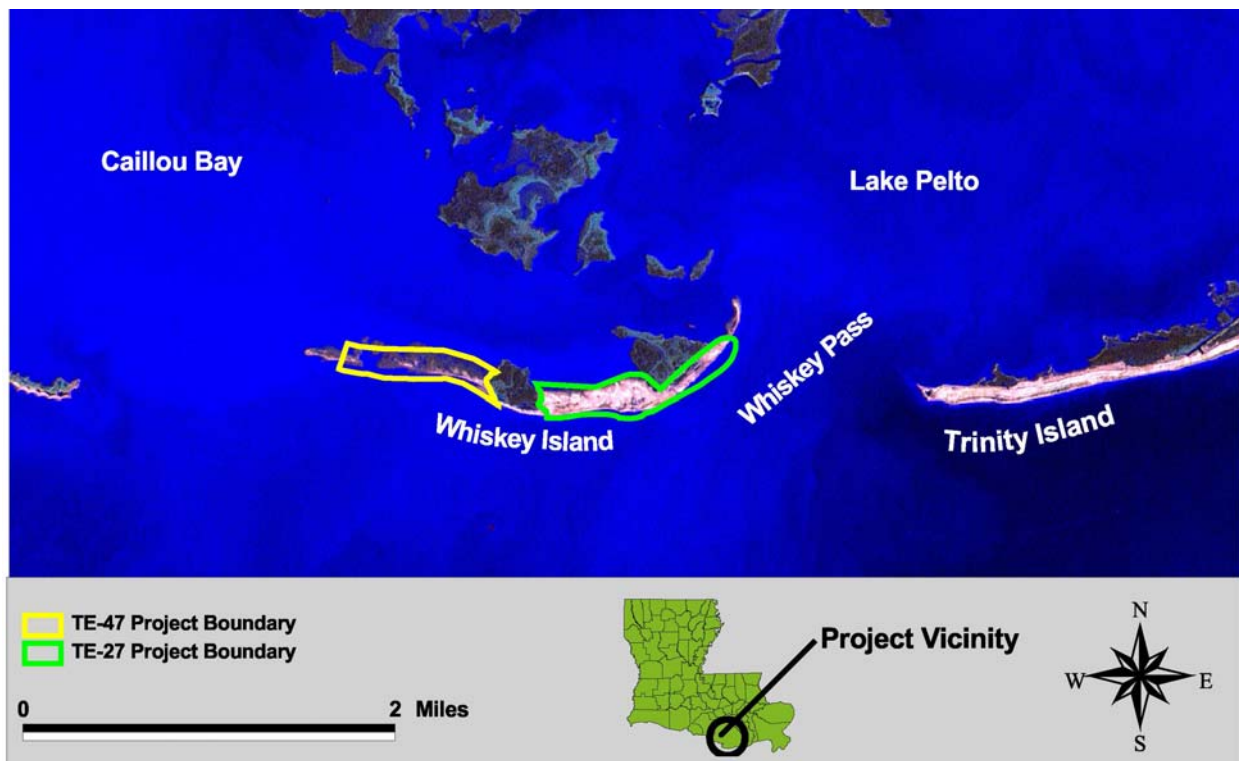


Figure 1. Ship Shoal: Whiskey West Flank Restoration (TE-47) project boundary

The Isles Dernieres barrier island chain shoreline is one of the most rapidly deteriorating barrier shorelines in the United States (Williams et al. 1992). It is estimated that most of Louisiana's barrier islands have naturally decreased in land mass by approximately 40% over the last 100 years (Monteferrante and Mendelssohn 1982). Historically, tropical storms and hurricanes have caused beach erosion and overwash of these islands. In addition, winter storms and cold front passages contribute to the erosion of the islands, most notably the back barrier salt marsh shorelines (LCWCRTF & WCRA 1999). Erosion of the gulf and bay shorelines is causing the islands to narrow. From the 1890's to 1988, island width had decreased approximately 2,612 feet (Williams et al. 1992). Historical landloss estimates in the area have averaged between 32.8 and 49.2 feet per year (LCWCRTF & WCRA 1999). Future landloss projections estimate that none of the Isles Dernieres chain will remain by 2050 and some of the islands will become sub-aqueous by 2007 (LCWCRTF & WCRA 1999). Mining of sand from the Ship Shoal and using this material to nourish the beaches on the western flank of Whiskey Island will aid in reducing storm surge and in protecting interior marsh and infrastructure (LCWCRTF & WCRA 1999). This objective is in accordance with *Coast 2050* Region 3 Ecosystem Strategies which include maintaining and restoring the Isles Dernieres barrier island chain.

II. Goal Statement

- Maintain approximately 125 acres of the created/restored dune, intertidal, and supratidal habitat by the end of the 20-year project life (Table 1).
- Prevent breaching of the barrier island throughout the 20-year project life.
- Assess the effectiveness of mining offshore Ship Shoal sand for use in future barrier island restoration projects.

Table 1. Acreage targets for the west flank of Whiskey Island with and without project (EPA 2003)

Target Year	Future Without Project (Acres)	Future With Project (Acres)
TY-0	186	186
TY-1 (as built)	179	500
TY-10	126	322
TY-20	60	125

III. Strategy Statement

- Create a 200-foot wide gulfside beach berm at an elevation of +3.0 feet NAVD-88 and a 100 to 300-foot wide dune at an elevation of +4.0 to +6.0 feet NAVD-88.
- Create back barrier marsh on the bay side of the island at an elevation of +2.0 feet NAVD-88 at the toe of the dune to +1.0 foot NAVD-88 at the toe of the platform.
- Sand fencing and vegetative plantings will be implemented to stabilize dune and back barrier components.

IV. Strategy-Goal Relationship

Project goals will be achieved by mining and transporting offshore Ship Shoal sand to restore the west flank of Whiskey Island. Material would be transported a distance of approximately 10 miles via pipeline and booster pumps to the island and used to create dune, marsh and intertidal habitat. Conventional earth moving equipment would be used to obtain design elevations, widths, and slopes. A design template which was selected through the numerical modeling of alternatives was used to achieve the goal of preventing island breaching over the life of the project.

V. Project Feature Evaluation

Alternative Designs

Three alternative island designs were modeled by Moffat & Nichol Engineers, Inc. (2004) to determine the best method for restoring the west flank of Whiskey Island. The alternatives include three designs of differing dune width and height, back barrier marsh width and height, and berm width and height are presented in detail below (Table 2).

Table 2. Alternative design parameters for the west flank of Whiskey Island

Alternatives	Berm Width (feet)	Berm Height (feet NAVD-88)	Dune Width (feet)	Dune Height (feet NAVD-88)	Back Barrier Marsh Width (feet)	Back Barrier Marsh Height (feet NAVD-88)	Total Acres Created
A	100	3.0	200	7.0	975-1325	1.0-2.0	547
B	200	3.0	300	6.0	825-1225	1.0-2.0	549
C	300	3.0	400	5.0	675-1025	1.0-2.0	542

Alternative A (Figure 2 and Appendix A) involves the construction of a marsh platform, beach berm, and dune. Because the design widths of the dune and beach berm are relatively small, this alternative design allows for the creation of more back barrier marsh habitat (204 acres) in lieu of beach and dune habitat (126 and 83 acres, respectively) and 134 acres of intertidal habitat. A total of 547 acres of subtidal gulf beach, dune, and intertidal marsh would be created and or restored using this design alternative.

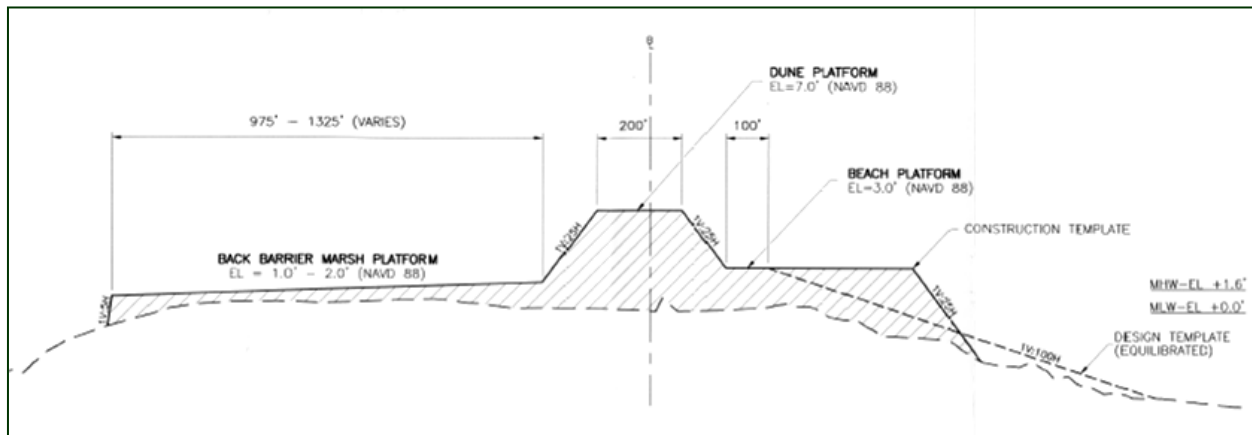


Figure 2. Alternative A (DMJM + HARRIS, Inc. 2005)

Alternative B (Figure 3 and Appendix B) involves the same components as Alternative A except that dune height is at a slightly lower elevation and dune and beach berm widths are increased. This alternative will allow for the creation of more beach and dune habitat (144 and 90 acres, respectively) than Alternative A, but less back barrier marsh habitat (181 acres) and a similar acreage of intertidal habitat (134 acres). A total of 549 acres of subtidal, gulf beach, dune, and intertidal marsh would be created and or restored using this design alternative.

