2012 Coastal Master Plan

Appendix A

Project Definitions

Table of Contents

List of Figures

List of Tables

1.0 Introduction

1.1 Developing a List of Projects

The 2012 Coastal Master Plan presents an integrated suite of projects that fulfills the plan's legislative mandate of supporting large-scale comprehensive risk reduction and restoration for coastal Louisiana. To ensure that the best projects were selected, we evaluated a large number of candidate projects using system modeling and other analytical tools. These evaluations provided a sound technical basis for decision making and informed public discussion of priorities and tradeoffs. Before this analysis could take place, however, we first needed to create a comprehensive list of candidate projects within the CPRA Jurisdiction Area (Figure 1) that captured the full range of risk reduction and restoration options for coastal Louisiana.

1.1.1 Establishing a Baseline

The 2012 Coastal Master Plan presents a 50-year plan for the coast and is intended to guide future State investments in coastal risk reduction and restoration for that time period. However, the State's coastal program has already resulted in the construction of numerous projects that will continue to have an effect on the landscape into the future. Additionally, funding has already been procured for a number of projects that will not compete for the potential future funding identified for the 2012 Coastal Master Plan. Projects in both these categories were considered to be part of the Future Without Action conditions, the baseline scenario against which Master Plan projects were evaluated. Projects that were incorporated into Future Without Action conditions belonged to one of the following categories:

- *Projects that have not yet been constructed but for which construction funding has been appropriated.* The State is currently implementing several programs in which approved projects have received funding for full implementation (e.g., CIAP, CDBG, HMGP, CWPPRA Phase II projects, State Surplus projects). Because funding has already been appropriated for the construction of these projects, they will not compete for the funding identified for implementation of the master plan. Because these projects have not yet been constructed, however, they needed to be input to the models so that their effects on the coastal system could be estimated.
- *Projects that were constructed after the models' topographic and bathymetric data were collected.* The predictive models utilize topographic and bathymetric data from late 2009, the most recent date for which comprehensive coast wide data are available. Numerous projects have been constructed since these data were collected and therefore had to be input into the models for their effects on the coastal system to be estimated.
- *Constructed projects that contain features that are actively operated to achieve project effects.* Some projects (e.g., marsh creation, barrier island restoration, earthen levees) involve the construction of passive features that are not actively operated after construction. While these projects are considered to be part of the Future Without Action conditions, they were not

input into the models if they were constructed prior to the date of the topographic/ bathymetric dataset, as all their features were captured in the dataset. Other projects (e.g., diversions, hydrologic restoration) involve the construction of features that must then be actively operated to achieve project effects. The operation of these features is not captured in the landscape and must therefore be input into the models. Still other projects (e.g., shoreline protection) involve the construction of hardened surfaces that do not erode or subside in the same manner as the surrounding landscapes. These features must be input into the models so that the models can capture the erosion control effects of these projects.

A full list of State projects that were considered to be part of Future Without Action conditions is presented in Table 1.

Table 1. Projects Considered Part of Future Without Action Conditions

Project ID	Project Name	Program	Project Type[1]	Last Year of Construction
Constructed Projects[2]				
AT-02	Atchafalaya Sediment Delivery	CWPPRA	SD	1998
AT-03	Big Island Mining	CWPPRA	DM	1998
BA-19	Barataria Bay Waterway Wetland Restoration	CWPPRA	MC	1996
BA-35	Pass Chaland to Grand Bayou Pass Barrier Shoreline Restoration	CWPPRA	BI	2009
BA-55	LA-1 Improvements- Fourchon to Leeville Bridge	CIAP	Other	2009
CS-02	Rycade Canal Marsh Management	State	MM	1994
CS-17	Cameron Creole Plugs	CWPPRA	HR	1997
CS-20	East Mud Lake Marsh Management	CWPPRA	MM	1996
CS-21	Highway 384 Hydrologic Restoration	CWPPRA	MM	2000
CS-23	Replace Sabine Refuge Water Control Structures at Headquarters Canal, West Cove Canal, and Hog Island	CWPPRA	MM	2001
CS-25	Plowed Terraces Demonstration	CWPPRA	SNT	2000
CS-32-CU1	East Sabine Lake Hydrologic Restoration- Terraces	CWPPRA	SNT	2009
CS-47 (EB)	Trosclair Road Repairs	CIAP	Other	2009
CS-ST	Sabine Terraces	State	SNT	1990
LA-01a	Dedicated Dredging Program - Lake Salvador	State	DM	1999
LA-01b	Dedicated Dredging Program - Bayou Dupont	State	DM	2000
LA-01d	Dedicated Dredging Program - Terrebonne Parish School Board	State	DM	2006
ME-14	Pecan Island Terracing	CWPPRA	SNT	2003
MR-03	West Bay Sediment Diversion	CWPPRA	SD	2003
MR-10	Dustpan Maintenance Dredging Operation for Marsh Creation in the Mississippi River Delta Demonstratiom	CWPPRA	DM	2002
N/A	Slidell Levees	Local	HP	Unknown

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
N/A	Slidell Levees Eastern	Local	HP	Unknown
N/A	Slidell Levees Western	Local	HP	Unknown
PO-06	Fritchie Marsh Restoration	CWPPRA	HR	2001
PO-16	Bayou Sauvage National Wildlife Refuge Hydrologic Restoration, Phase 1	CWPPRA	HR	1996
PO-17	Bayou LaBranche Wetland Creation	CWPPRA	MC	1994
PO-18	Bayou Sauvage National Wildlife Refuge Hydrologic Restoration, Phase 2	CWPPRA	HR	1997
PO-19	Mississippi River Gulf Outlet (MRGO) Disposal Area Marsh Protection	CWPPRA	HR	1999
PO-24	Hopedale Hydrologic Restoration	CWPPRA	HR	2004
PO-33	Goose Point/Point Platte Marsh Creation	CWPPRA	MC	2008
RI	Raccoon Island Repair	State	DM	1994
SBG	Spoilbank along the GIWW	State	VP	1993
TE-01	Montegut Wetland	State	MM	1993
TE-02	Falgout Canal Wetland	State	MM	1995
TE-03	Bayou LaCache Wetland	State	MM	1996
TE-06	Point au Chien Hydrologic Restoration	State	HR	2006
TE-07b	Lower Petit Caillou	State	HR	2007
TE-17	Falgout Canal Planting Demonstration	CWPPRA	VP	1996
TE-20	Isles Dernieres Restoration East Island	CWPPRA	BI	1999
TE-24	Isles Dernieres Restoration Trinity Island	CWPPRA	BI	1999
TE-25	East Timbalier Island Sediment Restoration, Phase 1	CWPPRA	BI	2000
TE-26	Lake Chapeau Sediment Input and Hydrologic Restoration, Point Au Fer Island	CWPPRA	HR, MC	1999
TE-27	Whiskey Island Restoration	CWPPRA	BI	1999
TE-29	Raccoon Island Breakwaters Demonstration	CWPPRA	BI	1997
TE-30	East Timbalier Island Sediment Restoration, Phase 2	CWPPRA	BI	2000
TE-37	New Cut Dune and Marsh Restoration	CWPPRA	BI	2007
TE-40	Timbalier Island Dune and Marsh Creation	CWPPRA	BI	2004
TV-06	Marsh Island Control Structures	State	MM	1993
TV-12	Little Vermilion Bay Sediment Trapping	CWPPRA	SNT	1999
TV-13a	Oaks/Avery Canal Hydrologic Restoration, Increment 1	CWPPRA	HR	1999
TV-15	Sediment Trapping at "The Jaws"	CWPPRA	SNT	2004
TV-18	Four Mile Canal Terracing and Sediment Trapping	CWPPRA	SNT	2004
Projects not represented in Predictive Models' Dataset[3]				
TE-44	North Lake Mechant Landbridge Restoration	CWPPRA	SP, MC	2009

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
TE-50	Whiskey Island Back Barrier Marsh Creation	CWPPRA	BI	2010
BA-36	Dedicated Dredging on the Barataria Basin Landbridge	CWPPRA	MC	2010
BA-36 (EB)	Barataria Landbridge Dedicated Dredging (CIAP)	CIAP (St.)	NC	2010
BA-39	Mississippi River Sediment Delivery System	CWPPRA	MC	2010
BA-54	Northwest Little Lake Marsh Creation and Enhancement	CIAP (Par.)	DM, MC, VP	2010
BA-63	Small Dredge Program	CIAP (Par.)	DM, MC	2010
CS-38	Black Lake Ecosystem Restoration	CIAP (Par.)	DM, MC	2010
LA-21.1	Beneficial Use- Sabine Cycle	Surplus 08	DM	2010
LA-21.2	Beneficial Use- Calcasieu Ship Channel	Surplus 08	DM	2010
ME-21(EB)	Grand Lake Shoreline Protection (CIAP)	CIAP (St.)	SP	2010
TE-43 (EB)	GIWW Bank Restoration of Critical Areas of Terrebonne (CIAP)	CIAP (St.)	SP	2010
TV-11B (EB)	Freshwater Bayou Bank Stabilization (CIAP)	CIAP (St.)	SP	2010
BA-25	Bayou Lafourche Freshwater Introduction	Surplus 08	FD	2011
BA-30 (EB)	East Grand Terre	CIAP (St.)	BI	2011
CS-04	Cameron Creole Levee	Surplus 08	HR	2011
TV-21	East Marsh Island Marsh Creation	CWPPRA	MC	2011
BA-66	West Bank and Vicinity (HSDRRS)	HP	HP	2012
AT-07	Deer Island Pass Realignment	CIAP (Par.)	DM, HR, MC	Pending
BA-04c	West Point a la Hache Outfall Management	CWPPRA	OM	Pending
BA-20-CU4	Jonathan Davis Wetland Protection	CWPPRA	HR	Pending
BA-27c	Barataria Basin Landbridge Shoreline Protection, Phase 3 - CU7 and CU8	CWPPRA	SP	Pending
BA-38	Pelican Island and Pass La Mer to Chaland Pass Restoration	CWPPRA	BI	Pending
BA-40	Riverine Sand Mining/Scofield Island Restoration	BB	BI	Pending
BA-41	South Shore of the Pen Shoreline Protection and Marsh Creation	CWPPRA	SP	Pending
BA-42	Lake Hermitage Marsh Creation	CWPPRA	MC	Pending
BA-43 (EB)	Long Distance Mississippi River Sediment Pipeline	CIAP (St.)	MC	Pending
BA-45 (EB)	Caminada Headlands	CIAP (St.)	BI	Pending
BA-48	Bayou Dupont Marsh and Ridge Creation Project	CWPPRA	MC	Pending
BA-50	Bayside Segmented Breakwaters at Grand Isle	CIAP (Par.)	SP	Pending
BA-51	Goose Bayou Ridge Creation and Shoreline Protection	CIAP (Par.)	SP	Pending
BA-52	Lower Lafitte Shoreline Stabilization at Bayou Rigolettes	CIAP (Par.)	SP	Pending
BA-58	Fringe Marsh Repair	CIAP (St.)	MC	Pending
BA-65	Fifi Island Restoration Extension	CIAP (Par.)	BI	Pending

