State of Louisiana
Department of Coastal Protection and Restoration
Operations Division

2009 Annual Inspection Report

for

DELTA WIDE CREVASSES (MR-09)

State Project Number MR-09
Priority Project List 6

November 16, 2009
Plaquemines Parish

Prepared by:

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Appendixes

I. Introduction

Delta Wide Crevasses (MR-09) was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended. The Delta Wide Crevasses Project was approved on the sixth (6^{th}) Priority Project List and project area is located within two wildlife management/refuge areas, both in Plaquemines Parish, La. The northern half of the project is located in the Delta National Wildlife Refuge. The southern half is located in the Pass a Loutre State Wildlife Management Area. The necessary agreements to allow project construction and operation to proceed have been executed between OCPR and the above-referenced parties.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Delta Wide Crevasses Project (MR-09) is to evaluate the constructed project features to identify any deficiencies and prepare a report detailing the condition of the project features and recommended corrective actions needed. Should it be determined that corrective actions are needed, OCPR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs (O&M Plan August 1, 2007). The annual inspection report also contains a summary of maintenance projects and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C. A summary of past and maintenance projects completed since completion of the initial construction of the Delta Wide Crevasses Project in 1999 are outlined in Section IV.

This annual inspection of the Delta Wide Crevasse Project (MR-09) was held on November 16, 2009 on a clear to partly cloudy and cool day with winds West at 5 mph. At the time of the inspection, 11:00 AM, the Mississippi River Stage at the Carrollton Gage in New Orleans , La. was +13.4 feet NGVD. In attendance were Tom Bernard, OCPR; Cheryl Brodnax and Joy Merino, NMFS. Due to the spread out and remote locations of the Crevasses, the three member inspection team chose to make the inspection by air. Photographs of that inspection are included in Appendix B of this report.

III. Project Description and History

The project area is located in Plaquemines Parish to the southeast of Venice, Louisiana on the active Mississippi River Delta (figure 1). This project utilizes the major process that forms subaerial land in the lower Mississippi River Delta, the formation of crevasses. Crevasses are breaks in the levee that allow overbank deposition of sediments to occur in adjacent interdistributary receiving bays. This deposition of sediments causes land formation that is controlled by the processes of distributary mouth-bar islands. Coleman

and Gagliano (1964) ordered the mouth-bar island process into crevasse sub-delta and crevasse-splay based on relative size. Crevasse sub-deltas consist of relatively large receiving bays that have areal extents of 115-154 sq mi. (300-400 sq km) and depths of 32-49 ft (10-15 m). The process by which these sub-deltas are formed is referred to as "bay filling" (Coleman and Gagliano 1964). Crevasse-splays are a smaller sub-unit that are distinguished from sub-deltas in that their size, frequency, and expected life spans are smaller generally having a receiving bay extent of approximately 0.234 sq mi. (0.59 sq km) (Boyer 1996).

The project consists of maintaining presently existing crevasse-splays, the construction of new crevasse-splays, and future maintenance of selected crevasse-splays in both the Pass-A-Loutre Wildlife Management Area (PALWMA) and the Delta National Wildlife Refuge (DNWR). The PALWMA covers 66,000 ac (26,709 ha) between Pass-A-Loutre and South Pass and is owned and managed by the Louisiana Department of Wildlife and Fisheries (LDWF). The DNWR covers 48,000 ac (19,425 ha) from just north of Main Pass southward to Pass-A-Loutre and is owned and managed by the U.S. Fish and Wildlife Service (USFWS). It is understood that the natural cycle of crevasse-splays is a temporary event that is rarely active for more than 10 to 15 years. This process of crevasse-splay deposition, building, and subsidence will all be considered in the evaluation of this project.

The usefulness of crevasses as a tool of wetland and coastal management on the Mississippi River Delta began to be realized in the early 1980's. The Louisiana Office of Coastal Protection and Restoration (OCPR) constructed three new crevasses in 1986 (on Pass-A-Loutre, South Pass, and Loomis Pass) that produced over 657 ac (266 ha) of emergent marsh from 1986 to 1991, and four crevasses in 1990 (two each on South Pass and Pass-A-Loutre) that produced over 400 ac (162 ha) of emergent marsh from 1990 to 1993 (LDNR 1993; Trepagnier 1994). Thirteen crevasses included in the OCPR Small Sediment Diversions Project cumulatively produced 313 ac (127 ha) of emergent marsh between 1986 and 1993; land growth rates ranged from 28 to 103 ac (11.3 to 41.7 ha) per crevasse for the older crevasses (4 to 10 years old) and 0.5 to 12 ac (0.2 to 4.9 ha) for the younger crevasses (0 to 2 years old) (LDNR 1996). Boyer et al. (1997) concluded that crevasses in the DNWR accumulated land at about 11.6 ac/yr (4.7 ha/yr), but subaerial growth did not occur for 2-3 years after the crevasses were constructed.