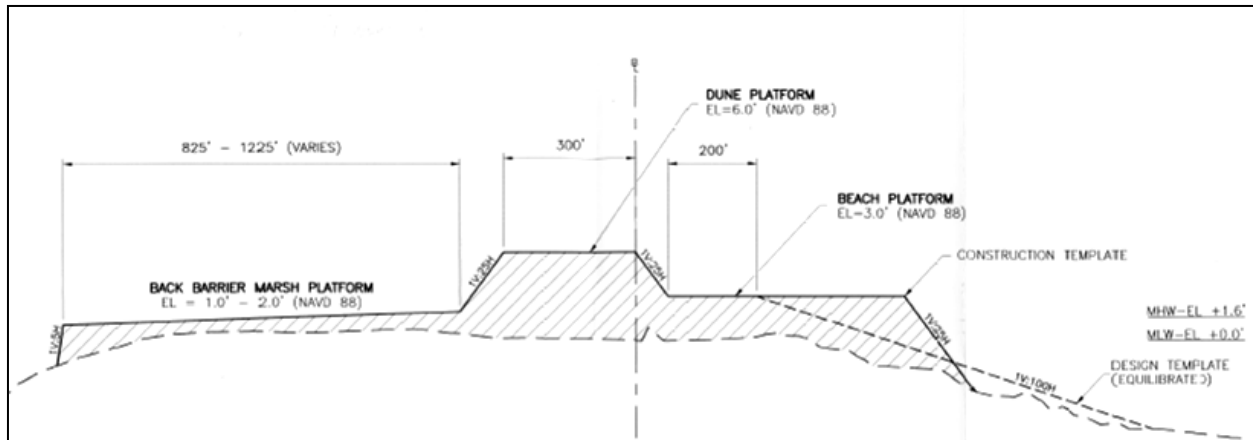


Figure 3. Alternative B (DMJM + HARRIS, Inc. 2005)

Alternative C (Figure 4 and Appendix C) also involves the same components as Alternatives A and B except dune height will be further reduced than Alternative B and the width of the beach berm and dune will be increased. Alternative C will result in the least amount of back barrier marsh creation (146 acres) but the largest acreage of beach berm and dune habitat (163 and 99 acres, respectively) and a similar total of intertidal habitat (134 acres). A total of 542 acres of subtidal gulf beach, dune, and intertidal marsh would be created and or restored using this design alternative.

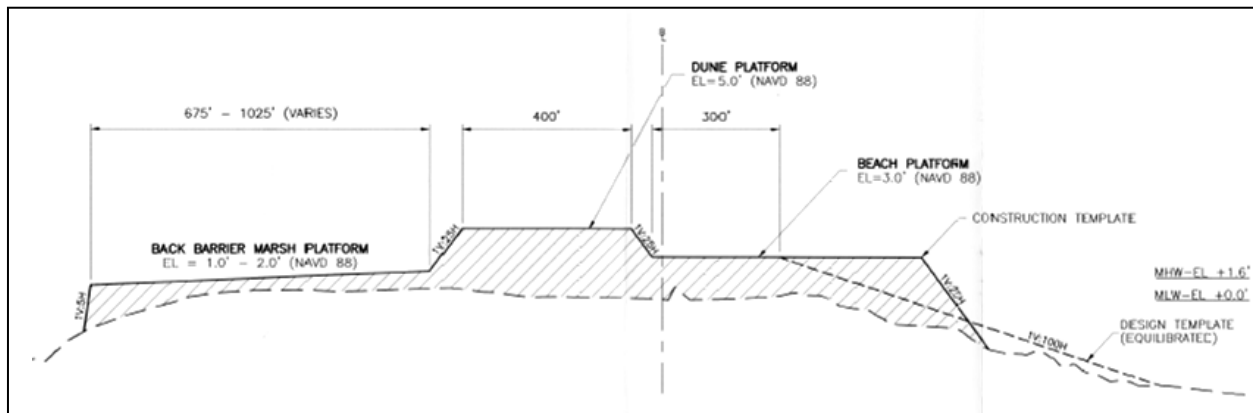


Figure 4. Alternative C (DMJM + HARRIS, Inc. 2005)

Model Discussion

Numerical models were developed by Moffatt & Nichol Engineers, Inc. (2004) to examine hydrodynamics, waves, sediment transport, and morphological changes under “future with-project” and “future without-project” conditions. In addition, the models were used to compare the performance of the three alternatives under design storm conditions and during a series of other storm scenarios over the 20-year project life. The models were developed using the Delft3D modeling system, an integrated surface water modeling system by WL|Delft Hydraulics in the Netherlands (DMJM + HARRIS, Inc. 2005).

Design Storm and Alternative Performance

Hurricanes and the associated storm surge play a large role in determining design parameters for barrier island restoration projects. Dune height and width often reduce the frequency of overwashing and breaching events that may occur and allow for the establishment

of back barrier marsh vegetation. Using a developed stage of storms versus frequency estimate for East Timbalier Island (Suhayda 1991) and Grand Isle (USACE 1979), Moffat & Nichol Engineers, Inc. estimated that a Category 2 storm was a reasonable design storm for this project. A design storm is essentially a storm that would recur over or near Whiskey Island once every thirty years and have an estimated storm surge of +5.0 feet NAVD-88. Storm surge combined with wave setup would increase the total height of surge to an estimated +7.0 feet NAVD-88. Moffat & Nichol Engineers, Inc. modeled the effects of the design storm and a major storm (Category 3-4), which is estimated to impact Whiskey Island once every 30 to 100 years, respectively, in the three alternative designs.

The model showed that the three alternatives would likely survive the design storm without catastrophic damage. However, Alternative C would experience overwashing and breaching and would be vulnerable to smaller tropical systems. In addition, Alternative C has an extremely wide dune, thereby reducing the acreage of the back barrier marsh. Alternative A was estimated to prevent breaching and experience less inundation and erosion than both Alternatives B and C during a design storm but caused increased flow-training effects on the central and eastern sections of Whiskey Island outside of the project area. Alternative B also prevented breaching but caused less flow-training effects, compared to Alternative A, on the central marsh lobe and eastern portions of the island. Also, the dune height of Alternative B (+6.0 feet NAVD-88) is consistent with the recommendations of Penland et al., (2003) that natural dune height (3.0-6.0 feet NAVD-88) results in a significant increase in biodiversity. Therefore, the Alternative B template was chosen by Moffatt & Nichol Engineers, Inc. as a superior design for the reconstruction of the Whiskey Island western flank.

In the event of a major storm (Category 3-4), the hydrodynamic and morphological impacts on the restored western flank of Whiskey Island are significantly more severe (DMJM + HARRIS, Inc. 2005). It is estimated that the entire island would be under more than +7.0 feet NAVD-88 of water. Significant breaching and subsequent erosion of the restored island area would occur (DMJM + HARRIS, Inc. 2005).

Alternative B-Extended

As mentioned previously, modeling results of Alternatives A, B, and C showed that the central marsh lobe (Figure 5) would experience increased overwash and possible breaching (flow-training effects) if the island experienced a storm surge associated with a Category 2 hurricane. Therefore, a fourth alternative was formulated by Moffat & Nichol Engineers Inc. by modifying Alternative B (Appendix D) with the intention of protecting the central marsh lobe from inundation. This fourth alternative was called Alternative B-Extended. Modeling results show that by extending the beach berm and dune template of Alternative B eastward, flow over the marsh lobe in the middle section of the island would be reduced during a design storm. This extended beach berm and dune template (Figure 6) would tie in with the previously constructed TE-27 project. Additionally, this extension would, through longshore transport processes, act as a feeder beach for the western flank. Alternative B-Extended was chosen as the preferred alternative by the project team at the 30% Design Review Meetings.