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
BA-67	New Orleans to Venice	Federal	HP	Pending
BA-73	Grand Isle and Vicinity	Federal	HP	Pending
BA-75-1	Jean Lafitte Tidal Protection	Surplus 07	HP	Pending
BA-75-2	Rosethorne Tidal Protection	Surplus 07	HP	Pending
BA-75-3	Lafitte Tidal Protection	Surplus 07	HP	Pending
BA-82	Lafitte Levee Repair	CDBG	HP	Pending
BA-83	Rosethorne Wetland Assimiliation	CDBG	HR	Pending
BA-84	Bayou Lafourche FWD - Walter S Lemann Memorial Pump Station	CDBG	HR	Pending
BS-13 (EB)	Bayou Lamoque Floodgate Removal	CIAP (St.)	DI	Pending
BS-17	Lake Lery Rim Re-Establishment and Marsh Creation	CIAP (Par.)	MC	Pending
CS-04a	Cameron-Creole Maintenance	CWPPRA	HR	Pending
CS-28	Sabine Refuge Marsh Creation, Increment 1	CWPPRA	MC	Pending
CS-33	Cameron Parish Shoreline	Surplus 07	SP	Pending
CS-34	Beneficial Use Calcasieu Ship Channel	Surplus 07	DM	Pending
CS-35 (EB)	Marsh Creation via Beneficial Use (Phase 1) (CIAP)	CIAP (St.)	DM	Pending
CS-41	Horseshoe Lake Marsh Restoration	CIAP (Par.)	HR, SP	Pending
CS-44	Rabbit Island	CIAP (Par.)	DM, MC, SP	Pending
CS-49-CU1	Cameron-Creole Freshwater Introduction - Vegetative Plantings	CWPPRA	FD	Pending
CS-52	CIAP - Clear Marais Bank Protection	CIAP (Par.)	SP	Pending
CS-53	Cameron-Creole Levee	Surplus 09	HP	Pending
PO-87	Madisonville Bulkhead	CDBG	SP	Pending
ME-20	South Grand Chenier Hydrologic Restoration Project	CWPPRA	HR	Pending
ME-21	Grand Lake Shoreline Protection	CWPPRA	SP	Pending
ME-25 (SF)	Marsh Creation Near Freshwater Bayou	Surplus 07	MC	Pending
MR-017	Living Shoreline	CIAP (St.)	Other	Pending
MR-018	Shoreline Protection Emergency Restoration	CIAP (St.)	SP	Pending
MR-019	Mississippi River Reintroduction into Bayou Lafourche	CIAP (St.)	FD	Pending
N/A	East of Harvey Canal	Surplus 07	HP	Pending
N/A	Forty Arpent Levee	Surplus 07	HP	Pending
N/A	Raising of LA 1 Floodgate and Lock Structure	Surplus 07	HP	Pending
N/A	Raising of LA 23 at Lareussite	Surplus 07	HP	Pending
N/A	South Slidell/St. Tammany storm protection levees	Other	HP	Pending
N/A	St. Charles Parish West Bank Hurricane Protection	Surplus 07	HP	Pending
PO-36 (EB)	Orleans Landbridge Shoreline Protection	CIAP (St.)	SP	Pending

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
PO-42	West LaBranche Shoreline Protection	CIAP (Par.)	SP	Pending
PO-43	East LaBranche Shoreline Protection	CIAP (Par.)	SP	Pending
PO-46	Reserve Relief Canal Shoreline Protection Project	CIAP (Par.)	SP	Pending
PO-52	Lake Pontchartrain Shoreline Protection	CIAP (Par.)	SP	Pending
PO-55	Lake Pontchartrain and Vicinity- Lake Borgne Surge Barrier (HSDRRS)	HSDRRS	HP	Pending
PO-56	Lake Pontchartrain and Vicinity (HPO) (HSDRRS)	HSDRRS	HP	Pending
PO-63	Lake Pontchartrain and Vicinity (PRO) (HSDRRS)	HSDRRS	HP	Pending
PO-64	Lake Pontchartrain and Vicinity, Seabook Structure (HSDRRS)	HSDRRS	HP	Pending
PO-70	Northshore Beach Marsh Creation/Restoration	CIAP (Par.)	MC	Pending
PO-72	Biloxi Marsh	Surplus 07	SP	Pending
PO-73	Central Wetlands Assimilation	CIAP (St.)	Other	Pending
PO-88	East Labranche Shoreline Protection	CDBG	SP	Pending
PO-89	South Slidell Flood Control Structure	CDBG	HP	Pending
PO-90	West Lac Des Allemands Shoreline Protection	CIAP (Par.)	SP	Pending
TE-32A	North Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management	CWPPRA	FD	Pending
TE-34	Penchant Basin Natural Resources Plan, Increment 1	CWPPRA	HR	Pending
TE-39	South Lake Decade Freshwater Introduction	CWPPRA	FD	Pending
TE-43	GIWW Bank Restoration of Critical Areas in Terrebonne	CWPPRA	SP	Pending
TE-48B	Raccoon Island Shoreline Protection/Marsh Creation - Phase B	CWPPRA	MC	Pending
TE-52	West Belle Pass Barrier Headland Restoration	CWPPRA	BI, MC	Pending
TE-60	Lake Verret Swamp and Lake Rim Restoration	CIAP (Par.)	DM, MC	Pending
TE-63	Falgout Canal Freshwater Enhancement	CIAP (St.)	HR	Pending
TE-64	Morganza to the Gulf (locally constructed segments)	Surplus 07	HP	Pending
TE-65	Larose to Golden Meadow (locally constructed segments)	Surplus 08	HP	Pending
TE-78	Cutoff-Pointe Aux Chene Levee	CDBG	HP	Pending
TV-32	Lake Sand Terracing	CIAP (Par.)	MC, SP	Pending
TV-33	Lake Tom/Lake Michael Terracing	CIAP (Par.)	MC, SP	Pending
TV-35	Vermilion Bay Shoreline Restoration	CIAP (Par.)	SNT, SP	Pending
TV-45	Shoreline Protection and Marsh Creation at Tiger Point	CIAP (Par.)	SP	Pending
TV-51	Oyster Reef Parallel to Cheniere au Tigre	CIAP (Par.)	SP	Pending
TV-52	Franklin Canal sinkable barge and floodgate	CDBG	HP	Pending
TV-55	Morgan City/ St Mary Flood Protection	Surplus 09	HP	Pending
TV-56	Four-Mile Canal Storm Surge Reduction Construction	Surplus 09	HP	Pending
TV-58	Flood Control Structure at Boston Canal (CDBG)	CDBG	HP	Pending
TV-60	Front Ridge Cheniere Terracing Project	CDBG	SNT	Pending

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
Constructed projects that contain shoreline protection features (shapefiles needed to project erosion rates)[3]				
BA-05b	Queen Bess	State	SP, DM	1993
BA-05c	Baie de Chactas	State	SP	1990
BA-15	Lake Salvador Shore Protection Demonstration	CWPPRA	SP	1998
BA-15x1	Lake Salvador Shoreline Protection Extension	State	SP	2005
BA-15X-2 (EB)	Lake Salvador Shoreline Protection (Phase III)	CIAP	SP	2009
BA-16	Bayou Segnette	State	SP	1998
BA-23	Barataria Bay Waterway West Side Shoreline Protection	CWPPRA	SP	2000
BA-26	Barataria Bay Waterway East Side Shoreline Protection	CWPPRA	SP	2001
BA-27	Barataria Landbridge Shoreline Protection (Phases 1 and 2)	CWPPRA	SP	2008
BA-27d	Barataria Basin Landbridge Shoreline Protection Phase 4	CWPPRA	SP	2008
BA-37	Little Lake Shoreline Protection/ Dedicated Dredging Near Round Lake	CWPPRA	SP, MC	2007
CAT-01	Cheniere Au Tigre	State	SP	2005
CIAPFIFI	Fifi Island Restoration	Other	SP	2003
CS-01	Holly Beach	State	SP	1994
CS-11B	Sweet Lake/Willow Lake Hydrologic Restoration	CWPPRA	SP	2001
CS-18	Sabine National Wildlife Refuge Erosion Protection	CWPPRA	SP	1995
CS-22	Clear Marais Bank Protection	CWPPRA	SP	1997
CS-24	Perry Ridge Shore Protection	CWPPRA	SP	1999
CS-30	GIWW - Perry Ridge West Bank Stabilization	CWPPRA	SP	2001
CS-BL	Blind Lake	State	SP	1989
DNR 2513-03-11	Bush Canal and Bayou Terrebonne Bank Stabilization	Other	SP	2007
FTL-01	Fort Livingston Fisheries Habitat Restoration	Other	SP	2003
GIBSB	Grand Isle Bay Side Breakwaters	State	SP	1995
HPL-MIT	Lake Pontchartrain Mitigation Project	Other	SP	1996
LA-06	Shoreline Protection Foundation Improvements Demonstration	CWPPRA	SP	2006
ME-04	Freshwater Bayou Wetland (Phases 1 &2)	CWPPRA	HR, SP	1998
ME-09	Cameron Prairie National Wildlife Refuge Shoreline Protection	CWPPRA	SP	1994
ME-13	Freshwater Bayou Bank Stabilization	CWPPRA	SP	1998
ME-19	Grand-White Lakes Landbridge Protection	CWPPRA	SP	2004
ME-18 (EB)	Rockefeller Shoreline Protection Demonstration	CIAP	SP	2009
ME-22	South White Lake Shoreline Protection	CWPPRA	SP	2006
N/A	Brannon Ditch	State	SP	1991

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type**[1]	**Last Year of Construction**
N/A	MRGO Shoreline Protection - USACE	Federal	SP	Unknown
NGI	North Grand Isle Breakwaters	State	SP	1995
PO-02c	Bayou Chevee	State	SP	1994
PO-03	LaBranche Shoreline Stabilization and Canal Closure	State	SP	1987
PO-03b	LaBranche Shoreline Protection	State	SP	1996
PO-10	Turtle Cove Shore Protection	State	SP	1994
PO-22	Bayou Chevee Shoreline Protection	CWPPRA	SP	2001
PO-30	Lake Borgne Shoreline Protection	CWPPRA	SP	2008
SSB	Sabine Shellbank Stabilization	State	SP	1990
TE-22	Point au Fer Canal Plugs	CWPPRA	SP, HR	2000
TE-23	West Belle Pass Headland Restoration	CWPPRA	DM, SP	1998
TE-41	Mandalay Bank Protection Demonstration	CWPPRA	SP	2003
TE-45	Terrebonne Bay Shore Protection Demonstration	CWPPRA	SP	2008
TE-46	West Lake Boudreaux Shoreline Protection and Marsh Creation	CWPPRA	SP, MC	2008
TE-48	Raccoon Island Shoreline Protection/Marsh Creation	CWPPRA	SP	2008
TV-03	Vermilion River Cutoff Bank Protection	CWPPRA	SP	1996
TV-09	Boston Canal/Vermilion Bay Bank Protection	CWPPRA	SP	1995
TV-11	Freshwater Bayou Bank Protection	State	SP	1994
TV-13b	Oaks/Avery Structures	State	SP	2000
TV-16 (CW-05)	Chenier Au Tigre Sediment Trapping Demonstration	CWPPRA	SNT, SP	2001
TV-17	Lake Portage Landbridge	CWPPRA	SP	2004
TV-4355NP1	Quintana Canal/ Cypremort Point	State	SP	1998
Diversion projects included in DEM that influence land building (shapefiles needed to project land building)[3]				
BA-01	Davis Pond Freshwater Diversion	WRDA	FD	2002
BA-02	GIWW (Gulf Intracoastal Waterway) to Clovelly Hydrologic Restoration	CWPPRA	HR	2000
BA-03	Naomi Siphon Diversion	CWPPRA	FD	2002
BA-03c	Naomi Outfall Management	CWPPRA	OM	2002
BS-03a	Caernarvon Diversion Outfall Management	CWPPRA	OM	2002
BA-04	West Point a la Hache Siphon	State	FD	1992
BS-06	Lake Lery Hydrologic Restoration	State	FD	1997
BS-08	Caernarvon Freshwater Diversion	State	FD	1991
BS-11	Delta Management at Fort St. Philip	CWPPRA	SD	2006
CS-27	Black Bayou Hydrologic Restoration	CWPPRA	HR	2001
CS-29	Black Bayou Culverts Hydrologic Restoration	CWPPRA	HR	2007
ME-01	Pecan Island Freshwater Introduction	State	FD	1992

Table 1. Projects Considered Part of Future Without Action Conditions				
Project ID	**Project Name**	**Program**	**Project Type[1]**	**Last Year of Construction**
MR-01b	Small Sediment Diversions	State	SD	1993
ME-11	Humble Canal Hydrologic Restoration	CWPPRA	HR	2003
ME-16	Freshwater Introduction South of Highway 82	CWPPRA	HR	2006
MR-06	Channel Armor Gap Crevasse	CWPPRA	SD	1997
MR-09	Delta Wide Crevasses	CWPPRA	SD	1999
PO-01	Violet Siphon	State	FD	1992
PO-08	Central Wetlands Pump Outfall	State	FD	1992
TE-28	Brady Canal Hydrologic Restoration	CWPPRA	HR	2000
TV-04	Cote Blanche Hydrologic Restoration	CWPPRA	HR	1999
TV-14	Marsh Island Hydrologic Restoration	CWPPRA	HR	2001

Notes to Table 1:

1. Project Type: BI=Barrier Island; DM=Beneficial Use of Dredged Material; FD=Freshwater Diversion; HP=Hurricane Protection; HR=Hydrologic Restoration; INF=Infrastructure; LA=Land Acquisition; MC=Marsh Creation; MM=Marsh Management; OM=Outfall Management; PA=Public Access; PL=Planning; SD=Sediment Diversion; SNT=Sediment and Nutrient Trapping; SP=Shoreline Protection; VP=Vegetation Planting.
2. Projects are considered part of Future Without Action Conditions but were not input into the predictive models because they involve passive landscape features that are already captured in the topographic/bathymetric grid or no attribute data were available to input into the models.
3. Projects were input into the predictive models if attribute data were available.