The project features covered by this inspection are inclusive of and are identified as the Delta Wide Crevasses (MR-09). The intention of the annual inspection is to maintain the project in a condition that will generally provide the anticipated benefits that the project was based on. There is no requirement that this project function to any standard beyond the 20-year economic life; except that it is not left as a hazard to navigation or a detriment to the environment. A site map showing the project boundary within the Delta Wide Crevasses project benefit area is shown in Attachment II along with a map identifying all of the project features within the project area.

IV. Summary of Past Maintenance Projects

General Maintenance: Below is a summary of completed maintenance project:

Originally dredged in 1999, crevasses No. 9, 11, and 12, in the PALWMA had silted in and did not function as originally constructed. The first maintenance cycle took place in 2005. This maintenance dredging contract re-dredged those three crevasses to their original design dimensions, and dredged two new crevasses in the same area. Those were NC-1, and NC-3. Also constructed in this maintenance contract was crevasse No. 81, which is located on Baptiste Collette in the Delta Wildlife Management Area. Se Attachment II for locations of the maintenance sites.

V. Inspection Results of Crevasses Dredged in 2005 (See Appendix "B" for Project Photos)

A. Crevasse No. NC-1: (1,000 ft. X 100 ft. X -8.0 ft. NAVD 88) This 2005 new-crevasse appears to be in good to excellent condition. Visable flows indicate that it has retained most of its originally constructed depth. River water is flowing very well through the channel carrying large amounts of sediment, and the spoil from the dredging of the crevasse has vegetated throughout the deposited bay area.

B. Crevasse No. NC-3: (1,400 ft. X 100 ft. X -8.0 ft. NAVD 88) This is the second of the two new 2005 crevasses and the only one cut on Main Pass. It is functioning very well, and flowing with a very swift current bringing much needed sediments into the interior bays. The crevasse appears to be maintaining a good depth throughout its channel length and the spoil from the crevasse dredging has completely vegetated. LDWF reports small amount of shoaling at the mouth.

C. Crevasse No. 9: (2,200 ft. X 75 ft. X -8.0 ft. NAVD 88) Good flow is being maintained in this dog-leg shaped previously dredged crevasse (1999). Its location allows for swift currents during the present high river stages. The spoil deposition from this cut is very heavily vegetated and seems to have kept its constructed height above the bays.

D. Crevasse No. 11: (2,600 ft. X 100 ft. X -8.0 ft. NAVD 88) This re-dredged crevasse (1999) has maintained a good flow throughout its length. It appears to have maintained its depth throughout and the current in this cut is more than adequate. All of the spoil deposited in the inner lagoon areas has vegetated very heavily and appears to be in excellent condition. The present high water is allowing much sediment to enter the interior marshes.

E. Crevasse No. 12: (2,000 ft. X 75 ft. X -8.0 ft. NAVD 88) Despite being located off of the main channel, this crevasse appears to be functioning very well. There is sufficient current to carry sediments to the inner section of the bays and lagoons and the spoil from the dredging is heavily vegetated. Swift flows indicate that