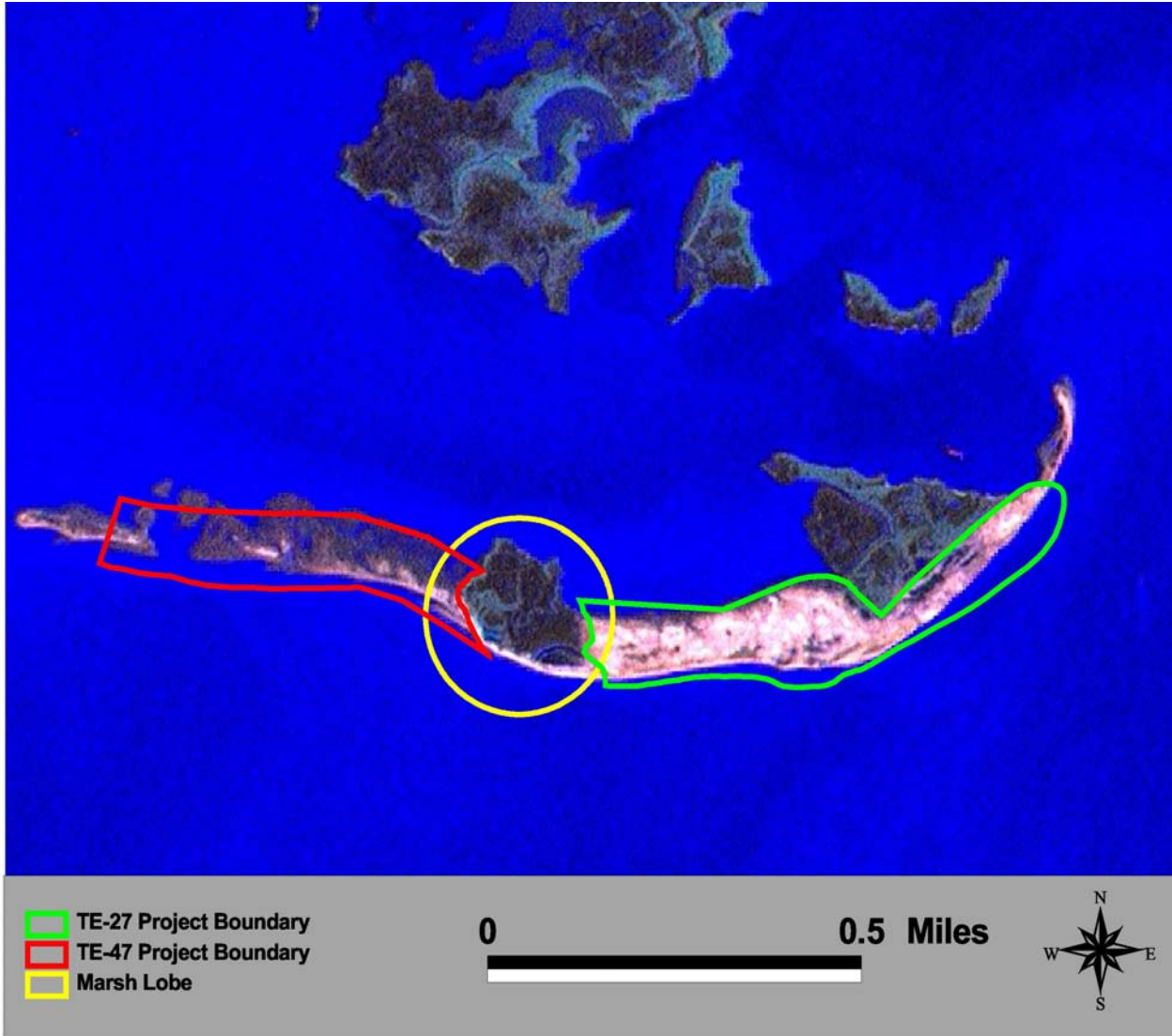


Figure 5. Whiskey Island marsh lobe

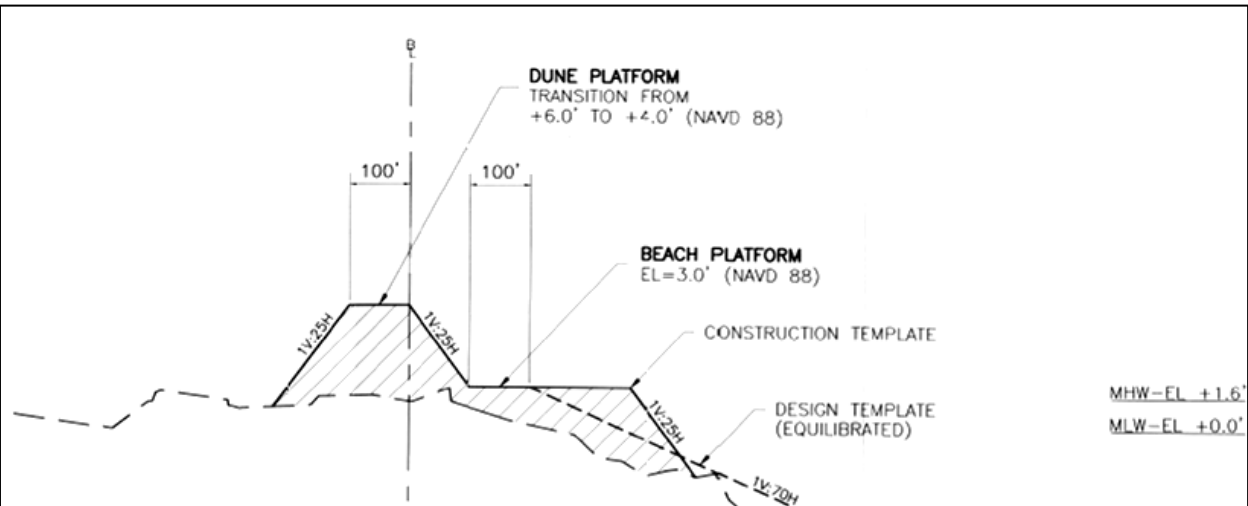


Figure 6. Alternative B-Extended portion to be constructed across the central marsh lobe (DMJM + HARRIS, Inc. 2005)

Alternative B-Extended involves the same components as Alternative B except that dune and beach berm length extends farther east and dune height transitions from +6.0 feet NAVD-88 to +4.0 feet NAVD-88 to protect the central marsh area of Whiskey Island (Table 3). This alternative will allow for more subtidal (203 acres), beach (198 acres), dune (121 acres), and intertidal marsh habitat creation (181 acres) compared to the other alternatives. A total of 703 acres of subtidal gulf beach, dune, and intertidal marsh would be created and/or restored using this design alternative.

Table 3. Design parameters of Alternative B and Alternative B-Extended for the west flank of Whiskey Island (DMJM + HARRIS, Inc. 2005)

Alternatives	Berm Width (feet)	Berm Height (feet NAVD-88)	Dune Width (feet)	Dune Height (feet NAVD-88)	Back Barrier Marsh Width (feet)	Back Barrier Marsh Height (feet NAVD-88)	Total Acres Created
B	200	3.0	300	6.0	825-1225	1.0-2.0	549
B-Extended	100-200	3.0	100-300	4.0-6.0	0-1225	1.0-2.0	703

The model also showed that significant losses of the restored western flank can be expected over the life of the project. At the end of the project life it is estimated that only 20-30%, or roughly 100 to 150 acres of the restored subaerial portion of the western flank using the Alternative B-Extended design will remain without a maintenance event (Moffatt & Nichol Engineers, Inc. 2004). In addition, the habitat type will change significantly over the life of the project. Following construction, the restored western flank will likely have a habitat distribution of 40% supratidal beach, 20% intertidal beach, and 40% intertidal marsh. At year 20 the distribution would be similar to conditions today in that 20% supratidal beach, 60% intertidal beach, and 20% intertidal marsh, would still exist. The relatively high loss of material is a direct result of overwash during storm events, longshore transport, and other natural erosional processes. Alternatives A, B, and C were estimated to have a similar percent of restored area remaining at the end of the project life (DMJM + HARRIS, Inc. 2005).

Geotechnical Analysis of Borrow Site

The proposed borrow site is located approximately 10 miles due south of Whiskey Island and is contained entirely within Ship Shoal-Block 88. Ship Shoal is an east-west linear offshore bank 31 miles long by 3 miles wide and up to 16 feet thick and submerged in approximately 10-30 feet of water (DMJM + HARRIS, Inc. 2005). In order to determine a suitable borrow site within Ship Shoal, a preliminary geophysical survey was conducted by C & C Technologies (2003). C & C Technologies determined that the west central section of Ship Shoal-Block 88 contained material suitable for restoring the west flank of Whiskey Island. A subsequent sand source investigation of Ship Shoal-Block 88 was conducted by Soil Testing Engineers, Inc. (STE) in late March and early April of 2004. The purpose of this investigation was to further assess the suitability of the offshore borrow site material within Block 88 for the restoration of the west flank of Whiskey Island (STE 2004). Thirty-five vibracores were collected from a 5,500-foot by 6,500-foot plan view area of the middle to southern half of Block 88. The depth at which the vibracores were collected ranged from 18 to 23 feet.

Analysis of grain size, Atterberg limits determinations, moisture content determinations, and specific gravity revealed that the upper sands were the most suitable sediment type present within the area of Block 88 for island restoration. Typically, an upper fine sand layer was

located at the crest or top of the shoal while a central silty sand to sandy silt layer and a lower clay layer were contained underneath. It was determined that within the investigated area that the upper sands ranged in thickness from 4 feet at the northeast corner to 20 feet or greater at the northwest corner. A total of approximately 17,300,000 cubic yards of sand is contained within the investigated area of Block 88. Mean grain size of the upper crest of the shoal was determined to be 0.20 mm, with a 2.3 PHI value. These values were used to determine the compatibility of the sediments at the borrow site to those contained at the western flank of Whiskey Island.