1.1.2 Sources of Project Ideas

To develop the project list for the 2012 Coastal Master Plan, we mined existing studies, plans, reports, and presentations for project concepts. Table 2 presents a listing of studies and plans that were considered for project selection. For the purposes of the master plan, "project concepts" was defined as risk reduction and/or restoration activities that have been previously proposed by various sources. The project concepts may have been approved by federal agencies or by the State for study or design, but none had been funded for construction. Using these past studies, we compiled a list of more than 1,500 existing project concepts.

Table 2. Sources of Project Concepts		
Year of Study	**Study Title**	**Study Sponsor(s)**
1996	Barataria Terrebonne National Estuary Program Comprehensive Conservation Management Plan	BTNEP
1998	Coast 2050: Toward a Sustainable Coastal Louisiana	Louisiana Coastal Wetlands Conservation Task Force, Wetlands Conservation and Restoration Authority
2000	Mississippi River Sediment, Nutrient, and Freshwater Redistribution Study	USACE, Louisiana Coastal Wetlands Conservation Task Force

Table 2. Sources of Project Concepts		
Year of Study	**Study Title**	**Study Sponsor(s)**
2003	Jefferson Parish Coastal Wetland Conservation and Restoration Plan	Jefferson Parish Government
2004	Louisiana Coastal Area Comprehensive Study	USACE, LDNR
2006	Comprehensive Habitat Management Plan for the Lake Pontchartrain Basin Foundation	Lake Pontchartrain Basin Foundation
2006	Phase 2 Reconnaissance-Level Evaluation of the Third Delta Conveyance Channel Project	LDNR
2006	Envisioning the Future of the Gulf Coast	
2007	Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast	CPRA
2007	A Plan to Sustain Coastal Louisiana Using the Multiple Line of Defense Strategy	McKnight Foundation, Multiple Lines of Defense Assessment Team
2007	Coastal Impact Assistance Program (CIAP) Tier II Projects	CPRA
2008	Plaquemines Parish Strategic Implementation Plan	Plaquemines Parish Government
2009	A Dutch Perspective on Coastal Louisiana Flood Risk Reduction and Landscape Stabilization	Netherlands Water Partnership, USACE
2009	Louisiana Coastal Protection and Restoration Final Technical Report	USACE
2009	Compilation of Project Concepts for Future Consideration (presented in FY 2010 Annual Plan)	CPRA
2009	Comprehensive Plan for Coastal Restoration in Terrebonne Parish	Terrebonne Parish Consolidated Government
2010	Mississippi River Gulf Outlet Ecosystem Restoration Study	USACE
2010	Coastal Sustainability Studio Concepts	Coastal Sustainability Studio
2010	Vision for St. Bernard Parish	St. Bernard Parish Government
2010	St. Mary Levee District Master Plan	St. Mary Levee District
2011	Coastal Restoration Scoping Document	Calcasieu Parish Police Jury
Undated	Vermilion Parish Hurricane Protection Plan	Vermilion Parish Police Jury
Multiple	Coastal Wetland Planning, Protection, and Restoration Act (CWPPRA) Priority Project List Finalists	CPRA, EPA, NRCS, USACE, USFWS
Ongoing	Southwest Coastal Louisiana Feasibility Study	USACE, CPRA

On a parallel track, we developed a suite of voluntary nonstructural projects, including elevating residential structures, floodproofing residential and nonresidential structures, and acquisition of structures. This approach was necessary because no comprehensive nonstructural study has occurred to date in coastal Louisiana, and consequently no significant body of nonstructural concepts existed to be mined for the master plan. Further discussion of nonstructural considerations is presented in Appendix F – Implementation and Adaptive Management.

1.1.3 Screening Rationale

The 2012 Coastal Master Plan's candidate project list needed to be large enough to represent the breadth of thinking on coastal protection and restoration over the past 20 years. At the same time, the list had to be small enough so that every project could be individually evaluated by the planning tools within the available timeframe. Furthermore, many project concepts proposed in past studies were duplicative of each other or involved such minor differences as to constitute essentially identical projects. Given these considerations, the initial list of over 1,500 project concepts needed to be screened to a more manageable number of candidate projects that nonetheless captured the full range of available options for risk reduction and restoration in coastal Louisiana.

Screening Criteria. To be considered for the list of candidate projects, a project concept had to meet following screening criteria:

- **Size Threshold.** The 2012 Coastal Master Plan involves a large-scale, regional approach to coastal risk reduction and restoration. At the heart of the master plan's analysis are an interconnected suite of coarse-scale predictive models that estimate restoration and risk reduction effects of candidate projects on various aspects of the coastal system. These models were developed for a system-wide, planning scale analysis, and consequently are in some cases unable to capture the effects of small-scale, localized projects in the coastal system. To support the 2012 Coastal Master Plan's charge to invest in a regional approach to coastal sustainability, and in light of the coarse scale utilized by some of the predictive models, a minimum size threshold was established for projects to be considered in the 2012 Plan. The expected extent of project concept effects needed to meet a minimum size threshold of at least 500 acres to ensure that the project's effects were large enough for the models to capture. For example, small-scale wastewater assimilation concepts and storm water pumping stations did not meet this criterion and were not included on the list. (Exceptions to this criterion were made for project concepts that did not meet this size threshold if they had already been authorized for study [e.g., CWPPRA Phase 1 projects] or were under consideration for inclusion in alternatives of an authorized study [e.g., Southwest Louisiana Coastal Study measures]. Additionally, shoreline protection and bank stabilization projects were not subjected to this criterion because of the difficulty in estimating benefit areas for these features.)
- **Geographic Area.** Certain types of project concepts were screened from some areas (e.g., marsh creation projects in the lower Atchafalaya or Wax Lake Deltas) because the natural processes they addressed were already occurring in those locations, and investment in restoration projects in these areas would be unnecessary.
- **Adequate Information.** Project concepts needed enough specific information that they could be evaluated using our models. Adequate information typically included specific geospatial location data (for all project concepts), elevations (for risk reduction projects), and, where applicable, information on proposed operational regimes (for restoration projects). Programmatic concepts that did not present a specific project, such as programs to promote

beneficial use of dredged material coast wide, did not meet this criterion and were not included in the list. Additionally, restoration project concepts that required an operational regime to evaluate their effects (e.g., hydrologic restoration projects involving hydrologic control structures that are operated based on surface water levels) were not included if no operational regime was proposed in the original study.

- **Inconsistency with Master Plan Objectives and Principles**. Project concepts needed to meet the objectives and principles of the master plan to be considered for inclusion in the Projects List. Projects that did not meet these criteria (e.g., restoration projects that do not involve harnessing the natural processes such as fish hatcheries; projects that do not involve coastal restoration or storm-surge flood risk reduction features) were eliminated from consideration.

Eliminating Duplications. Many project concepts had overlapping scopes, goals, and physical locations. In such cases, the screening criteria were used to determine which projects should take precedence. For example, two project concepts might propose the same method and effects, but one might simply present a broadly stated goal while the other included targeted acreage, a GIS polygon, and/or an operational regime. In that case, the project that included greater detail was selected. In many cases, a project concept proposed in an older study (e.g., Coast 2050) overlapped with one included in a more recent study (e.g., LACPR). In these cases, the most recent version was generally retained, given that more detail was typically provided and the supporting data were more recent.

A list of all projects that were eliminated from consideration is included in Appendix A1.

Combining Project Concepts. In some cases, two project concepts were very similar and both included components that added value. In those cases, the two projects were merged to gain the greatest scope of restoration or risk reduction elements and make the analysis more efficient. Small marsh creation, barrier island/headland restoration, and shoreline protection project concepts were often grouped into larger concepts when they were in close proximity to each other or where project features would provide synergistic benefits.

A Consistent Approach to Diversions. The initial review effort produced an array of diversion concepts that would use fresh water and sediment from rivers to stabilize salinity gradients, nourish existing marshes, and provide sediment for the building of new land. This initial list included a wide variety of ideas, ranging in size from large sediment diversions to small freshwater siphons. The list was too broad in scope, however, to allow a consistent, comparative analysis of the effects of diversions. We enlisted the help of the Framework Development Team to develop a consistent, comprehensive approach to diversion concepts. Interested members participated in a River Use Workgroup that developed and refined the approach to diversion standardization. The workgroup established locations, discharges, and flow regimes for these diversion concepts. The workgroup members proposed that the 2012 Coastal Master Plan generally consider three discharge capacities for Mississippi River diversions: 5,000 cubic feet per second (cfs), 50,000 cfs, and 250,000 cfs, as well as some larger scale use of the river in some locations. Modeling this range of capacities allowed us to better hone our thinking as to how best to site and size diversions and use river resources.

1.2 The Project List

Using the methods described above, a list of 397 projects was ultimately developed for evaluation in the 2012 Coastal Master Plan. Included within this project list are 248 restoration projects, 33 structural protection projects, and 116 nonstructural projects. The list represents a diverse array of projects throughout the coast. Project fact sheets providing details on each of the projects evaluated are presented in Appendix A2.

1.2.1 Restoration Projects

Restoration projects are those projects whose features restore degraded components of Louisiana's coastal ecosystem by re-establishing natural processes. The projects in this table are grouped into the following eight general categories:

- **Bank Stabilization (6 projects):** Onshore placement of earthen fill and vegetative plantings designed to reduce wave energies and maintain shorelines in open bays, lakes, and natural and artificial channels.
- **Barrier Island/Headland Restoration (9 projects):** Creation and restoration of dune, beach, and back barrier marsh to restore or augment Louisiana's offshore barrier islands and headlands.
- **Diversion and Channel Realignment (49 projects [total includes 9 channel realignment projects):** Creation of new conveyance channels to divert fresh water and/or sediment from coastal Louisiana's rivers into adjacent basins to stabilize or restore salinity gradients, nourish existing wetlands, and support land building.
- **Hydrologic Restoration (25 projects):** Project features that restore natural hydrologic patterns either by 1) conveying fresh water to areas that have been cut off by manmade features, or 2) preventing the intrusion of saltwater through manmade channels into lower salinity areas.
- **Marsh Creation (110 projects [total includes 45 "child" projects; see Note 1 for Table 2]):** Creation of new wetlands in open water areas through placement of dredged material and vegetative plantings to restore ecosystem services and provide additional storm surge attenuation.
- **Oyster Barrier Reefs (5 projects [total includes 1 "child" project; see Note 1 for Table 2]):** Establishment of bioengineered oyster reefs to improve oyster cultivation and serve as breakwaters to attenuate wave energies.
- **Ridge Restoration (16 projects):** Re-establishment of historic ridges through sediment placement and vegetative plantings to restore natural hydrologic patterns and provide storm surge reduction.

- **Shoreline Protection (28 projects [total includes 4 "child" projects; see Note 1 for Table 2]):** Nearshore segmented rock breakwaters to reduce wave energies on shorelines in open bays, lakes, sounds, and natural and manmade channels.