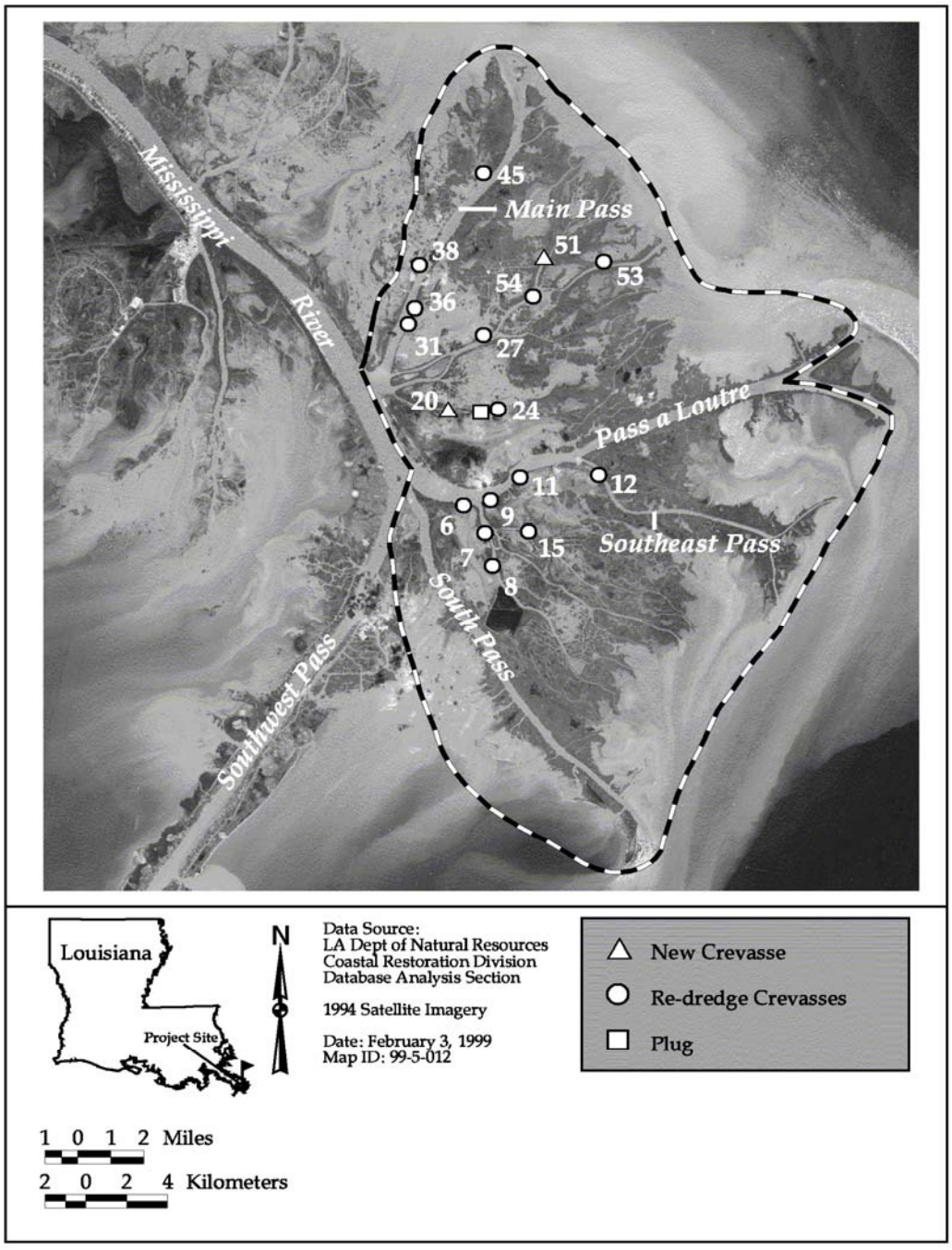
there remains good depth throughout the cut. This crevasse also had been previously dredged (1999).

F. Crevasse No. 81: (1,200 ft. X 100 ft. X -8.0 ft. NAVD 88) This crevasse is located off of Baptiste Colette in the Delta Wildlife Management Area. The current in the crevasse is strong, since it is located in close proximity to the Mississippi River. Even though last years soundings indicate that the mouth of this crevasse has silted up from the large amounts of sediments that is carried into the cut by the river currents, there is still enough current seems to be carrying plenty sediments into the interior marsh area. The last inspection indicated that there was 3 to 4 feet of draft that exists at the mouth of the crevasse.

VI. Conclusions and recommendations

As a result of the inspection, the team concluded that all project features are functioning as designed and should continue to do so without any immediate maintenance. Abnormal high river stages, during the past three seasons, caused more than normal shoaling in the southwest pass channel. This brought on more dredging and the deposition of the dredged material in the flowage in Pass a Loutre. This additional shoal material, combined with the high river flows, added to the sediments introduced into the pass and then into the crevasses areas. Those amounts of sediments were noticeable during the inspection and are contributing highly to the success of this project. Further assessment of the project will be determined following the next scheduled inspection in 2010. Therefore; it is recommended that no action be taken for maintenance at this time.

APPENDIX "A"
Project Features Map



APPENDIX B
Photographs

Crevasse No. NC-1, (view 1) Looking into crevasse from Pass-a-Loutre, notice rings of roseau in center of photo.

Crevasse No. NC-1, (view 2) Looking west. Vegetated Spoil area in center of view.

Crevasse No. NC-3, (view 1) Looking out to South Pass. Southwest Pass and West Bay are in background.

Crevasse No. NC-3, (view 2), Vegetated crevasse dredging spoil in bay area, foreground.

Crevasse No. 9, (view 1) Looking south. Notice bay area, heavily vegetated spoil from crevasse dredging.

Crevasse No. 9, (view 2) Vegetated spoil deposition in bay Area, and also large amounts of heavy sediments.