Geotechnical Analysis of Whiskey Island West Flank

Soil Testing Engineers (STE 2004) performed a sampling investigation of the sediments on and around both the eastern and western flanks of Whiskey Island in May of 2004. The purpose of this sampling investigation was to compare the sediment characteristics of Whiskey Island to those of the borrow site using a sediment suitability assessment. Forty-nine “grab” samples were collected across the subaerial profile, south Gulf side, and back barrier of Whiskey Island. Grain size sieve analyses and moisture content determinations were performed by STE to classify sediments collected. Results of the geotechnical analysis indicated that the average grain size of the material collected at or above MLW from the west flank of Whiskey Island was approximately 0.20 mm.

Sediment Suitability Index

A sediment suitability assessment was conducted to determine how texturally similar the borrow material in Ship Shoal-Block 88 was compared to the native material on Whiskey Island’s western flank (STE 2004). If the material added to the western flank of Whiskey Island is coarser or finer than the native material the performance of the project will be significantly reduced. The borrow material placed on the beach of Whiskey Island will undergo a natural sorting process as a result of coastal processes and will eventually approach the native grain-size distribution. The finer material that does not match the native material will be lost offshore (USACE 2002).

The mean grain size of samples taken from at or above MLW of the west flank of Whiskey Island was approximately 0.20 mm, while deeper Gulf and bay subtidal samples were significantly finer. Therefore, it was determined that the samples collected in Ship Shoal-Block 88 were similar to those collected at Whiskey Island and contained primarily fine sand with a mean grain size of 0.20 mm. An overfill factor was used in order to estimate the volume of borrow material needed to produce a stable unit of usable fill material with similar grain size characteristics as the native material. If the overfill factor is estimated to be 1.0, the borrow and native material are nearly identical. Overfill factors were computed using data from each of the borrow area vibracores and samples from the MLW and shallow crest of the west flank. The average overfill factor was calculated to be 1.2, meaning 1.2 volumetric units of borrow material would be required to create 1.0 unit of stable Whiskey Island beach material.

Dredging Alternative Analysis

An estimated 2-4 million cubic yards of sand will be dredged and transported nearly 10 miles from Ship Shoal-Block 88. Dredging and transport alternatives were chosen based on several factors including production rates, transport distance, water depth, environmental factors, cost, and equipment availability (DMJM + HARRIS, Inc. 2005). Three dredging and transport

options were chosen for further evaluation after completion of the Preliminary 30% Design Review Meeting.

- Hydraulic suction cutterhead dredge with pipeline/booster station to shore: Transport of sediments will be accomplished by pumping material through twenty to thirty-six inch pipelines to shore. Floating and fixed booster pumps will be situated along the pipeline and spaced to optimize cost. Once the sediment is transported, the material will be placed along the front of the restoration project for final placement and grading.
- Hopper dredges to intermediate point for transfer to pipeline/booster station to shore: The pipeline to shore, with booster stations, would be similar to the first option but shorter in overall length. Dredges will be chosen based on the operating drafts and transfer points from the hopper dredge to pipeline to the shore of Whiskey Island.
- Hydraulic cutterhead dredge filling hopper barge for delivery to intermediate transfer point to pipeline/booster station to shore: This approach is similar to the second option substituting a cutterhead dredge and barges for the hopper dredges. This option offers more flexibility and assurance of production output by using multiple units as well as the ability to locate the transfer point in shallower water closer to shore.

Dredging cost estimates were computed based on a U.S. Army Corps of Engineers CEDEP estimating system, and included the costs of performing the dredging, transport and placement of material. Based on these cost estimates DMJM+HARRIS determined that the hydraulic suction cutterhead dredge with pipeline/booster station to shore is the most cost effective and efficient alternative for the construction of this project.

Borrow Site Impacts

The Moffat & Nichol Engineers, Inc. model evaluated the changes in shoal geometry and the resulting impacts on local wave conditions following mining of sediments from the shoal (DMJM + HARRIS, Inc. 2005). One concern with removing sand from Ship Shoal was the impacts on regional and local wave conditions. Stone et al. (2003) found that removal of the shoal (1.6 billion cubic yards) would increase significant wave heights during severe storms as much as 90-100% over the shoal and 50% in the lee of the shoal, but that shoal removal would not measurably increase near-shore wave energies or erosion on the Isles Dernieres. It can be expected that impacts from removing 2-4 million cubic yards of material for this project would be less severe than removal of the entire shoal.

Moffatt & Nichol Engineers, Inc. used SWAN for both existing and post-dredge conditions to better understand the hydrodynamic impacts of removing 17 million cubic yards of sediment (entire volume of Block 88) from the shoal, although only 2-4 million cubic yards would be required for the restoration of the western flank of Whiskey Island. It was determined that during a severe storm the change in wave height was estimated at 1.4 feet or a 7.0% increase compared to current conditions. However, the extent of these impacts were localized and limited to an area of approximately 4 miles wide by 6 miles long. Waves associated with fair weather conditions travel over the existing shoal without dissipating. It can therefore be assumed that

removing sand from Ship Shoal-Block 88 would have only a small localized impact on wave climate under storm conditions.

Back Barrier Marsh Creation

Back barrier marsh will be created using coarse material mined from Ship Shoal. The elevation of the back barrier will be +2.0 feet NAVD-88 at the back toe of the dune and +1.0 feet NAVD-88 at the bay shoreline. Vegetation will be used to further stabilize the material. No settlement analysis was conducted on the back barrier component but it is estimated that the coarse material being used will experience little dewatering and consolidation. The back barrier marsh elevation for this project is significantly lower than design elevations of similar barrier island projects. However, many of the previous constructed back barrier marsh components were built at an elevation too high to be considered function subtidal marsh (DMJM + HARRIS, Inc. 2005).

Sand Fencing

Sand fencing aids in the formation of dunes and traps sand that otherwise would be lost (Khalil and Lee 2004). The Barrier Island Comprehensive Monitoring (BICM) Program, recommends installing sand fencing 4 feet high with 50% porosity (i.e., ratio of area of open space to total projected area) placed parallel to shore along the entire length of the dune. The purpose of the sand fencing design is to capture wind-blown sand and help build and stabilize mounds. Sand fencing will be constructed on the western flank of Whiskey Island after the construction of the dune, intertidal and supratidal components of the project are completed.

Vegetation

The United States Department of Agriculture (USDA) recommended the use of both marshhay cordgrass (*Spartina patens*) and bitter panicum (*Panicum amarum*) in dune restoration projects (USDA 1992). These plants should stabilize sand particles when used in conjunction with sand fencing. A slightly altered protocol was recently formulated by LDNR's Coastal Engineering Division's Planting Section. This protocol is based on reviews of previous planting plans, specifications, and is meant to improve survival and coverage for the vegetative planting of future projects. The new planting strategy includes increasing the diversity of the plants used on berm and dune habitat and installing the plants earlier in the growing season. The added species are thought to better tolerate the dry harsh conditions found on the berm and dune areas of barrier islands during the summer months (Ken Balingher, LDNR, Personal Communication April 2005). By installing the dune plants earlier in the season (early spring), the vegetation will have time to establish root systems before summer begins and disturbances to bird nesting areas will be minimized.

VI. Assessment of Goal Attainability

Environmental data and scientific literature documenting the effects of the proposed project features in field application are evaluated below to assess whether or not, and to what degree the project features will elicit the desired ecological response.

Dune Building

According to the Louisiana Gulf Shoreline Restoration Report (Campbell and Benedet 2003), the basic design for beach nourishment should place enough sediment in the island system to produce a volumetrically stable and sediment-rich barrier complex. The most important parameter when developing an optimal design is to compensate for the amount of sediment

typically lost naturally by the system. The initial increase in volume should also include natural components of barrier islands, such as berm, dune, and back barrier marsh.

Historically, the height of artificial dunes is a controversial subject. Some hold the view that dune height should mimic the natural surroundings and allow for overwash of the islands. Penland et al. (2003) recommends building dunes at an elevation that mimics natural barrier island conditions (+3.0 to +6.0 feet NAVD-88) to facilitate an increase in biodiversity. Others believe that dune height should be significantly higher than natural dunes to protect infrastructure and prevent overwashing during storm events (LGSRR 2003). Therefore, dune height should be a function of specific project goals. If the goal of the project is to prevent overwashing and breaches, higher dunes are needed. In contrast, if the goals of the project are to maximize island and marsh footprints while maintaining the island area and its environment, then lower and wider dunes should be constructed. The overall objective of the TE-47 project is to maintain island area and mimic natural barrier island habitat; therefore, lower wider dunes that allow some island rollover would be the favorable design specification.

There are several recently constructed Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) barrier island projects that have included the design and implementation of dune and marsh platforms. However, it is difficult to evaluate these projects due to the fact that environmental monitoring data are limited. A list of constructed projects along the Isle Dernieres barrier island chain and their respective design parameters are listed below.