Additional information about the restoration projects evaluated in the master plan is presented in Sections 3.1 through 3.8. Table 3 provides a list of all restoration projects evaluated for the 2012 Coastal Master Plan.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan

Project ID	Project Type	Name	Description	Region	Parish
004.BS.01	Bank Stabilization	Grand Lake Bank Stabilization	Bank stabilization of 497,000 feet of Grand Lake shoreline	PU 4	Cam.
004.BS.02	Bank Stabilization	West Cove Bank Stabilization	Bank stabilization of 106,000 feet of shoreline in the West Cover area of Calcasieu Lake	PU 4	Cam.
004.BS.03	Bank Stabilization	GIWW Bank Stabilization (Freshwater Bayou to Calcasieu Ship Channel)	Bank stabilization of 421,000 feet of GIWW shoreline between Freshwater Bayou and Calcasieu Ship Channel	PU 4	Cal., Cam., Ver.
004.BS.04	Bank Stabilization	Calcasieu-Sabine Bank Stabilization	Bank stabilization of 164,000 feet of Gulf shoreline between Sabine River and Calcasieu Ship Channel	PU 4	Cam.
004.BS.05	Bank Stabilization	Sabine Lake Bank Stabilization	Bank stabilization of 133,000 feet of Sabine Lake shoreline	PU 4	Cam.
004.BS.06	Bank Stabilization	Calcasieu Ship Channel Bank Stabilization (Gulf to Calcasieu Lake)	Bank stabilization of 75,000 feet of the Calcasieu Ship Channel from the Gulf of Mexico to Calcasieu Lake	PU 4	Cam.
001.BH.01	Barrier Island/ Headland Restoration	Breton Sound Barrier Island Restoration	Creation of dune and back barrier marsh in the Pontchartrain Basin offshore of Black Bay, Eloi Bay, and Drum Bay in Breton Sound	PU 1	Plaq., StB.
001.BH.02	Barrier Island/ Headland Restoration	Chandeleur Islands Barrier Island Restoration	Restoration of dune and back barrier marsh in the Chandeleur Island chain	PU 1	StB.
002.BH.02	Barrier Island/ Headland Restoration	Cheniere Ronquille Barrier Island Restoration	Restoration of dune and back barrier marsh at Cheniere Ronquille	PU 2	Plaq.
002.BH.04	Barrier Island/ Headland Restoration	Barataria Pass to Sandy Point Barrier Island Restoration	Restoration of dune and back barrier marsh in barrier islands Between Barataria Pass and Sandy Point	PU 2	Plaq., Jeff.
002.BH.05	Barrier Island/ Headland Restoration	Belle Pass to Caminada Pass Barrier Island Restoration	Restoration of dune, beach, and back barrier marsh in barrier islands between Belle Pass and Caminada Pass	PU 2	Laf., Jef.
002.BH.06	Barrier Island/ Headland Restoration	Grand Isle Barrier Island Restoration	Restoration of dune and beach on Grand Isle	PU 2	Jef.
03a.BH.01	Barrier Island/ Headland Restoration	Whiskey Island West Flank Barrier Island Restoration	Restoration of dune, beach, and back barrier marsh along the west flank of Whiskey Island	PU 3a	Ter.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
03a.BH.03	Barrier Island/ Headland Restoration	Isles Dernieres Barrier Island Restoration	Restoration of dune, beach, and back barrier marsh in Isles Dernieres barrier islands	PU 3a	Ter.
03a.BH.04	Barrier Island/ Headland Restoration	Timbalier Islands Barrier Island Restoration	Restoration of dune, beach, and back barrier marsh in Timbalier barrier islands	PU 3a	Ter.
001.DI.01	Diversion	Lower Breton Diversion (5,000 cfs)	Diversion to lower Breton Sound in the vicinity of Black Bay, 5,000 cfs capacity[1]	PU 1	Plaq.
001.DI.02	Diversion	Lower Breton Diversion (50,000 cfs)	Diversion to lower Breton Sound in the vicinity of Black Bay, 50,000 cfs capacity[2]	PU 1	Plaq.
001.DI.04	Diversion	Lower Breton Diversion (250,000 cfs)	Diversion to lower Breton Sound in the vicinity of Black Bay, 250,000 cfs capacity[3]	PU 1	Plaq.
001.DI.05	Diversion	Bonnet Carre Diversion (5,000 cfs)	Diversion at Bonnet Carre, 5,000 cfs capacity[1]	PU 1	StC.
001.DI.06	Diversion	Fort St. Phillip Diversion (5,000 cfs)	Delta Building diversion north of Fort St. Phillip, 2,500-5,000 cfs capacity (uncontrolled diversion with a design flow of 3,000 cfs at the 50% exceedence stage of the river)	PU 1	Plaq.
001.DI.14	Diversion	Upper Breton Diversion (5,000 cfs)	Diversion to Upper Breton Sound in the vicinity of Braithwaite, 5,000 cfs capacity[1]	PU 1	Plaq., StB.
001.DI.15	Diversion	Upper Breton Diversion (50,000 cfs)	Diversion to Upper Breton Sound in the vicinity of Braithwaite, 50,000 cfs capacity[2]	PU 1	Plaq., StB.
001.DI.17	Diversion	Upper Breton Diversion (250,000 cfs)	Diversion to Upper Breton Sound in the vicinity of Braithwaite, 250,000 cfs capacity[3]	PU 1	Plaq., StB.
001.DI.18	Diversion	Central Wetlands Diversion (5,000 cfs)	Diversion to Central Wetlands in the vicinity of Violet, 5,000 cfs capacity[1]	PU 1	Orl., StB.
001.DI.19	Diversion	Central Wetlands Diversion (50,000 cfs)	Diversion to Central Wetlands in the vicinity of Violet, 50,000 cfs capacity[2]	PU 1	Orl., StB.
001.DI.21	Diversion	East Maurepas Diversion (5,000 cfs)	Diversion to Maurepas Swamp in the vicinity of Hope Canal, 5,000 cfs capacity[3]	PU 1	StJo.
001.DI.22	Diversion	East Maurepas Diversion (25,000 cfs)	Diversion to Maurepas Swamp in the vicinity of Hope Canal, 25,000 cfs capacity (operation at capacity when Mississippi River flows exceed 400,000 cfs, operation at 4% of river flows below 400,000 cfs)	PU 1	StJo.
001.DI.23	Diversion	Mid-Breton Sound Diversion (5,000 cfs)	Diversion to Mid-Breton Sound in the vicinity of White Ditch, 5,000 cfs capacity[1]	PU 1	Plaq.
001.DI.24	Diversion	Mid-Breton Sound Diversion (50,000 cfs)	Diversion to Mid-Breton Sound in the vicinity of White Ditch, 50,000 cfs capacity[2]	PU 1	Plaq.
001.DI.25	Diversion	Benneys Bay Diversion (20,000 cfs)	Diversion at Benneys Bay, 20,000 cfs capacity (uncontrolled diversion)	PU 1	Plaq.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
001.DI.29	Diversion	West Maurepas Diversion (5,000 cfs)	Diversion(s) to Maurepas Swamp in the vicinity of Blind River or Hope Canal, maximum capacity 5,000 cfs	PU 1	StJa., StJo.
001.DI.30	Diversion	Pontchartrain-Barataria Multi-Diversion Plan	5,000 cfs diversions at Maurepas, Bonne Carre, Northwest Barataria, Hahnville, Central Wetlands, Caernarvon, Mid-Breton, Myrtle Grove, Hermitage, Black Bay; 10,000 cfs Diversions at Empire, Venice, and Baptiste Collette	PU 1/2	Mul-tiple
002.DI.01	Diversion	Spanish Pass Diversion (7,000 cfs)	Diversion at Spanish Pass, 7,000 cfs capacity (uncontrolled diversion)	PU 2	Plaq.
002.DI.02	Diversion	Mid-Barataria Diversion (5,000 cfs)	Diversion to mid-Barataria in the vicinity of Myrtle Grove, 5,000 cfs capacity[1]	PU 2	Plaq.
002.DI.03	Diversion	Mid-Barataria Diversion (50,000 cfs- 1st Increment)	Diversion to mid-Barataria in the vicinity of Myrtle Grove, 50,000 cfs capacity (represents initial component of a 250,000 cfs diversion)[2]	PU 2	Plaq.
002.DI.03a	Diversion	Mid-Barataria Diversion (250,000 cfs- 2nd Increment)	Diversion to mid-Barataria in the vicinity of Myrtle Grove, (represents incremental expansion of 002.DI.03 to 250,000 cfs capacity)	PU 2	Plaq.
002.DI.04	Diversion	Mid-Barataria Diversion (250,000 cfs)	Diversion to mid-Barataria in the vicinity of Myrtle Grove, 250,000 cfs capacity[3]	PU 2	Plaq.
002.DI.05	Diversion	Northwest Barataria Diversion (5,000 cfs)	Diversion to Northwest Barataria, 5,000 cfs capacity[1]	PU 2	StJa.
002.DI.06	Diversion	West Pointe a la Hache Diversion (5,000 cfs)	Diversion in the vicinity of West Pointe a la Hache, 5,000 cfs capacity[1]	PU 2	Plaq.
002.DI.07	Diversion	West Pointe a la Hache Diversion (50,000 cfs)	Diversion in the vicinity of West Pointe a la Hache, 50,000 cfs capacity[2]	PU 2	Plaq.
002.DI.09	Diversion	West Pointe a la Hache Diversion (250,000 cfs)	Diversion in the vicinity of West Pointe a la Hache, 250,000 cfs capacity[3]	PU 2	Plaq.
002.DI.14	Diversion	Lower Barataria Diversion (5,000 cfs)	Diversion to lower Barataria in the vicinity of Empire, 5,000 cfs capacity[1]	PU 2	Plaq.
002.DI.15	Diversion	Lower Barataria Diversion (50,000 cfs)	Diversion to lower Barataria in the vicinity of Empire, 50,000 cfs capacity[2]	PU 2	Plaq.
002.DI.16	Diversion	Lower Barataria Diversion (250,000 cfs)	Diversion to lower Barataria in the vicinity of Empire, 250,000 cfs capacity[3]	PU 2	Plaq.
002.DI.17	Diversion	Hahnville Diversion (5,000 cfs)	Diversion to upper Barataria in the vicinity of Hahnville, 5,000 cfs capacity[1]	PU 2	StC.
002.DI.18	Diversion	Hermitage Diversion (5,000 cfs)	Diversion in the vicinity of Hermitage, 5,000 cfs capacity[1]	PU 2	Plaq.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
002.DI.19	Diversion	Hermitage Diversion (250,000 cfs Seasonally Operated)	Diversion n the vicinity of Hermitage, 250,000 cfs capacity (operated only from January through May)[3]	PU 2	Plaq.
002.DI.21	Diversion	Third Delta Diversion (West Fork)	Third Delta Diversion into Terrebonne Bay, 50,000 cfs capacity (western fork only)	PU 2/3a	Asc., Asu., Ter., Laf.
03a.DI.01	Diversion	Bayou Lafourche Diversion (1,000 cfs)	Diversion at Bayou Lafourche, 1,000 cfs capacity (continuous operation at capacity)	PU 2/3a	Laf.
03a.DI.08	Diversion	Bayou Lafourche Diversion (5,000 cfs)	Diversion at Bayou Lafourche, 5,000 cfs capacity[1]	PU 2/3a	Laf.
03a.DI.03	Diversion	Atchafalaya River Diversion (20,000 cfs)	Diversion to benefit Penchant and Southwest Terrebonne marshes, 20,000 cfs capacity (continuous operation at capacity)	PU 3a/3b	StM., Ter.
03a.DI.05	Diversion	Atchafalaya River Diversion (150,000 cfs)	Diversion to benefit Penchant and Southwest Terrebonne marshes, 150,000 cfs capacity	PU 3a/3b	StM., Ter.
03b.DI.04	Diversion	Increase Atchafalaya Flow to Eastern Terrebonne	Increase freshwater flows from Atchafalaya River to Terrebonne marshes (20,000 cfs east along the GIWW towards HNC)	PU 3a/3b	StM., Ter.
03b.DI.05	Diversion	Wax Lake Delta Reallocation	Wax Lake Delta Reallocation- 67% of Atchafalaya River	PU 3b	StM.
03b.DI.06	Diversion	Violet, Davis Pond, and Bayou Lafourche Diversions (100,000 cfs)	Diversions at MRGO/Violet, Davis Pond, Bayou Lafourche, 100,000 cfs capacity each (no operation for river flows below 600,000 cfs; for flows between 600,000 and 1.25 million cfs, one diversion operated at a time for 3-4 months; for flows above 1.25 million cfs, all three diversions operated simultaneously)	PU 1/2/3a	Mul-tiple
001.DI.32	Channel Re-alignment	Down River Reallocation (50/50)	Down River Reallocation, Black Bay/ Empire: 50% Breton/50% Barataria	PU 1/2	Plaq.
001.DI.33	Channel Re-alignment	Down River Reallocation (90/10)	Down River Reallocation, Black Bay/Empire: 90% Breton/10% Barataria	PU 1/2	Plaq.
001.DI.34	Channel Re-alignment	Down River Reallocation (10/90)	Down River Reallocation, Empire/Black Bay: 10% Breton/90% Barataria	PU 1/2	Plaq.
001.DI.35	Channel Re-alignment	Up River Reallocation (50/50)	Up River Reallocation, Mid Breton Sound/Hermitage: 50% Breton/50% Barataria	PU 1/2	Plaq.
001.DI.36	Channel Re-alignment	Up River Reallocation (90/10)	Up River Reallocation, Mid-Breton Sound/Hermitage: 90% Breton/10% Barataria	PU 1/2	Plaq.
001.DI.37	Channel Re-alignment	Up River Reallocation (10/90)	Up River Reallocation, Hermitage/Mid-Breton Sound: 10% Breton/90% Barataria	PU 1/2	Plaq.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
001.DI.38	Channel Re-alignment	Up River Reallocation (80/20)	Up River Reallocation, Mid-Breton Sound/Hermitage: 80% Breton/20% Barataria	PU 1/2	Plaq.
001.DI.39p	Channel Re-alignment	Mississippi River Channel Realignment (Study)	Study to explore potential locations and discharge regimes of a channel realignment on the lower Mississippi River	PU1/2	Plaq.
002.DI.20	Channel Re-alignment	Pass a Loutre Channel Realignment with Up River Diversions	Up River Diversions: Bayou Manchac/Bayou Braud (Maurepas): 5,000 cfs; Blind River: 5,000 cfs; Garyville (Hope Canal) 3,000 cfs; Bonne Carre: 10,000 cfs; Violet: 20,000 cfs; White's Ditch: 1,000 cfs; Benney's Bay: 50,000 cfs; Belair (Black Bay): 200,000 cfs; Bohemia: 200,000 cfs; Channel Modifications (Pass a Loutre): 200,000 cfs; Lagan (Northwest Barataria): 1,000 cfs; Johnson (Hahnville): 1,000 cfs; Jesuit Bend (Myrtle Grove-smaller): 5,000 cfs; Myrtle Grove (larger): 20,000 cfs; Deer Range (Hermitage): 10,000 cfs; Buras (Venice): 59,900 cfs.	PU 1/2	Mul-tiple
001.HR.01	Hydrologic Restoration	Amite River Diversion Canal Hydrologic Restoration	Hydrologic restoration in western Maurepas Swamp by gapping spoil banks on Amite River Diversion Canal	PU 1	Liv., Asc.
002.HR.02	Hydrologic Restoration	Bayou Rigolets Hydrologic Restoration	Channel management of Bayou Rigolets, Bayou Perot, and Harvey Cut Channel via sheet pile walls	PU 2	Jef., Laf.