Crevasse No. 11, (view 1) From Pasa-a-loutre looking into Crevasse.

Crevasse No. 11, (view 2) Crevasse end looking at spoil area vegetation and huge amounts of sediments from the pass.

Crevasse No. 12, (view 1) Looking into interior bay from Channel showing large amounts of vegetation in early stage.

Crevasse No. 12, (view 2) Inside crevasse looking towards feeder channel. Notice material buildup in center of view.

Crevasse No. 81, (view 1) Looking upriver from inside the bay towards Baptiste Collette channel.

Crevasse No. 81, (view 2) Inside crevasse showing heavy amounts vegetated spoil area and newly deposited sediments.

Appendix C
Three-Year Operation & Maintenance Budgets

Delta Wide Crevasses/ MR-09 / PPL 6

Three-Year Operations & Maintenance Budgets 07/01/2009 - 06/30/2012

Project Manager	O & M Manager	Federal Sponsor	Prepared By
Thomas Bernard	*Thomas Bernard*	*NMFS*	*Thomas Bernard*

	2009/2010	2010/2011	2011/2012
Maintenance Inspection	$5,443.00	$5,584.00	$5,729.00
General Maintenance	$0.00	$0.00	$0.00
Structure Operation	$0.00	$0.00	$0.00
Administration	$0.00	$0.00	$0.00
Maintenance/Rehabilitation			

09/10 Description:

E&D	$0.00
Construction	$0.00
Construction Oversight	$0.00
Sub Total - Maint. And Rehab.	$ -

10/11 Description

E&D		$0.00
Construction		$0.00
Construction Oversight		$0.00
Sub Total - Maint. And Rehab.		

11/12 Description:

E&D			$0.00
Construction			$0.00
Construction Oversight			$0.00
		Sub Total - Maint. And Rehab.	$ -

	2009/2010	2010/2011	2011/2012
Total O&M Budgets	**$ 5,443.00**	**$ 5,584.00**	**$ 5,729.00**

O &M Budget (3 yr Total)	**$ 16,756.00**
Unexpended O & M Budget	**$ 962,771.00**
Remaining O & M Budget (Projected)	**$ 946,015.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET 2009/2010

Delta Wide Crevasses/ MR-09 / PPL 6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,443.00	**$5,443.00**
General Structure Maintenance	LUMP	0	$0.00	**$0.00**
Engineering and Design	LUMP	0	$0.00	**$0.00**
Operations	LUMP	0	$0.00	**$0.00**
Construction Oversight	LUMP	0	$0.00	**$0.00**
ADMINISTRATION				
LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	0	$0.00	$0.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER - Breakwater	LUMP	1	$0.00	$0.00
			TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	0	$0.00	$0.00
Materials		LUMP	0	$0.00	$0.00
Mob / Demob		LUMP	0	$0.00	$0.00
Contingency		LUMP	0	$0.00	$0.00
General Structure Maintenance		LUMP	0	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,443.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET 2010/2011

Delta Wide Crevasses/ MR-09 / PPL 6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,584.00	**$5,584.00**
General Structure Maintenance (Radio Equip.)	LUMP	0	$0.00	**$0.00**
Engineering and Design	LUMP	0	$0.00	**$0.00**
Operations	LUMP	0	$0.00	**$0.00**
Construction Oversight	LUMP	0	$0.00	**$0.00**
ADMINISTRATION				
LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument		EACH	0	$0.00	$0.00
Staff Gauge / Recorders		EACH	0	$0.00	$0.00
Marsh Elevation / Topography		LUMP	0	$0.00	$0.00
TBM Installation		EACH	0	$0.00	$0.00
OTHER					$0.00
				TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings		EACH	0	$0.00	$0.00
OTHER					$0.00
				TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navigation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$3.65	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware		LUMP	0	$0.00	$0.00
Materials		LUMP	0	$0.00	$0.00
Mob / Demob		LUMP	0	$0.00	$0.00
Contingency		LUMP	0	$0.00	$0.00
General Structure Maintenance		LUMP	0		$0.00
Survey		LUMP	0	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,584.00**

OPERATION AND MAINTENANCE BUDGET WORKSHEET 2011/2012

Delta Wide Crevasses/ MR-09 / PPL 6

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	$5,729.00	**$5,729.00**
General Structure Maintenance	LUMP	0	$0.00	**$0.00**
Engineering and Design	LUMP	0	$0.00	**$0.00**
Operations	LUMP	0	$0.00	**$0.00**
Construction Oversight	LUMP	0	$0.00	**$0.00**
ADMINISTRATION				
LDNR / CRD Admin.	LUMP	0	$0.00	$0.00
FEDERAL SPONSER Admin.	LUMP	0	$0.00	$0.00
SURVEY Admin.	LUMP	0	$0.00	$0.00
OTHER				$0.00
			TOTAL ADMINISTRATION COSTS:	**$0.00**