Isles Dernieres Restoration East Island (TE-20)

- Approximately 242 acres of supratidal, intertidal, and dune habitat was created using sediments dredged from Whiskey Pass
- Marsh platform constructed to an elevation of +4 feet NAVD-88
- Dune elevation of +8 feet NAVD-88 with a dune width of 300 to 500 feet
- Construction completed in July 1999

Isles Dernieres Restoration Trinity Island (TE-24)

- Included the creation of approximately 353 acres of supratidal, intertidal, and dune habitat using sediments dredged from Whiskey Pass
- Marsh platform constructed to an elevation of +4 feet NAVD-88 and 800 feet wide
- Dune elevation of +8 feet NAVD-88 with a dune width of 300 feet
- Construction completed in July 1999

East Timbalier Island Sediment Restoration – Phase 1 (TE-25)

- Included the creation of approximately 226 acres of barrier island habitat.
- Marsh platform constructed to an elevation of +2.0 feet NAVD-88 and 500 feet wide
- Dune elevation of +5 feet NAVD-88 and dune width of 200 feet
- A 7,000 foot seawall was constructed along the Gulf shoreline.
- Construction was completed in May 2001

Whiskey Island Restoration (TE-27)

- Included the creation of approximately 355 acres of supratidal, intertidal, and dune habitat using sediments dredged from Whiskey Pass

- Dune and Marsh elevations ranging from +3 to +4 feet NAVD-88 with a width of 300-500 feet
- Construction completed in July 1999

Timbalier Island Dune and Marsh Creation (TE-40)

- Marsh platform constructed to an elevation of 1.4 feet NAVD-88 and 800 feet wide
- Dune elevation of +8 feet NAVD-88 and a dune width of 400 feet
- Construction recently completed

Preliminary observations show that these barrier island restoration projects were effective at reducing island erosion and initially succeeded in increasing the height and volume of the islands (West 2004). However, sampling trips after the arrival of Hurricane Isidore and Lili have shown that the previously mentioned barrier islands have sustained considerable loss of land on both the gulf and bay sides of the island to open water. Although a significant amount of sediment has been lost, the island chain has yet to become sub-aqueous due to the preventative sediment fill before the arrival of two major storms. Sand fencing and vegetation plantings have been shown to reduce sediment loss on the islands and should be installed as soon as possible following construction. Increasing species richness and vegetative cover may promote increased sediment stability and facilitate further synergistic effects of vegetation growth and volume maintenance (West 2004).

Although the previously listed projects differ in design, the general objectives of creating dune and marsh habitat, preventing breaching and overwashing and establishing vegetation are similar. Future performance evaluations are needed for each of these projects to determine an optimized design for island and marsh restoration in the barrier island systems.

Vegetation Plantings and Sand Fencing

Factors that may affect vegetative planting projects include soil characteristics, wave fetch, herbivore threats, and many other site specific conditions (Bahlinger 1995). The USDA recommends the use of both marshhay cordgrass (*Spartina patens*) and bitter panicum (*Panicum amarum*) in dune restoration projects (USDA 1992). The following studies support the use of vegetation plantings in barrier island restoration projects, when used in combination with sand fencing.

- Mendelssohn et al. (1991) demonstrated the success of effectively building dunes in low sediment supply systems such as Pass La Mer to Chalant Pass and Pelican Island by combining vegetation plantings with sand fencing to decrease wind velocity along the dune. The three species of plants used in the study were bitter panicum (*Panicum amarum*), sea oats (*Uniola paniculata*), and seashore paspalum (*Paspalum vaginatum*). In addition, Mendelssohn et al. (1991) concluded that straight fences with spurs were initially more successful at accumulating sand and promoting dune height. Additionally, straight fences arranged parallel to the shoreline were more effective overall when compared to those angled perpendicularly to the shoreline.
- The Timbalier Island Planting Demonstration (TE-18) project was a 5-year demonstration of sediment trapping fences used in conjunction with vegetative plantings to build dunes along the gulf shoreline of Timbalier Island, in Terrebonne Parish, Louisiana. Over 7,390 linear feet of sand fencing was constructed parallel to the Gulf of Mexico shoreline and each fence

site had perpendicular spurs added every 50 feet that extended 25 feet from the fence bayward. Marshhay cordgrass (*Spartina patens*) and Atlantic panicgrass (*Panicum amarum* var. *amarulum*) were planted on the bay side of the fences. Both *Panicum amarum* var. *amarulum* and *Spartina patens* displayed excellent transplant survival when sand fences remained intact, approximately 93% and 53% respectively. Fenced and planted sections of the project area experienced a 0.8 foot per year increase in average dune height between 1995 and 1999, while the reference areas experienced a 0.5 foot per year increase. Sand fencing along with vegetative plantings appeared to be successful in trapping sediment and increasing overall dune height particularly in the first one to two years after construction (Townson et al. 1999).

- In 1992, the LDNR performed a restoration study which incorporated the use of marshhay cordgrass (*Spartina patens*) planted on 1-foot centers at Trinity Island, one of the four islands within Isles Dernieres. By 1994, this and other native vegetation such as salicornia (*Salicornia virginica*), baccharis (*Baccharis halimifolia*), black mangrove (*Avicennia germinans*), and seaside goldenrod (*Solidago sempervirens*) had propagated and assisted in stabilizing the island (Bahlinger 1995).
- Preliminary analyses of data from two similar CWPPRA barrier island projects showed only a slight increase in vegetation cover two years following construction. At Isles Dernieres Restoration East Island (TE-20), there was a slight increase in vegetation from 1999 (immediate post-construction) to 2001 (2 year post-construction) for bay, spur, and areas left unplanted. Data for Isles Dernieres Restoration Trinity Island (TE-24) showed that vegetation slightly increased in cover between 1999 (immediate post-construction) and 2001 (2 year post-construction) for unplanted areas and for bay, dune, and spur areas planted (Krumrine and Brass 2003).
- Success of marshhay cordgrass (*Spartina patens*) has been demonstrated in many studies but high mortality rates occurred in plantings for TE-25 and TE-30 on East Timbalier Island. The drought conditions of 2001 could have negatively affected the vegetation in these projects. A site visit in 2001 revealed that bitter panicum (*Panicum amarum*) was vigorous in most areas. The advantages of bitter panicum as stabilizing vegetation far outweigh those of marshhay cordgrass, thus bitter panicum is planted more often (Keith Lovell, LDNR, Personal Communication, October 2003).
- The Whiskey Island Restoration (TE-27) project included vegetative plantings of dune, berm and back barrier marsh areas with smooth cordgrass (*Spartina patens*), bitter panicum (*Panicum amarum*) and marshhay cordgrass (*Spartina patens*). Initial monitoring indicated that vegetative survival one growing season after planting was very low (30.0%), possibly due to drought after planting (Khalil and Lee in press). Additionally, vegetative cover in planted areas was low (<15.0%), indicating alternate planting designs need to be considered in future projects to maximize cover of bare sediment faster (West 2003). In 2003, thirty of the fifty-six vegetation plots were underwater. Elevation models from the surveys indicated volume loss of sediment 1.5 years after deposition to be approximately 21,6000 cy, indicating the need for sand fencing used in conjunction with vegetative plantings soon after construction.

Vegetative plantings used in conjunction with sand fencing have been successfully implemented to conserve and stabilize barrier island material that might otherwise be lost through natural erosion processes. In most instances, vegetation plantings of bitter panicum (*Panicum amarum*) and marshay cordgrass (*Spartina patens*) appeared to be the most successful type of vegetation, in terms of survival and coverage, used on barrier islands. However, species diversity should be a consideration in future plantings. Both sand fencing and vegetation plantings should be installed soon after construction completion to conserve as much barrier island material as possible.

Summary and Conclusion

The purpose of the Ship Shoal: Whiskey West Flank Restoration project is to rebuild and nourish the western end of Whiskey Island using sand mined from the offshore submerged bar known as Ship Shoal. Storm impacts, inadequate supply of sediments, and relative sea level rise have left the western flank of the island in a critical state. Future landloss projections estimate that none of the Isles Dernieres chain will remain in 2050 and that some of the islands will become sub-aqueous by 2007 (LCWCRTF & WCRA 1999).

Numerical models developed by Moffatt and Nichol Engineers Inc. were used to mimic surrounding hydrology, evaluate project design alternatives, and determine the effects of mining sand on the Ship Shoal borrow site. The model predicted that both Alternatives A and B would withstand a possible design storm (Category 2 hurricane). The model determined that Alternative A would experience less inundation and erosion during storm conditions, but previous literature has suggested the dune height of Alternative B would mimic natural dune height (+3.0-+6.0 feet NAVD-88) and result in an increase in biodiversity. Alternative B was selected as the most feasible means of restoring the western flank of Whiskey Island. However, in order to prevent water from inundating the central marsh lobe and eastern section of the island, an extension to Alternative B has been included in the designed. Analysis of model results indicated that the consequences of removing sand from Ship Shoal would be relatively insignificant and the hydrodynamic effects would be localized (Moffat and Nichol Engineers Inc. 2004).

Observations from past Isle Dernieres restoration projects have shown some initial success was achieved in reducing erosion and increasing the height and volume of these systems. Thus far, these projects have prevented the restored islands from becoming sub-aqueous despite impacts from two major hurricanes. However, narrowing on both the bay and gulf sides of the islands has been reported due to natural erosional forces, including longshore and crossshore losses and loss due to storm impacts.