03a.HR.02	Hydrologic Restoration	Central Terrebonne Hydrologic Restoration	Freshwater Enhancement in Central Terrebonne	PU 3b	Ter.
03a.HR.03	Hydrologic Restoration	GIWW Bypass South of Houma	Construction of a GIWW Bypass channel south of Houma	PU 3a	Ter.
03a.HR.04	Hydrologic Restoration	Chacahoula Basin Hydrologic Restoration	Structures to increase hydrologic connectivity across Highway 182 in the Chacahoula Basin	PU 3b	Ter.
03a.HR.10	Hydrologic Restoration	HNC Lock Hydrologic Restoration	Operation of the HNC Lock for hydrologic restoration	PU 3a	Ter.
03b.HR.01	Hydrologic Restoration	Freshwater Introduction to GIWW Toward Highway 82	Outfall management to convey freshwater east of Hwy 82 through GIWW	PU 3b	Ver., Ibe., StM.
004.HR.02	Hydrologic Restoration	GIWW Lock West of Calcasieu Ship Channel	New lock on the GIWW west of Calcasieu Ship Channel to maintain salinity gradients	PU 4	Cal.
004.HR.03	Hydrologic Restoration	Mermentau River Hydrologic Restoration	Restoration of original Mermentau River connection to Gulf and constriction of Mermentau Ship Channel to authorized dimensions	PU 4	Cam.
004.HR.05	Hydrologic Restoration	Little Pecan Bayou Hydrologic Restoration	Installation of structures south of Little Pecan Bayou for freshwater introduction	PU 4	Cam.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
004.HR.06	Hydrologic Restoration	Calcasieu Ship Channel Salinity Control Measures	Construction of measures designed to prevent saltwater from entering Calcasieu Lake through the Calcasieu Ship Channel	PU 4	Cam.
004.HR.07	Hydrologic Restoration	Little Pecan Bayou Sill	Saltwater sill on Little Pecan Bayou to reduce saltwater intrusion	PU 4	Cam.
004.HR.08	Hydrologic Restoration	Sabine Pass Hydrologic Restoration	Isolation of Sabine Lake from Sabine Ship Channel via rock dike	PU 4	Cam.
004.HR.10	Hydrologic Restoration	Gum Cove Ridge Hydrologic Restoration	Structure on GIWW at Gum Cove Ridge to reduce saltwater intrusion	PU 4	Cal.
004.HR.12	Hydrologic Restoration	Tom's Bayou Hydrologic Restoration	Control structure at Tom's Bayou for salinity control of Rainey Marsh	PU 3b	Ver.
004.HR.13	Hydrologic Restoration	Deep Lake Hydrologic Restoration	Spillway structure north of Deep Lake to increase freshwater exchange	PU 4	Cam.
004.HR.14	Hydrologic Restoration	Alkali Ditch Area Hydrologic Restoration	Control structures at Alkali Ditch, Crab Gully, and Black Lake Bayou for salinity control of Calcasieu watershed	PU 4	Cam., Cal.
004.HR.17	Hydrologic Restoration	Oyster Bayou Hydrologic Restoration	Salinity barrier at Oyster Bayou to reduce saltwater intrusion in Calcasieu watershed	PU 4	Cam.
004.HR.18	Hydrologic Restoration	Mermentau Basin Hydrologic Restoration (East of Calcasieu Lake)	Water control structure in Mermentau Basin at Highways 82 and 27 east of Calcasieu Lake for freshwater introduction	PU 4	Cam.
004.HR.19	Hydrologic Restoration	Mermentau Basin Hydrologic Restoration (South of Grand Lake)	Water control structure in Mermentau Basin at Highways 82 and 27 south of Grand Lake for freshwater introduction	PU 4	Cam.
004.HR.20	Hydrologic Restoration	Mermentau Basin Hydrologic Restoration (South of White Lake)	Water control structure in Mermentau Basin at Highways 82 and 27 south of White Lake for freshwater introduction	PU 4	Ver.
004.HR.21	Hydrologic Restoration	Southwest Pass Hydrologic Restoration	Rock sills at Southwest Pass to reduce tidal exchange	PU 4	Ver., Ibe.
004.HR.22	Hydrologic Restoration	East Calcasieu Lake Hydrologic Restoration	Spillway structure in the Cameron-Creole levee at East Calcasieu Lake	PU 4	Cam.
004.HR.23	Hydrologic Restoration	Humble Canal Hydrologic Restoration	Spillway structure at Humble Canal to increase freshwater flow to wetlands	PU 4	Cam.
004.HR.24	Hydrologic Restoration	Sabine River Hydrologic Restoration (5,000 cfs)	Diversion of the Sabine River to into wetlands south of GIWW (up to 5,000 cfs capacity)	PU 4	Cam., Cal.
001.CO.01	Marsh Creation	South Lake Lery Marsh Creation	Creation of 450 acres of marsh in the vicinity of Lake Lery	PU 1	Plaq., StB.
001.MC.02	Marsh Creation	Hopedale Marsh Creation	Creation of 550 acres of marsh in the vicinity of Hopedale	PU 1	StB.
001.MC.04	Marsh Creation	Breton Landbridge Marsh Creation	Creation of 19,720 acres of marsh in Breton Sound from MRGO to the Mississippi River	PU 1	Plaq., StB.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
001.MC.04a	Marsh Creation	Breton Landbridge Marsh Creation- Component A	Creation of 10,250 acres of marsh from Bayou Terre aux Boeufs to the Mississippi River (component of 001.MC.04)[4]	PU 1	Plaq.
001.MC.04b	Marsh Creation	Breton Landbridge Marsh Creation- Component B	Creation of 5,320 acres of marsh from MRGO to Bayou Terre aux Boeufs (component of 001.MC.04)[4]	PU 1	StB.
001.MC.04c	Marsh Creation	Breton Landbridge Marsh Creation- Component C	Creation of 4,140 acres of marsh between Lake Lery and Bayou Terre aux Boeufs (component of 001.MC.04)[4]	PU 1	Plaq., StB.
001.MC.05	Marsh Creation	New Orleans East Landbridge Restoration	Creation of 8,510 acres of marsh in the New Orleans East Landbridge	PU 1	Orl., StT.
001.MC.06	Marsh Creation	Breton Marsh Creation	Creation of 17,420 acres of marsh from Caernarvon to Phoenix and along Bayou Terre au Boeufs	PU 1	Plaq., StB.
001.MC.06a	Marsh Creation	Breton Marsh Creation- Component A	Creation of 5,580 acres of marsh along the east bank of Bayou Terre au Boeufs (component of 001.MC.06)[4]	PU 1	StB.
001.MC.06b	Marsh Creation	Breton Marsh Creation- Component B	Creation of 3,830 acres of marsh along the west bank of Bayou Terre au Boeufs (component of 001.MC.06)[4]	PU 1	StB.
001.MC.06c	Marsh Creation	Breton Marsh Creation- Component C	Creation of 8,010 acres of marsh from Caernarvon to Phoenix (component of 001.MC.06)[4]	PU 1	Plaq.
001.MC.07	Marsh Creation	Lake Borgne Marsh Creation	Creation of 4,460 acres of marsh along the shoreline of Lake Borgne	PU 1	StB.
001.MC.07a	Marsh Creation	Lake Borgne Marsh Creation- Component A	Creation of 2,230 acres of marsh along the shoreline of Lake Borgne (component of 001.MC.07)[4]	PU 1	StB.
001.MC.08	Marsh Creation	Central Wetlands North Marsh Creation	Creation of 4,670 acres of marsh in the northern Central Wetlands area	PU 1	Orl., StB.
001.MC.08a	Marsh Creation	Central Wetlands Marsh Creation- Component A	Creation of 2,010 acres of marsh in the northern Central Wetlands area (component of 001.MC.08)[4]	PU 1	Orl., StB.
001.MC.09	Marsh Creation	Biloxi Marsh Creation	Creation of 33,280 acres of marsh in Biloxi Marsh rom Oyster Bay to Drum Bay	PU 1	StB.
001.MC.09a	Marsh Creation	Biloxi Marsh Creation- Component A	Creation of 14,970 acres of marsh in Biloxi Marsh near Drum Bay (component of 001.MC.09)[4]	PU 1	StB.
001.MC.10	Marsh Creation	LaBranche Marsh Creation	Creation of 2,740 acres of marsh at LaBranche	PU 1	StC.
001.MC.11	Marsh Creation	Fort St. Phillip Marsh Creation	Creation of 5,160 acres of marsh at Fort St. Phillip	PU 1	Plaq.
001.MC.12	Marsh Creation	Quarantine Bay Marsh Creation	Creation of 16,730 acres of marsh at Quarantine Bay	PU 1	Plaq.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
001.MC.12a	Marsh Creation	Quarantine Bay Marsh Creation- Component A	Creation of 7,360 acres of marsh at Quarantine Bay (component of 001.MC.12)[4]	PU 1	Plaq.
001.MC.12b	Marsh Creation	Quarantine Bay Marsh Creation- Component B	Creation of 9,370 acres of marsh at Quarantine Bay (component of 001.MC.12)[4]	PU 1	Plaq.
001.MC.13	Marsh Creation	Golden Triangle Marsh Creation	Creation of 2,440 acres of marsh in the Golden Triangle area	PU 1	Orl., StB.
001.MC.14	Marsh Creation	Bayou Bonfouca Marsh Creation	Creation of 480 acres of marsh near Bayou Bonfouca	PU 1	StT.
001.MC.15	Marsh Creation	Central Wetlands South Marsh Creation	Creation of 1,160 acres of marsh in the southern Central Wetlands area	PU 1	StB.
001.MC.16	Marsh Creation	Lake Ameda Marsh Creation	Creation of 1,400 acres of marsh in the vicinity of Lake Ameda	PU 1	StB.
001.MC.17	Marsh Creation	Eastern Lake Borgne Marsh Creation	Creation of 1,890 acres along the eastern shore of Lake Borgne	PU 1	StB.
001.MC.18	Marsh Creation	Lake Pontchartrain Rim Marsh Creation- Jefferson Parish	Creation of 320 acres of marsh buffer in front of Lake Pontchartrain levees- Jefferson Parish	PU 1	Jef.
001.MC.19	Marsh Creation	Lake Pontchartrain Rim Marsh Creation- Orleans Parish	Creation of 700 acres of marsh buffer in front of Lake Pontchartrain levees- Orleans Parish	PU 1	Orl.
001.MC.23	Marsh Creation	Pass a Loutre Marsh Creation	Creation of 580 acres of marsh along Pass a Loutre	PU 1	Plaq.
002.CO.01	Marsh Creation	Grand Liard Marsh/Ridge Restoration	Restoration of 560 acres of marsh and historic ridge in the vicinity of Grand Liard	PU 2	Plaq.
002.MC.02	Marsh Creation	Venice Ponds Marsh Creation	Creation of 1,580 acres of marsh at Venice Ponds	PU 2	Plaq.
002.MC.03	Marsh Creation	Buras-Venice Marsh Creation	Restoration of 1,600 acres of marsh buffer adjacent to Buras-Venice levee	PU 2	Plaq.
002.MC.04	Marsh Creation	Lower Barataria Marsh Creation	Creation of 32,510 acres of marsh in Lower Barataria Basin from Barataria Waterway to East Golden Meadow	PU 2	Jef., Laf.
002.MC.04a	Marsh Creation	Lower Barataria Marsh Creation- Component A	Creation of 10,400 acres of marsh in Lower Barataria Basin from Barataria Waterway to Little Lake (component of 002.MC.04)[4]	PU 2	Jef.
002.MC.04b	Marsh Creation	Lower Barataria Marsh Creation- Component B	Creation of 8,130 acres of marsh along the southeast shore of Little Lake (component of 002.MC.04)[4]	PU 2	Jef., Laf.
002.MC.04c	Marsh Creation	Lower Barataria Marsh Creation- Component C	Creation of 13,980 acres of marsh in Lower Barataria Basin between East Golden Meadow and Little Lake (component of 002.MC.04)[4]	PU 2	Laf.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
002.MC.04d	Marsh Creation	Lower Barataria Marsh Creation- Component D	Creation of 2,930 acres of marsh in Lower Barataria Basin between East Golden Meadow south of Little Lake (component of 002.MC.04)[4]	PU 2	Laf.
002.MC.05	Marsh Creation	Large-Scale Barataria Marsh Creation	Creation of 26,890 acres of marsh in Barataria Basin from Myrtle Grove to GIWW	PU 2	Plaq., Jef., Laf.
002.MC.05a	Marsh Creation	Large-Scale Barataria Marsh Creation- Component A	Creation of 9,410 acres of marsh in Barataria Basin from Myrtle Grove to Barataria Waterway (component of 002.MC.05)[4]	PU 2	Plaq., Jef.
002.MC.05b	Marsh Creation	Large-Scale Barataria Marsh Creation- Component B	Creation of 5,380 acres of marsh in Barataria Basin from the Pen to Bayou Perot (component of 002.MC.05)[4]	PU 2	Jef.
002.MC.05c	Marsh Creation	Large-Scale Barataria Marsh Creation- Component C	Creation of 9,140 acres of marsh in Barataria Basin from Bayou Perot to Lake Salvador (component of 002.MC.05)[4]	PU 2	Laf.
002.MC.05d	Marsh Creation	Large-Scale Barataria Marsh Creation- Component D	Creation of 2,960 acres of marsh in Barataria Basin at Delta Ponds (component of 002.MC.05)[4]	PU 2	Laf.
002.MC.05e	Marsh Creation	Large-Scale Barataria Marsh Creation- Component E	Creation of 8,070 acres of marsh in Barataria Basin to address the Barataria Landbridge (component of 002.MC.05)[4]	PU 2	Plaq., Jef.
002.MC.06	Marsh Creation	Barataria Landbridge Marsh Creation	Creation of 15,580 acres of marsh on the Barataria Landbridge between the Mississippi River and Bayou Grand Chenier	PU 2	Plaq.
002.MC.07	Marsh Creation	Barataria Bay Rim Marsh Creation	Creation of 2,010 acres of marsh along northern rim of Barataria Bay	PU 2	Plaq., Jef., Laf.
002.MC.08	Marsh Creation	North Caminada Marsh Creation	Creation of 16,730 acres of marsh north of Caminada headland to Leeville	PU 2	Laf.
002.MC.09	Marsh Creation	Bastian Bay/Buras Marsh Creation	Creation of 2,550 acres of marsh at Bastian Bay/Buras	PU 2	Plaq.
002.MC.10	Marsh Creation	Empire Marsh Creation	Creation of 5,740 acres of marsh near Empire	PU 2	Plaq.
002.MC.12	Marsh Creation	Leeville Area Marsh Creation	Creation of 10,590 acres of marsh along Hwy 1 east of Leeville	PU 2	Laf.
002.MC.12a	Marsh Creation	Leeville Area Marsh Creation- Component A	Creation of 7,380 acres of marsh along Hwy 1 east of Leeville (component of 002.MC.12)[4]	PU 2	Laf.
002.MC.12b	Marsh Creation	Leeville Area Marsh Creation- Component B	Creation of 3,480 acres of marsh along Hwy 1 east of Leeville (component of 002.MC.12)[4]	PU 2	Laf.
03a.MC.03	Marsh Creation	Terrebonne Bay Rim Marsh Creation	Creation of 3,370 acres of marsh along the northern rim of Terrebonne Bay	PU 3a	Laf., Ter.