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	$0.00	$0.00
Staff Gauge / Recorders	EACH	0	$0.00	$0.00
Marsh Elevation / Topography	LUMP	0	$0.00	$0.00
TBM Installation	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL SURVEY COSTS:	**$0.00**

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	$0.00	$0.00
OTHER				$0.00
			TOTAL GEOTECHNICAL COSTS:	**$0.00**

CONSTRUCTION

CONSTRUCTION DESCRIPTION:	Repair of storm damage to valves, fencing, and embankment. Replacement of storm damaged gate actuator.				
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
	0	0.0	0	$0.00	$0.00
Filter Cloth / Geogrid Fabric		SQ YD	0	$0.00	$0.00
Navagation Aid		EACH	0	$0.00	$0.00
Signage		EACH	0	$0.00	$0.00
General Excavation / Fill		CU YD	0	$0.00	$0.00
Dredging		CU YD	0	$0.00	$0.00
Sheet Piles (Lin Ft or Sq Yds)			0	$0.00	$0.00
Timber Piles (each or lump sum)			0	$0.00	$0.00
Timber Members (each or lump sum)			0	$0.00	$0.00
Hardware- Gate Actuator, gate sleeves		LUMP	0	$0.00	$0.00
Materials		LUMP	0	$0.00	$0.00
Mob / Demob		LUMP	0	$0.00	$0.00
Contingency		LUMP	0	$0.00	$0.00
General Structure Maintenance		LUMP	0	$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
OTHER				$0.00	$0.00
				TOTAL CONSTRUCTION COSTS:	**$0.00**

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **$5,729.00**

Appendix D
Field Inspection Form

FIELD INSPECTION CHECK SHEET

Project No. / Name:	Delta Wide Crevasses MR-09	Date of Inspection:	November 16, 2009 Time: 11:00 AM
Crevasse No.	**See Report Section III**	Inspector(s):	OCPR: Tom Bernard, NMFS: Cheryl Brodnax & Joy Merino
Crev. / Terr. Specs.	See Report Section III	Water Level:	13.4 NGVD at New Orleans, La. Time: 7:00 AM
Type of Inspection:	2009 Annual Inspection	Weather Conditions:	Clear to Partly Cloudy, Wind W @ 5mph, Cool

Item	Condition	Physical Damage	Dimensions	Photo	Observations and Remarks
Crevasse # NC-1	Very Good	None	1,000 ft X 100 ft by -8.0' NAVD 88	Appendix B	This 2005 new-crevasse appears to be in good to excellent condition. Visable flows indicate that it has retained most of its original constructed depth. River water is flowing very well through the channel carrying large amounts of sediment, and the spoi
Crevasse # NC-3	Very Good	None	1,400 ft X 100 ft by -8.0' NAVD 88	Appendix B	This 2005 new crevasse off of Main Pass is functioning very well, seems to be flowing very swiftly carrying much sediments to the interior bays. LDWF reports some small amounts of shoaling at the mouth; however, there is little evidence of that being a pr
Crevasse # 9	Very Good	None	2,200 ft X 75 ft by -8.0' NAVD 88	Appendix B	Good flow is being maintained by this dog-leg shaped crevasse. It appears, from the flow velocity, that good water depth is being maintained throughout its length carrying much needed river sediments into the bays. Dredge spoil from the crevasse has veget
Crevasse # 11	Very Good	None	2,600 ft X 100 ft by -8.0' NAVD 88	Appendix B	This re-dredged crevasse maintains a good flow throughout its length and appears to be carrying much needed river sediments into the interior marsh areas. There is no evidence of logs and stumps that were so prevelent during the dredging. Spoil has heavi
Crevasse # 12	Very Good	None	2,000 ft X 75 ft by -8.0' NAVD 88	Appendix B	Currents are moderate to swift through this crevasse, despite it being located off of the main channel. There is evidence of sediments being carried into the marsh areas, and the spoil from the crevasse excavation has vegetated very heavily. This crevasse
Crevasse # 81	Very Good	None	1,200 ft X 100 ft by -8.0' NAVD 88	Appendix B	This crevasse is located on the south bank of Baptiste Collette just off of the Miss. River. Due to its location, it is receiving strong current and heavy sediment loads. The spoil form the crevasse escavation has vegetated very nicely and the current con