Monitoring results and literature reviews have revealed that sand fencing and vegetation plantings aided in the formation of dunes and in conserving material that otherwise would be lost. In order to increase survival and percent coverage rates of vegetation on barrier islands the Coastal Engineering Division plans to increase the diversity of plants used on dune habitat and back barrier marsh areas and plant vegetation earlier in the season to allow root systems to develop before the harsh summer months (Ken Balingher, LDNR, Personal Communication April 2005). Monitoring reports have advised installing sand fencing and vegetation plantings as soon as possible after construction completion to conserve sediment (West 2005).

VII. 95% Design Review Recommendations

Restoration of Louisiana's barrier islands using offshore borrow material has been used with great initial success, albeit at a high cost. Barrier islands will continue to erode, narrow and migrate landward and experience loss due to storm events over time. However, without the addition of new sand material to Louisiana's barrier island systems valuable oil infrastructure, coastal communities and interior marsh areas would be more vulnerable to flooding and wave energies associated with hurricanes. Alternative restoration techniques, including the use of rock shoreline protection structures on barrier islands, have proven largely ineffective. The exceptions to this statement are the rock breakwaters constructed to protect Raccoon Island. In this instance, a submerged shoal offshore of the island resulted in net accretion behind constructed breakwaters. In most cases, rock breakwaters used to protect barrier islands inhibit island rollover and in some cases interfere with longshore transport process resulting in increased erosion effects down drift of the shoreline protection structure.

Based on information gathered from similar restoration projects, engineering designs and related literature, the proposed strategies in the Ship Shoal: Whiskey West Flank Restoration project will likely achieve all of the desired goals. It is therefore recommended that this project progress towards construction following a favorable 95% Design Review. However, prior to construction, the following issue needs to be addressed.

- It is believed that the sandy material used to create the back barrier marsh component will experience minimal settlement and consolidation over the life of the project. However, a settlement analysis may be useful to determine how long the restored area will remain at the intertidal target elevation range of 1.0-2.0 feet NAVD-88.

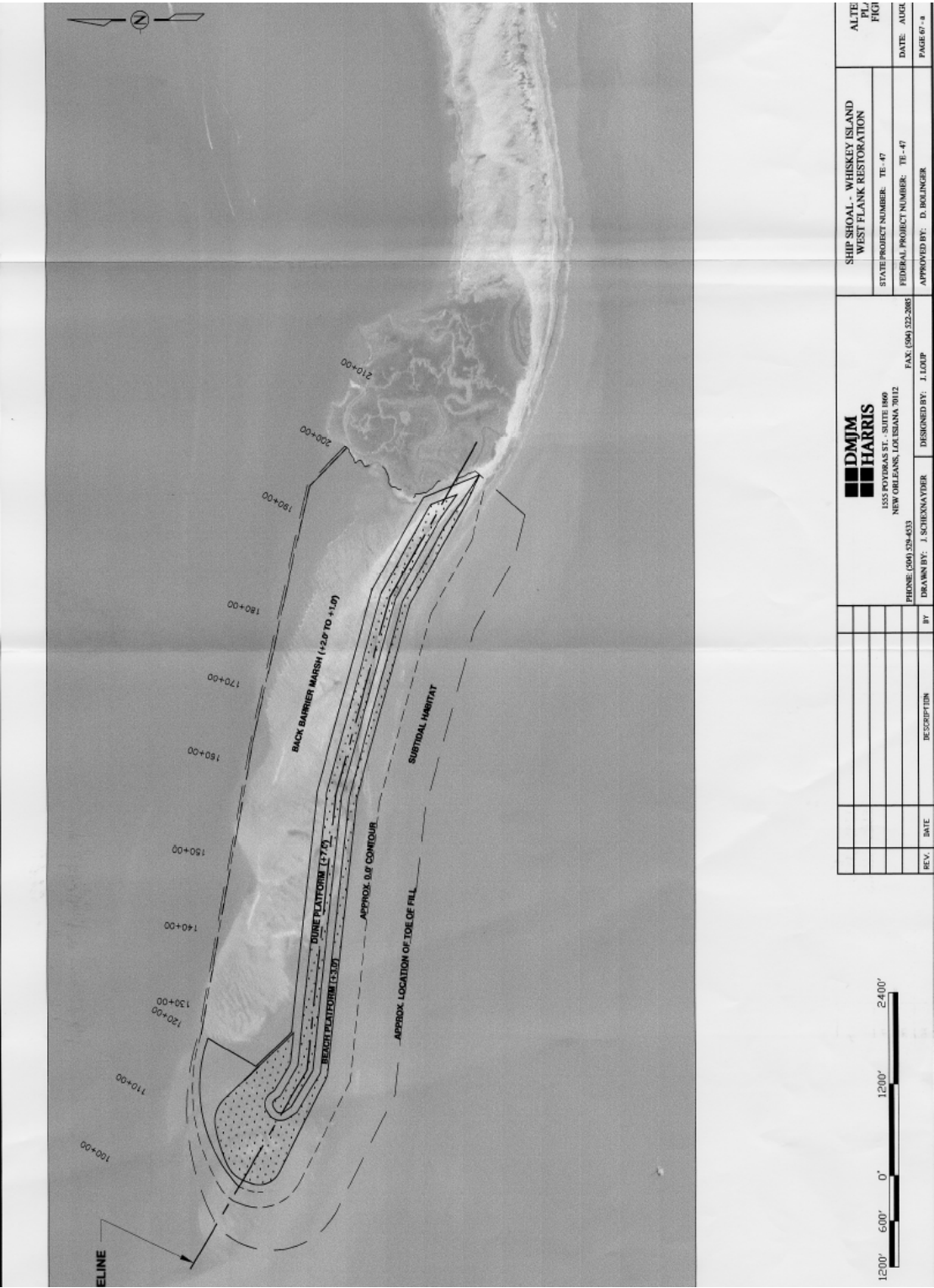
References

- Armbruster, C. K., D. M. Lee, M. A. Townson, and N. Clark. 2001. Whiskey Island Restoration (TE-27) Monitoring Progress Report No. 1. February 14, 1998 to August 25, 1999. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 29 pp.
- Bahlinger K. 1995. Vegetation Plantings as a Method of Coastal Wetland Restoration. Louisiana Department of Natural Resources, Coastal Restoration Division. Baton Rouge, Louisiana. 20 pp.
- C & C Technologies. 2003. High Resolution Geophysical and Archeological Survey of Portions of Blocks 87, 88, 89, 94 and 95 Ship Shoal Area, Whiskey West Flank Restoration Project Using Ship Shoal Sediment Coastal Terrebonne Parish, Louisiana.
- Campbell, T. and L. Benedet. 2003. Louisiana Gulf Shoreline Restoration Report, Chapter 10. Coastal Planning and Engineering, Inc. Boca Raton, Florida. 13 pp.
- DMJM + HARRIS, Inc. 2005. Ship Shoal :Whiskey West Flank Restoration (TE-47) 95% Design Report. New Orleans, Louisiana 88 pp.
- Environmental Protection Agency (EPA). 2003. Ship Shoal Whiskey Pass Closure and West Flank Extension, Wetland Value Assessment. 24 pp. plus Appendices.
- Hester, M. W., B. J. Wilsey, and I. A. Mendelssohn. 1994. Grazing of *Panicum amarum* in a Louisiana Barrier Island Dune Plant Community: Management Implications for Dune Restoration Projects. *Ocean and Coastal Management* 23: 213-224.
- Krumrine, B. F. and A. Y. Brass. 2003. Ecological Review: Timbalier Island Dune and Marsh Restoration. Louisiana Department of Natural Resources: Coastal Restoration Division. Baton Rouge, Louisiana. 16 pp.
- Khalil, S. M. and D. M. Lee. 2004. Restoration of Isles Dernieres, Louisiana: Some Reflections on Morphodynamic Approaches in the Northern Gulf of Mexico to Conserve Coastal/Marine Systems. *Journal of Coastal Research*, Special Issue 39. 8 pp.
- Louisiana Gulf Shoreline Restoration Report (LGSRR). 2003. Louisiana Coastal Area, Louisiana Ecosystem Restoration. Comprehensive Coastwide Ecosystem Restoration Study.
- Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority (LCWCRTF & WCRA). 1999. Coast 2050: Toward a Sustainable Coastal Louisiana, The Appendices. Appendix E—Region 3 Supplemental Information. Louisiana Department of Natural Resources. Baton Rouge, Louisiana. 173 pp.