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Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
03a.MC.03p	Marsh Creation	Terrebonne Bay Rim Marsh Creation Study	Planning and design of marsh creation along the northern rim of Terrebonne Bay (3,370 acres)	PU 3a	Laf., Ter.
03a.MC.04	Marsh Creation	Caillou Lake-Lake Mechant Marsh Creation	Creation of 22,700 acres of marsh at Caillou Lake and Lake Mechant	PU 3a	Ter.
03a.MC.04a	Marsh Creation	Caillou Lake-Lake Mechant Marsh Creation- Component A	Creation of 6,360 acres of marsh near Caillou Lake west of Wilson Pass (component of 03a.MC.04)[4]	PU 3a	Ter.
03a.MC.04b	Marsh Creation	Caillou Lake-Lake Mechant Marsh Creation- Component B	Creation of 5,770 acres of marsh near Caillou Lake east of Wilson Pass(component of 03a.MC.04)[4]	PU 3a	Ter.
03a.MC.04c	Marsh Creation	Caillou Lake-Lake Mechant Marsh Creation- Component C	Creation of 5,900 acres of marsh near the south shore of Caillou Lake (component of 03a.MC.04)[4]	PU 3a	Ter.
03a.MC.04d	Marsh Creation	Caillou Lake-Lake Mechant Marsh Creation- Component D	Creation of 4,770 acres of marsh near Caillou Lake east of Bay Junop (component of 03a.MC.04)[4]	PU 3a	Ter.
03a.MC.05	Marsh Creation	Golden Meadow-Montegut Marsh Creation	Creation of 30,900 acres of marsh from Golden Meadow to Montegut	PU 3a	Laf., Ter.
03a.MC.05a	Marsh Creation	Golden Meadow-Montegut Marsh Creation- Component A	Creation of 8,960 acres of from Montegut to Grand Bayou Canal (component of 03a.MC.05)[4]	PU 3a	Laf., Ter.
03a.MC.05b	Marsh Creation	Golden Meadow-Montegut Marsh Creation- Component B	Creation of 11,430 acres of marsh from Grand Bayou Canal to Golden Meadow (component of 03a.MC.05)[4]	PU 3a	Laf.
03a.MC.05c	Marsh Creation	Golden Meadow-Montegut Marsh Creation- Component C	Creation of 10,510 acres of marsh from Grand Bayou Canal to Larose (component of 03a.MC.05)[4]	PU 3a	Laf.
03a.MC.05d	Marsh Creation	Golden Meadow-Montegut Marsh Creation- Component D	Creation of 5,560 acres of marsh from Galliano to Golden Meadow (component of 03a.MC.05)[4]	PU 3a	Laf.
03a.MC.06	Marsh Creation	Montegut Area Marsh Creation	Creation of 1,130 acres of marsh from Montegut to LA-56	PU 3a	Laf.
03a.MC.07	Marsh Creation	Belle Pass-Golden Meadow Marsh Creation	Creation of 14,420 acres of marsh from Belle Pass to Golden Meadow	PU 3a	Laf.
03a.MC.07a	Marsh Creation	Belle Pass-Golden Meadow Marsh Creation- Component A	Creation of 5,190 acres of marsh from Golden Meadow to the Southwestern Louisiana Canal (component of 03a.MC.07)[4]	PU 3a	Laf.
03a.MC.07b	Marsh Creation	Belle Pass-Golden Meadow Marsh Creation- Component B	Creation of 9,230 acres of marsh from the Southwestern Louisiana Canal to Belle Pass (component of 03a.MC.07)[4]	PU 3a	Laf.
03a.MC.08	Marsh Creation	HNC-Lake Mechant Marsh Creation	Creation of 8,920 acres of marsh from the HNC to Lake Mechant	PU 3a	Ter.
03a.MC.09	Marsh Creation	North Terrebonne Bay Marsh Creation	Creation of 24,680 acres of marsh in North Terrebonne Bay	PU 3a	Laf., Ter.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
03a.MC.09a	Marsh Creation	North Terrebonne Bay Marsh Creation- Component A	Creation of 5,190 acres of marsh between Bayou Pointe au Chien and Catfish Lake (component of 03a.MC.09)[4]	PU 3a	Laf.
03a.MC.09b	Marsh Creation	North Terrebonne Bay Marsh Creation- Component B	Creation of 4,940 acres of marsh between Bayou St. Jean Charles and Bayou Pointe au Chien (component of 03a.MC.09)[4]	PU 3a	Ter.
03a.MC.09c	Marsh Creation	North Terrebonne Bay Marsh Creation- Component C	Creation of 8,890 acres of marsh between Bayou Terrebonne and Point Barre (component of 03a.MC.09)[4]	PU 3a	Ter.
03a.MC.09d	Marsh Creation	North Terrebonne Bay Marsh Creation- Component D	Creation of 5,680 acres of marsh between Point Barre and Bayou St. Jean Charles (component of 03a.MC.09)[4]	PU 3a	Ter.
03a.MC.10	Marsh Creation	Dulac-Cocodrie Marsh Creation	Creation of 28,060 acres of marsh in the Dulac-Cocodrie area	PU 3a	Ter.
03a.MC.10a	Marsh Creation	Dulac-Cocodrie Marsh Creation- Component A	Creation of 6,170 acres of marsh between Dulac and Cocodrie (component of 03a.MC.10)[4]	PU 3a	Ter.
03a.MC.10b	Marsh Creation	Dulac-Cocodrie Marsh Creation- Component B	Creation of 5,330 acres of marsh east and west of Lake Boudreaux (component of 03a.MC.10)[4]	PU 3a	Ter.
03a.MC.10c	Marsh Creation	Dulac-Cocodrie Marsh Creation- Component C	Creation of 5,330 acres of marsh between Bayou Terrebonne and Bayou Petite Caillou (component of 03a.MC.10)[4]	PU 3a	Ter.
03a.MC.10d	Marsh Creation	Dulac-Cocodrie Marsh Creation- Component D	Creation of 11,220 acres of marsh between Bayou Petite Caillou and Lake Boudreaux (component of 03a.MC.10)[4]	PU 3a	Ter.
03b.CO.01	Marsh Creation	North Lost Lake Marsh Creation	Creation of 850 acres of marsh in the vicinity of Lost Lake	PU 3b	Ter.
03b.MC.02	Marsh Creation	Bayou Decade Marsh Creation	Creation of 5,190 acres of marsh near Bayou Decade	PU 3b	Ter.
03b.MC.03	Marsh Creation	Marsh Island Marsh Creation	Creation of 6,670 acres of marsh at Marsh Island	PU 3b	Ibe.
03b.MC.04	Marsh Creation	Bayou Penchant Marsh Creation	Creation of 1,350 acres of marsh near Bayou Penchant	PU 3b	Ter.
03b.MC.05	Marsh Creation	Terrebonne GIWW Marsh Creation	Creation of 1,190 acres of marsh along the GIWW in Terrebonne	PU 3b	Ter.
03b.MC.07	Marsh Creation	East Rainey Marsh Creation	Creation of 3,080 acres of marsh in the eastern portion of Rainey Marsh	PU 3b	Ver.
03b.MC.08	Marsh Creation	Lower Atchafalaya Marsh Creation	Creation of 1,750 acres of marsh along the Lower Atchafalaya River	PU 3b	StM., Ter.
03b.MC.09	Marsh Creation	Pointe Au Fer Island Marsh Creation	Creation of 5,830 acres of marsh on Point au Fer Island	PU 3b	Ter.
004.MC.01	Marsh Creation	South Grand Chenier Marsh Creation	Creation of 7,330 acres of marsh at South Grand Chenier	PU 4	Cam.
004.MC.02	Marsh Creation	South Mermentau Basin Marsh Creation	Creation of 9,370 acres of marsh south of Highway 82 near Pecan Island	PU 4	Ver.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
004.MC.04	Marsh Creation	Mud Lake Marsh Creation	Creation of 3,910 acres of marsh at Mud Lake	PU 4	Cam.
004.MC.06	Marsh Creation	Sweet Lake Marsh Creation	Creation of 2,550 acres of marsh at Sweet Lake	PU 4	Cam.
004.MC.07	Marsh Creation	West Rainey Marsh Creation	Creation of 3,550 acres of marsh in the western portion of Rainey Marsh	PU 3b	Ver.
004.MC.08	Marsh Creation	Cole's Bayou Marsh Creation	Creation of 1,390 acres of marsh at Rainey Marsh - Cole's Bayou	PU 3b	Ver.
004.MC.10	Marsh Creation	Southeast Calcasieu Lake Marsh Creation	Creation of 7,600 acres of marsh southeast of Calcasieu Lake	PU 4	Cam.
004.MC.11	Marsh Creation	Commissary Point Marsh Creation	Creation of 300 acres of marsh at Commissary Point	PU 4	Cam.
004.MC.13	Marsh Creation	Cameron Meadows Marsh Creation	Creation of 3,290 acres of marsh at Cameron Meadows	PU 4	Cam.
004.MC.16	Marsh Creation	East Pecan Island Marsh Creation	Creation of 7,340 acres of marsh at East Pecan Island	PU 4	Ver.
004.MC.17	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (North of Hackberry)	Creation of 13,190 acres of marsh in Northwest Calcasieu Lake north of Hackberry	PU 4	Cal., Cam.
004.MC.17a	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (North of Hackberry)- Component A	Creation of 3,830 acres of marsh in Northwest Calcasieu Lake north of Hackberry (component of 004.MC.17)[4]	PU 4	Cal., Cam.
004.MC.17b	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (North of Hackberry)- Component B	Creation of 3,960 acres of marsh in Northwest Calcasieu Lake north of Hackberry (component of 004.MC.17)[4]	PU 4	Cam.
004.MC.17c	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (North of Hackberry)- Component C	Creation of 5,410 acres of marsh in Northwest Calcasieu Lake north of Hackberry (component of 004.MC.17)[4]	PU 4	Cal., Cam.
004.MC.18	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (South of Hackberry)	Creation of 10,950 acres of marsh in Northwest Calcasieu Lake south of Hackberry	PU 4	Cam.
004.MC.18a	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (South of Hackberry)- Component A	Creation of 4,820 acres of marsh in Northwest Calcasieu Lake south of Hackberry (component of 004.MC.18)[4]	PU 4	Cam.
004.MC.18b	Marsh Creation	Northwest Calcasieu Lake Marsh Creation (South of Hackberry)- Component B	Creation of 6,130 acres of marsh in Northwest Calcasieu Lake south of Hackberry (component of 004.MC.18)[4]	PU 4	Cam.
004.MC.19	Marsh Creation	East Calcasieu Lake Marsh Creation	Creation of 14,840 acres of marsh east of Calcasieu Lake	PU 4	Cam.
004.MC.20	Marsh Creation	Black Bayou Marsh Creation	Creation of 5,050 acres of marsh at Black Bayou	PU 4	Cal., Cam.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
004.MC.21	Marsh Creation	Gum Cove Marsh Creation	Creation of 3,300 acres of marsh at Gum Cove	PU 4	Cal., Cam.
004.MC.22	Marsh Creation	Central Canal Marsh Creation	Creation of 3,800 acres of marsh at Central Canal	PU 4	Cam.
004.MC.23	Marsh Creation	Calcasieu Ship Channel Marsh Creation	Creation of 2,640 acres of marsh near Calcasieu Ship Channel	PU 4	Cam.
004.MC.25	Marsh Creation	Kelso Bayou Marsh Creation	Creation of 260 acres of marsh near Kelso Bayou	PU 4	Cam.
001.OR.01	Oyster Barrier Reef	Biloxi Marsh Oyster Barrier Reef	Creation of 240,000 feet of oyster barrier reef in Biloxi Marsh	PU 1	StB.
001.OR.01a	Oyster Barrier Reef	Biloxi Marsh Oyster Barrier Reef-Component A	Creation of 113,000 feet of oyster barrier reef in the northern portion of Biloxi Marsh (component of 001.OR.01)[4]	PU 1	StB.
03b.OR.01	Oyster Barrier Reef	Atchafalaya Bay Oyster Barrier Reef	Creation of 25,000 feet of oyster barrier reef from Eugene Island to Pointe au Fer Island	PU 3b	StM., Ter.
03b.OR.02	Oyster Barrier Reef	West Cote Blanche Bay Oyster Barrier Reef	Creation of 28,000 feet of oyster barrier reef in the vicinity of Dead Cypress Point	PU 3b	StM., Ibe.
03b.OR.03	Oyster Barrier Reef	East Cote Blanche Bay Oyster Barrier Reef	Creation of 30,000 feet of oyster barrier reef in the vicinity of Marone Point	PU 3b	StM., Ibe.
001.RC.01	Ridge Restoration	Bayou LaLoutre Ridge Restoration	Restoration of 117,000 feet (270 acres) historic ridge along Bayou LaLoutre	PU 1	StB.
002.RC.01	Ridge Restoration	Bayou Long Ridge Restoration	Restoration of 49,000 feet (110 acres) of historic ridge along Bayou Long/Bayou Fontanelle	PU 2	Plaq.
002.RC.02	Ridge Restoration	Spanish Pass Ridge Restoration	Restoration of 53,000 feet (120 acres) of historic ridge along banks of Spanish Pass near Venice	PU 2	Plaq.
002.RC.03	Ridge Restoration	Bayou Grand Cheniere Ridge Restoration	Restoration of 100,000 feet (230 acres) of historic ridge along Bayou Grand Cheniere	PU 2	Plaq.
03a.RC.01	Ridge Restoration	Bayou DeCade Ridge Restoration	Restoration of 47,000 feet (110 acres) of historic ridge along Bayou DeCade from Lake Decade to Raccourci Bay	PU 3a/3b	Ter.
03a.RC.02	Ridge Restoration	Bayou DuLarge Ridge Restoration	Restoration of 106,000 feet (240 acres) of historic ridge along Bayou DuLarge	PU 3a/3b	Ter.
03a.RC.03	Ridge Restoration	Small Bayou LaPointe Ridge Restoration	Restoration of 55,000 feet (130 acres) of historic ridge along Small Bayou LaPointe	PU 3a	Ter.
03a.RC.04	Ridge Restoration	Mauvais Bois Ridge Restoration	Restoration of 60,000 feet (140 acres) of historic ridge at Mauvais Bois	PU 3b	Ter.
03a.RC.05	Ridge Restoration	Bayou Terrebonne Ridge Restoration	Restoration of 55,000 feet (130 acres) of historic ridge along Bayou Terrebonne	PU 3a	Ter.
03a.RC.06	Ridge Restoration	Bayou Pointe au Chene Ridge Restoration	Restoration of 57,000 feet (130 acres) of historic ridge along Bayou Pointe au Chene	PU 3a	Laf., Ter.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
03b.RC.01	Ridge Restoration	Bayou Sale Ridge Restoration	Restoration of 36,000 feet (80 acres) acres of historic ridge along Bayou Sale	PU 3b	StM.
004.RC.01	Ridge Restoration	Grand Chenier Ridge Restoration	Restoration of 86,000 feet (200 acres) of historic ridge along Grand Chenier Ridge	PU 4	Cam.
004.RC.02	Ridge Restoration	Cheniere au Tigre Ridge Restoration	Restoration of 60,000 feet (140 acres) of historic ridge along Bill Ridge and Cheniere au Tigre	PU 3b	Ver.
004.RC.03	Ridge Restoration	Pecan Island Ridge Restoration	Restoration of 44,000 feet (100 acres) of historic ridge along Pecan Island Ridge	PU 4	Ver.
004.RC.04	Ridge Restoration	Hackberry Ridge Restoration	Restoration of 130,000 feet (300 acres) of historic ridge at Blue Buck and Hackberry	PU 4	Cam.
004.RC.05	Ridge Restoration	Front Ridge Restoration	Restoration of 147,000 feet (340 acres) of historic ridge along Front Ridge at Hackberry	PU 4	Cam.
001.CO.03	Shoreline Protection	East New Orleans Landbridge Shoreline Protection	Shoreline protection of 27,000 feet of the east side of the New Orleans Landbridge in the vicinity of Alligator Bend	PU 1	Orl.
001.SP.01	Shoreline Protection	Manchac Landbridge Shoreline Protection	Shoreline protection of 8,000 feet of Lake Pontchartrain shoreline north of Pass Manchac	PU 1	Tan.
001.SP.02	Shoreline Protection	Maurepas Shoreline Protection	Shoreline protection of 75,000 feet of the Maurepas landbridge (east and west sides)	PU 1	StJo.
001.SP.03	Shoreline Protection	Eastern Lake Borgne Shoreline Protection	Shoreline protection of 57,000 feet of the eastern shore of Lake Borgne	PU 1	StB.
001.SP.04	Shoreline Protection	MRGO Shoreline Protection	Shoreline protection of 133,000 of the north bank of MRGO	PU 1	StB.
002.SP.01	Shoreline Protection	GIWW Shoreline Protection (Bayou Lafourche to Bayou Perot)	Shoreline protection of 140,000 feet of GIWW bankline between Bayou Lafourche and Bayou Perot	PU 2	Laf.
03a.SP.01	Shoreline Protection	GIWW Shoreline Protection (Bourg to Amelia)	Shoreline protection of 426,000 feet of GIWW bankline between Bourg and Amelia	PU 3a/3b	Laf., Ter., StM.
03b.SP.01	Shoreline Protection	Freshwater Bayou Bank Stabilization (Belle Isle Canal to Lock)	Shoreline protection of 41,000 feet of Freshwater Bayou shoreline from Belle Isle Canal to Lock	PU 3b/4	Ver.
03b.SP.02	Shoreline Protection	Point Au Fer Island Barrier Headland Restoration	Shoreline protection through barrier headland restoration at Point Au Fer Island	PU 3b	Ter.
03b.SP.03	Shoreline Protection	Bayou Sale Shoreline Protection	Shoreline protection of 36,000 feet of shoreline along Bayou Sale	PU 3b	StM.
03b.SP.04	Shoreline Protection	Marsh Island Shoreline Protection	Shoreline protection of 108,000 feet of Marsh Island shoreline	PU 3b	Ibe.

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Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
03b.SP.05	Shoreline Protection	Gulf Shoreline Protection (Freshwater Bayou to Southwest Pass)	Shoreline protection of 90,000 feet of Gulf shoreline from Freshwater Bayou to Southwest Pass	PU 3b	Ver.
03b.SP.06	Shoreline Protection	Vermilion Bay and West Cote Blanche Bay Shoreline Protection	Shoreline protection of 524,000 feet of shoreline in Vermilion Bay and West Cote Blanche Bay	PU 3b	StM., Ver., Ibe.
03b.SP.06a	Shoreline Protection	Vermilion Bay and West Cote Blanche Bay Shoreline Protection (Critical Areas)	Shoreline protection in critical areas of Vermilion Bay and West Cote Blanche Bay (83,000 feet) (component of 03b.SP.06)[4]	PU 3b	StM., Ver., Ibe.
03b.SP.07	Shoreline Protection	East Cote Blanche Bay Shoreline Protection	Shoreline protection of 51,000 feet of shoreline along East Cote Blanche Bay	PU 3b	StM.
03b.SP.08	Shoreline Protection	Southwest Pass Shoreline Protection (West Side)	Shoreline protection of 37,000 feet of shoreline along Southwest Pass immediately west of Marsh Island	PU 3b	Ver.
03b.SP.09	Shoreline Protection	GIWW Shoreline Protection (Intracoastal City to Amelia)	Shoreline protection of 690,000 feet of GIWW Bankline between Intracoastal City and Amelia	PU 3b	StM., Ver., Ibe.
004.BH.03	Shoreline Protection	Southwest Louisiana Shoreline Protection	Shoreline protection of 148,000 feet of Gulf shoreline south of Pecan Island	PU 4	Ver.
004.BS.04a	Shoreline Protection	Calcasieu-Sabine Shoreline Protection-Component A	Shoreline protection of critical areas of Gulf shoreline between Calcasieu River and Sabine River (38,000 feet) (component of 004.BS.04)[4]	PU 4	Cam.
004.SP.01	Shoreline Protection	Rockefeller Refuge Shoreline Protection	Shoreline protection of 50,000 feet of Gulf shoreline at Rockefeller Refuge	PU 4	Cam.
004.SP.02	Shoreline Protection	Schooner Bayou Canal Shoreline Protection	Shoreline protection of 21,000 feet of Schooner Bayou Canal bankline from Highway 82 to North Prong	PU 4	Ver.
004.SP.03	Shoreline Protection	Freshwater Bayou Canal Shoreline Protection	Shoreline protection 11,000 feet of Freshwater Bayou Canal Bankline at Vermilion Bay	PU 4	Ver.
004.SP.04	Shoreline Protection	Southwest Pass Shoreline Protection (East Side)	Shoreline protection of 27,000 feet of Gulf shoreline along east side of Southwest Pass	PU 3b	Ibe.
004.SP.05	Shoreline Protection	Gulf Shoreline Protection (Calcasieu River to Freshwater Bayou)	Shoreline protection of 348,000 feet of Gulf shoreline between Calcasieu River and Freshwater Bayou	PU 4	Cam., Ver.
004.SP.05a	Shoreline Protection	Gulf Shoreline Protection (Calcasieu River to Rockefeller)	Shoreline protection along the Gulf shoreline between Calcasieu River and Rockefeller Refuge (component of 004.SP.05)[4]	PU 4	Cam., Ver.
004.SP.05b	Shoreline Protection	Gulf Shoreline Protection (Calcasieu River to Lower Mud Lake)	Shoreline protection along the Gulf shoreline between Calcasieu River and Lower Mud Lake (component of 004.SP.05)[4]	PU 4	Cam.