- Mendelssohn, I. A., M. W. Hester, F. J. Monteferrante, and F. Talbot. 1991. Experimental Dune Building and Vegetative Stabilization in a Sand-Deficient Barrier Island Setting on the Louisiana Coast, USA. *Journal of Coastal Research* 7:137-149.
- Moffatt & Nichol Engineers, Inc. 2004. Draft Coastal Engineering & Modeling Report. TE-47 Ship Shoal: Whiskey West Flank Restoration. New Orleans, Louisiana. 251 pp.
- Monteferrante, F. J. and I. A. Mendelssohn. 1982. Vegetative Investigation for the Management of Barrier Islands and Beaches in Louisiana. *Proceedings of the Coastal Society*. October 12, 1982. Baltimore, Maryland.
- Penland, S., P. Connor, F. Cretini, and K. Westphal. 2003. CWPPRA Adaptive Management: Assessment of Fiver Barrier Island Restoration Projects in Louisiana. Pontchartrain Institute for Environmental Sciences, University of New Orleans.
- Soil Testing Engineers, Inc (STE). 2004. Sand Source Investigation Ship Shoal: Whiskey West Flank Restoration (TE-47) Project. 10 pp. plus appendices.
- Stone, G. W. and X. Zhang. 2001. A longshore sediment transport model for the Timbalier Islands, Louisiana. Baton Rouge, Louisiana: Coastal Studies Institute Louisiana State University.
- Stone, G.W., A. Sheremet, X. Zhang, Q. Liu, and B. Strong. 2003. Landfall of two tropical systems seven days apart along South-central Louisiana, USA. *Coastal Sediments 2003*, St. Petersburg, Florida.
- Suhayda, J. N. 1991. Environmental Data and Conceptual Design for the Protection of Oil Production Facilities at East Timbalier Island. Prepared for Greenhill Petroleum Corporation by Paragon Engineering Services.
- Townson, M. A., N. Clark and D. M. Lee. 2000. Timbalier Island Plantings Demonstration (TE-18) Progress Report No. 6. Louisiana Department of Natural Resources, Coastal Restoration Division, Baton Rouge, Louisiana. 31 pp.
- United States Army Corps of Engineers (USACE). 1979. Grand Isle and Vicinity Louisiana General Design Memorandum: Beach Erosion and Hurricane Protection. New Orleans District, New Orleans, Louisiana. 103 pp.
- United States Army Corps of Engineers (USACE). 2002. Coastal Engineering Manual (CEM). Engineer Manual 1110-2-1100, U.S. Army Corps of Engineers, Washington, D.C. (in 6 volumes).
- United States Department of Agriculture, Soil Conservation Service (USDA). 1992. Measures for Stabilizing Coastal Dunes. Americus Plant Materials Center. Americus, Georgia. 10pp.

- Williams, S.J., S. Penland and A.H. Sallenger, Jr. (edition.) 1992. Atlas of Shoreline Changes in Louisiana from 1853-1989. United States Geologic. Survey, Miscellaneous. Investment. Series I-2150-A, 103 pp.
- West, J.L. 2004. 2003 Operations, Maintenance, and Monitoring Report for Whiskey Island Restoration (TE-27). Louisiana Department of Natural Resources, Coastal Restoration Division. Thibodaux, Louisiana.
- West, J.L. 2004. 2003 Operations, Maintenance, and Monitoring Report for Isle Dernieres Restoration Trinity Island (TE-24). Louisiana Department of Natural Resources, Coastal Restoration Division. Thibodaux, Louisiana.
- West, J.L. 2004. 2003 Operations, Maintenance, and Monitoring Report for Isles Dernieres Restoration East Island (TE-20). Louisiana Department of Natural Resources, Coastal Restoration Division. Thibodaux, Louisiana.

Appendix A
Alternative A-Plan View (DMJM + HARRIS, Inc. 2005)

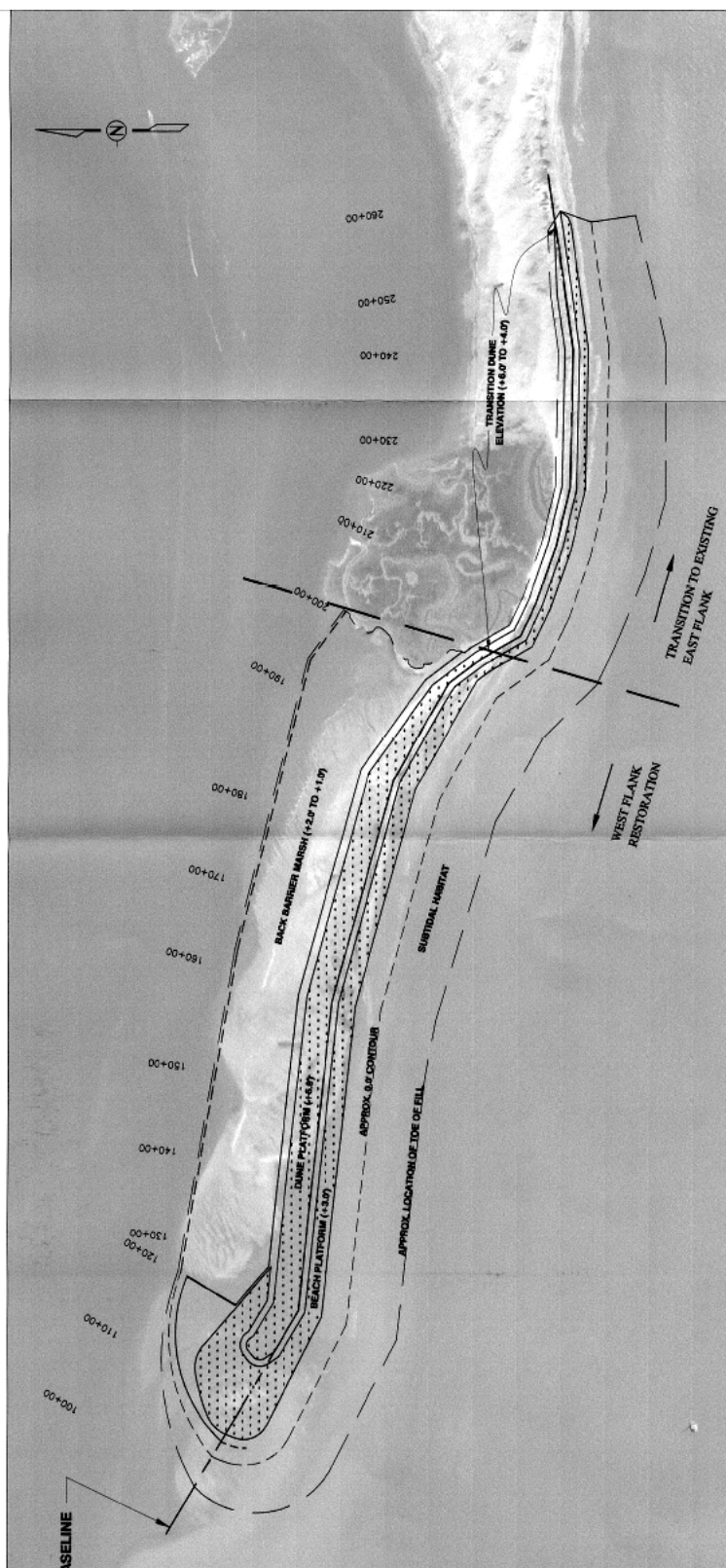


Appendix B
Alternative B-Plan View (DMJM + HARRIS, Inc. 2005)



Appendix C
Alternative C-Plan View (DMJM + HARRIS, Inc. 2005)



[illegible]

Enclosure 4K

Ship Shoal/Whiskey West Flank (TE-47)

Overgrazing Determination



Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

August 26, 2005

Mr. Brad Crawford
Environmental Protection Agency
Region VI
Water Quality Protection Division (6WQ-EMC)
1445 Ross Avenue
Dallas, Texas 75202-2733

Dear Mr. Crawford:

RE: Ship Shoal: Whiskey West Flank Restoration (TE-47)

I am in receipt of your request for an overgrazing determination for the Ship Shoal: Whiskey West Flank Restoration (TE-47). I contacted our local district conservationist and our state resource conservationist to discuss the grazing in the project area. Currently, livestock are not grazing in the area, nor do we see a potential for grazing once the project is installed. Therefore, it is our opinion, overgrazing is not a problem in this project area. If you have any questions please let me know.

Sincerely,

A handwritten signature in dark ink, appearing to read "W. Britt Paul", is written over the typed name.

W. Britt Paul
Assistant State Conservationist
for Water Resources and Rural Development

cc: Randolph Joseph, Area Conservationist, NRCS, Lafayette, Louisiana
Michael Trusclait, District Conservationist, NRCS, Thibodaux, Louisiana
Johanna Patc, State Grazing Lands Specialist, NRCS, Alexandria, Louisiana
John Jurgensen, Civil Engineer, NRCS, Alexandria, Louisiana

Enclosure 4L

Ship Shoal/Whiskey West Flank (TE-47)

Revised FFC Estimate

Enclosure 4M

Ship Shoal/Whiskey West Flank (TE-47)

Revised WVA

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Barrier Island

Project: Ship Shoal - Whiskey Island West Flank Restoration (TE-47)

Condition: Future Without Project

Variable		TY 0		TY 1		TY 10	
		Value	SI	Value	SI	Value	SI
V1	% Dune	0	0.10	0	0.10	0	0.10
V2	% Supratidal	30	1.00	30	1.00	28	1.00
V3	% Intertidal	70	1.00	70	1.00	72	0.94
V4	% Vegetative Cover	33	0.56	33	0.56	36	0.60
V5	% Woody Cover	15	1.00	15	1.00	16	1.00
V6	Interspersion	%	0.72	%	0.72	%	0.65
	Class 1	44		44		28	
	Class 2					15	
	Class 3	26		26		13	
	Class 4	30		30		44	
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.742		HSI = 0.742		HSI = 0.731	

Project..... Ship Shoal - Whiskey Island West Flank Restoration (TE-47)

FWOP

Variable		TY 20		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Dune	0	0.10				
V2	% Supratidal	22	1.00				
V3	% Intertidal	81	0.67				
V4	% Vegetative Cover	20	0.38				
V5	% Woody Cover	16	1.00				
V6	Interspersion	%	0.54	%		%	
	Class 1						
	Class 2	30					
	Class 3	10					
	Class 4	60					
V7	Beach/surf Zone	1	1.00				
		HSI = 0.624		HSI =		HSI =	

Project.....
FWOP

Variable		TY		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Dune						
V2	% Supratidal						
V3	% Intertidal						
V4	% Vegetative Cover						
V5	% Woody Cover						
V6	Interspersion Class 1 Class 2 Class 3 Class 4 Class 5	%		%		%	
V7	Beach/surf Zone						
		HSI =		HSI =		HSI =	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL

Barrier Island

Project: Ship Shoal - Whiskey Island West Flank Restoration (TE-47)

Condition: Future With Project

Variable		TY 0		TY 1		TY 2	
		Value	SI	Value	SI	Value	SI
V1	% Dune	0	1.10	7	1.00	7	1.00
V2	% Supratidal	30	1.00	30	1.00	30	1.00
V3	% Intertidal	70	1.00	63	1.00	63	1.00
V4	% Vegetative Cover	33	0.56	24	0.43	29	0.50
V5	% Woody Cover	15	1.00	11	1.00	11	1.00
V6	Interspersion	%	0.72	%	0.69	%	0.70
	Class 1	44		24		26	
	Class 2						
	Class 3	26		73		70	
	Class 4	30		3		4	
	Class 5						
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.742		HSI = 0.840		HSI = 0.854	

Project..... Ship Shoal - Whiskey Island West Flank Restoration (TE-47)

FWP

Variable		TY 3		TY 5		TY 10	
		Value	SI	Value	SI	Value	SI
V1	% Dune	7	1.00	7	1.00	5	1.00
V2	% Supratidal	30	1.00	30	1.00	29	1.00
V3	% Intertidal	63	1.00	64	1.00	65	1.00
V4	% Vegetative Cover	30	0.51	45	0.72	46	0.73
V5	% Woody Cover	12	1.00	12	1.00	12	1.00
V6	Interspersion	%	0.70	%	0.82	%	0.75
	Class 1	27		40		30	
	Class 2			30		30	
	Class 3	68		30		25	
	Class 4	5				15	
	Class 5						
V7	Beach/surf Zone	1	1.00	1	1.00	1	1.00
		HSI = 0.858		HSI = 0.917		HSI = 0.909	

Project.....
FWP

Variable		TY 20		TY		TY	
		Value	SI	Value	SI	Value	SI
V1	% Dune	0	0.10				
V2	% Supratidal	28	1.00				
V3	% Intertidal	72	0.94				
V4	% Vegetative Cover	29	0.50				
V5	% Woody Cover	10	1.00				
V6	Interspersion	%	0.66	%		%	
	Class 1						
	Class 2	45					
	Class 3	40					
	Class 4	15					
	Class 5						
V7	Beach/surf Zone	1	1.00				
		HSI = 0.713		HSI =		HSI =	

AAHU CALCULATION

Project: Ship Shoal - Whiskey Island West Flank Restoration (TE-47)

Future Without Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1041	0.742	772.92	
1	1007	0.742	747.68	760.30
10	758	0.731	554.30	5854.69
20	437	0.624	272.73	4077.80
			AAHUs =	534.64

Future With Project			Total	Cummulative
TY	Acres	x HSI	HUs	HUs
0	1041	0.742	772.92	
1	1249	0.840	1048.84	907.51
2	1216	0.854	1039.00	1044.00
3	1181	0.858	1012.71	1025.87
5	1114	0.917	1021.76	2035.80
10	946	0.909	860.35	4704.19
20	608	0.713	433.41	6358.02
			AAHUs	803.77

NET CHANGE IN AAHU'S DUE TO PROJECT	
A. Future With Project AAHUs =	803.77
B. Future Without Project AAHUs =	534.64
Net Change (FWP - FWOP) =	269.13

Enclosure 4N

Ship Shoal/Whiskey West Flank (TE-47)

Prioritization Score

PRIORITIZATION FACT SHEET
Revised November 21, 2006

Project Name and Number:

Ship Shoal: Whiskey West Flank Restoration (TE-47)

Goals and Objectives:

- Demonstrate the feasibility of moving Ship Shoal sands to the Isles Dernieres for future restoration projects;
- Restoring the integrity of the West Flank of Whiskey Island to retain its structural function;
- Adding offshore sediment to the West Flank of Whiskey Island from Ship Shoal to increase sediment supply and strengthen island formation;
- Rebuilding the natural structural framework within the coastal ecosystem to provide for separation of the gulf and the estuary;
- Creating a continuous protective barrier for back bays and inland marshes;
- To reduce wave energies thereby helping to reduce land loss;
- Strengthen the longshore transport system of sediment for continuous island building;
- Provide a unique and sustainable barrier island habitat for numerous biological species; and,
- Restoring roughly 500 acres of barrier island habitat into the island's West Flank

Proposed Solution

The Whiskey West Flank Restoration Project has completed the Phase 1 engineering and design evaluations. The project entails mining and transporting offshore Ship Shoal sediment to restore the west flank of Whiskey Island. A cutterhead suction dredge and/or hopper dredge would be used at Ship Shoal. Material would be transported a distance of approximately 8-10 miles with pipeline and booster pumps or as necessary to the island area. The proposed design features include: a 600 ft wide beach berm at +3 ft, a 300 ft wide dune at +6 ft elevation, and, a marsh platform which varies between 825 to 1225 ft wide. Transition to existing east flank restoration includes: a 450 ft wide berm at +3 ft and 100 ft wide dune that will transition in elevation from +6 ft from the west flank dune to +4 ft onto the adjacent east dune.

Proposed Prioritization Criteria Scores and Justification

Cost Effectiveness (cost/net acre)

Score: 1

Net wetland acres protected on the west flank of Whiskey Island: TY20 = 195 acres

Current total fully-funded cost estimate: \$ 52,925,941

\$52,925,941/195 acres = \$271,415/acre

Area of Need, High Loss Area

Score: 10

Based on the Memo Dated May 27, 2005, from Moffatt & Nichol, the projected historic shoreline erosion rate for the West Flank for FWOP, is 80 ft/yr and 86 ft/yr for the dune extension. The FWOP modeled shoreline erosion rates are 30 ft/yr for both the West Flank and the extension. The project is in the Terrebonne basin, hence, the **score is 10**.

An alternate method for estimating the existing erosion rate is as follows: Per the 95% E&D report, FWOP @ TY 0 (850 acres)/FWOP @ TY 20 (358 acres) = 42.1% remaining. Converting to an average annual loss rate; $(1 - \text{Loss Rate})^{20} = 42.1\%$, hence, the average annual loss rate = 4.23%.

Implementability

Score: 10

No known serious impediments that would preclude the project's timely implementation have emerged.

Certainty of Benefits

Score: 7

Traditional barrier island project

Sustainability of Benefits

Score: 1

Based on information in the 95% E&D report, for FWP, the area remaining at TY20 = 553 acres of the original 1135 acres, (i.e. 48.72% remaining). Since the FWP loss rate is based on the quality of sand, the FWP loss rates are used for this calculation rather than converting back to the FWOP loss rate. Converting to an average annual loss rate is as follows:

$(1 - \text{Loss Rate})^{20} = 48.72\%$, results in a land loss rate of 3.53%. Applying a 3.53% loss rate to TY21-TY30 results in $(1 - 0.0353)^{10} = 69.8\%$ remaining, or a 30.2% loss. This is a relatively conservative method to calculating % loss, hence, other methods would likely result in an even greater loss, all indicating a score of 1. (Converting back to the FWOP loss rate would still result in a score of 1).

Increasing riverine input in the deltaic plain or freshwater input and saltwater penetration limiting in the Chenier plain

Score: 0

The project will not result in increases in riverine flows.

Increased sediment input

Score: 10

The project will result in the significant placement of sediment from an offshore source. The proposed project would input approximately 3.85 MCY (in place) of Ship Shoal sediment into the Louisiana nearshore system.

Maintaining landscape features critical to a sustainable ecosystem structure and function**Score: 10**

The project serves to protect, for at least the 20 year life of the project, features which are critical to maintaining the integrity of the Terrebonne Basin (e.g., barrier islands).

Preparer of Fact Sheet

Brad Crawford, EPA, 214-665-7255,

Resulting Score:

$$(1*2.0) + (10*1.5) + (10*1.5) + (7*1.0) + (1*1.0) + (0*1.0) + (10*1.0) + (10*1.0) = 60$$

References

U.S. Environmental Protection Agency. October 2001. *Ship Shoal: Whiskey Pass Closure and Whiskey Island West Flank: Wetland Value Assessment Project Information Sheet.*

DMJM+Harris, Inc. 2005. *Ship Shoal: Whiskey Island West Flank Restoration (TE-47) Design Report. Revised for 95% Submittal. New Orleans, LA. 88 pp.*