Table 3. Restoration Projects Evaluated in the 2012 Coastal Master Plan					
Project ID	**Project Type**	**Name**	**Description**	**Region**	**Parish**
004.SP.06	Shoreline Protection	Grand Lake Shoreline Protection	Shoreline protection of 26,000 feet of critical areas along Grand Lake	PU 4	Cam.
004.SP.07	Shoreline Protection	Northeast White Lake Shoreline Protection	Shoreline Protection of 3,000 feet of critical areas along Northeast White Lake	PU 4	Ver.

Notes to Table 3:

1. Operational regime for standardized 5,000 cfs diversions: continuous operation at capacity for river flows above 200,000 cfs; no operation below 200,000 cfs.
2. Operational regime for standardized 50,000 cfs diversions: operation at capacity when Mississippi River flow exceeds 600,000 cfs; operation at 8% of river flow from 600,000 cfs down to 200,000 cfs; no operation below 200,000 cfs.
3. Operational regime for standardized 250,000 cfs diversions: operation at capacity when Mississippi River flow exceeds 900,000 cfs; operation at 50,000 cfs for flows from 900,000 cfs to 600,000 cfs; operation at 8% of river flow between 600,000 cfs and 200,000 cfs; no operation below 200,000 cfs.
4. Project represents a subdivision ("child") of a larger project. Effects of this "child" project were not modeled separately from the "parent" project; rather, project effects were estimated as a fraction of the "parent" project's effects based on the percentage of the "parent" project's area included within the "child" project.

1.2.2 Structural Protection Projects

Structural protection projects reduce hurricane flood risk in coastal communities by acting as a physical barrier against storm surge. The 33 structural protection projects evaluated in the 2012 Coastal Master Plan include one or more of the following basic components:

- *Earthen Levee:* The principal component of each structural protection project is the earthen levee. These structures consist of pyramidal banks of compacted earth that provide a barrier against storm surge for coastal communities or assets. Levees can either be linear or ring levees. Ring levees form a closed risk reduction system that encircles a protected area (referred to as a polder). Linear levees create a closed system by tying into other linear levees or by extending inland to high ground.
- *Concrete T-wall:* T-walls are typically located at points along an earthen levee that have a high potential for erosion or insufficient space for the wide slopes of an earthen levee.
- *Floodgate:* Floodgates are needed where levees or T-walls cross a road or railroad, or where they intersect waterways.
- *Pumps (Internal to Ring Levees):* Pumps are needed in enclosed risk reduction systems to allow water that enters a polder to be pumped out.

Additional information about the structural protection projects evaluated in the master plan is presented in Section 3.9. Table 4 presents the structural protection projects evaluated in the 2012 Coastal Master Plan.

Table 4. Structural Protection Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description[1]**	**Region**	**Parish**
001.HP.01	Alliance Area Levee- East Bank	Hurricane protection levee along the east bank of the Mississippi River across from the Alliance Refinery (elevation 33.0 feet)	PU 1	Plaq.
001.HP.02	Caernarvon to White Ditch	Hurricane protection levee along the east bank of the Mississippi River from Caernarvon to White Ditch (elevation 31.5 feet)	PU 1	Plaq.
001.HP.04	Greater New Orleans High Level	Hurricane protection levee around the Greater New Orleans area from Verret to the Bonnet Carre Spillway (elevation 15-35 feet)	PU 1	Orl., StB., Jef., StC.
001.HP.05	Greater New Orleans LaPlace Extension	Hurricane protection levee in the LaPlace area (elevation 13.5 feet)	PU 1	StC., StJo., St.Ja., Asc.
001.HP.07	Lake Pontchartrain Barrier (High)	Hurricane protection levee across the mouth of Lake Pontchartrain from New Orleans East to Slidell (elevation 33.0 feet)	PU 1	Orl., StT.
001.HP.08	Lake Pontchartrain Barrier (Low)	Hurricane protection levee across the mouth of Lake Pontchartrain from New Orleans East to Slidell (elevation 24.5 feet)	PU 1	Orl., StT.
001.HP.08p	Lake Pontchartrain Barrier (Low) - Study	Planning and design of a hurricane protection levee acroos the mouth of Lake Pontchartrain from New Orleans East to Slidell (elevation 24.5 feet)	PU 1	Orl., StT.
001.HP.13	Slidell Ring Levee	Hurricane protection levee around Slidell (elevation 16.0 feet)	PU 1	StT.
002.HP.01	Oakville to Myrtle Grove	Hurricane protection levee on the west bank of the Mississippi River from Oakville to Myrtle Grove (elevation 9.5 feet)	PU 2	Plaq.
002.HP.04	West Bank High Level	Hurricane protection levee around the West Bank from Waggaman to Belle Chasse (elevation 15.5 feet)	PU 2	Plaq., Jef., StC.
002.HP.05	Larose to Morgan City	Hurricane protection levee along the GIWW/Highway 90 from Larose to Morgan City (elevation 11.8 feet)	PU 3a/3b	Laf., Ter., StMt., Asu., StM.
002.HP.06	Donaldsonville to the Gulf	Hurricane protection levee along Highway 90 between the West Bank and Larose (elevation 15.5 ft.)	PU 2	StC., Laf.
002.HP.07	Lafitte Ring Levee	Hurricane protection levee around Lafitte (elevation 16.0 ft.)	PU 2	Jef.
002.HP.08	Maintain West Bank Levees	Maintenance of existing West Bank and Vicinity hurricane protection levees to design elevation for 50-year period of analysis	PU 2	Jef., Plaq., StC.
03a.HP.02a	Morganza to the Gulf (Low)	Hurricane protection levee around Houma and Terrebonne ridge communities from Larose to Humphreys (elevation 12-28 ft.)	PU 3a	Laf., Ter.
03a.HP.02b	Morganza to the Gulf (High)	Hurricane protection levee around Houma and Terrebonne ridge communities from Larose to Humphreys (elevation 19.5-36.5 ft.)	PU 3a	Laf., Ter.

Table 4. Structural Protection Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**[1]	**Region**	**Parish**
03a.HP.20	Maintain Larose to Golden Meadow	Maintenance of existing Larose to Golden Meadow hurricane protection levees to design elevation for 50-year period of analysis	PU 2/3a	Laf.
03b.HP.06	Iberia/Vermilion Upland Levee	Hurricane protection levee along the marsh/upland interface between Bayou Carlin and the Warren Canal (elevation 21.5 ft.)	PU 3b/4	Ibe., Ver.
03b.HP.07	Amelia Levee Improvements (2E)	Hurricane protection levee around Amelia (elevation 18.0 ft.)	PU 3b	StM.
03b.HP.08	Amelia Levee Improvements (3E)	Hurricane protection levee along the GIWW between Lake Palourde and the Bayou Boeuf Lock (elevation 18.0 ft.)	PU 3b	StM.
03b.HP.09	Amelia Levee Improvements (1E)	Hurricane protection levee south of Highway 90 between Gibson and Morgan City (elevation 16.5 ft.)	PU3b	StM.
03b.HP.10	Morgan City Back Levee	Hurricane protection levee along Lake Palourde in the vicinity of Morgan City (elevation 13.5 ft.)	PU 3b	StM.
03b.HP.11	Berwick to Wax Lake	Hurricane protection levee along the GIWW between the Atchafalaya River and Wax Lake Outlet (elevation 18.0 ft.)	PU 3b	StM.
03b.HP.12	Franklin and Vicinity	Hurricane protection levee along the GIWW between the Wax Lake Outlet and Charenton Drainage and Navigation Canal and along Bayou Sale (elevation 16.5 ft.)	PU 3b	StM.
03b.HP.13	Bayou Chene Floodgate	Floodgate across Bayou Chene near Amelia (elevation 10.0 ft.)	PU 3b	StM., Ter.
004.HP.03	Gueydan Ring Levee	Hurricane protection levee around Gueydan (elevation 9.0 ft.)	PU 4	Ver.
004.HP.04	Abbeville and Vicinity	Hurricane protection levee long the marsh upland interface between Abbeville and the Charenton Drainage and Navigation Canal (elevation 17-20 ft.)	PU 3b/4	StM., Ibe., Ver.
004.HP.06p	Lake Charles 500-Year Protection- Planning	Planning and design of multiple measures (marsh creation, ridge restoration, gates, nonstructural, etc.) to provide protection for the Greater Lake Charles Region	PU 4	Cal.
004.HP.06c	Lake Charles 500-Year Protection- Construction	Construction of protection measures selected in 004.HP.06p for the Greater Lake Charles Region	PU 4	Cal.
004.HP.11	Lake Charles Ring Levee (South)	Construction of a hurricane protection levee south of Lake Charles and Sulphur (elevation 14.4 ft.)	PU 4	Cal.
004.HP.12	Southwest GIWW (High)	Hurricane protection levee along the GIWW from Freshwater Bayou to the Sabine River (elevation 21.4 ft.)	PU 4	Cal., Cam., Ver.
004.HP.13	Southwest GIWW (Low)	Hurricane protection levee along the GIWW from Freshwater Bayou to the Sabine River (elevation 12.0 ft.)	PU 4	Cal., Cam., Ver.
004.HP.14	Southwest GIWW (Medium)	Hurricane protection levee along the GIWW from Freshwater Bayou to the Sabine River (elevation 15.0 ft.)	PU 4	Cal., Cam., Ver.

Notes to Table 4:

1. All elevations are referenced to the North American Vertical Datum of 1988 (NAVD88).

1.2.3 Nonstructural Projects

Nonstructural projects reduce hurricane-related flood risk through the implementation of various actions to individual residential and nonresidential structures. Although many parishes have implemented nonstructural measures to reduce flood risk within communities, no coast wide study of nonstructural measures has been completed to date. The 2012 Coastal Master Plan developed a methodology to create a comprehensive suite of 116 nonstructural projects throughout the coast to address this need.

Nonstructural projects for the master plan were developed at the census block level. Information about the assets within census blocks was obtained from the Federal Emergency Management Agency's (FEMA) Hazards-U.S. (HAZUS) database. We then determined that each nonstructural project would consist of some combination of the three basic components of nonstructural risk reduction:

- **Elevation:** raising structures so that their lowest floors are higher than a projected flood height;
- **Floodproofing:** refitting structures to be resistant to flood damages; or
- **Acquisition:** buying out structures in areas where projected flood heights make elevation or floodproofing infeasible.

Two variations of each nonstructural project were developed based on the target elevation (i.e., the elevation to which the structure will be floodproofed or raised). The project target elevations being used are the:

1. Base flood elevation (BFE) as found on FEMA's preliminary Digital Flood Insurance Rate Maps (DFIRM) plus one foot (BFE+1), and

2. The BFE plus four feet (BFE+4).

Therefore, the 116 nonstructural projects evaluated in the 2012 Coastal Master Plan consist of 58 project regions, each with two project elevation levels, than can be described as follows:

- Residential and non-residential floodproofing for structures in areas with a projected 100-year flood depth of 3 feet or less;
- Residential elevation to FEMA's BFE+1 (or BFE+4) for structures in areas with a projected flood depth between 3 and 18 feet; and
- Acquisition of residential structures that would need to be elevated greater than 18 feet to reach the BFE+1 (or BFE+4).

For residential structures, the risk reduction measure to be implemented (i.e., floodproofing, elevation, or acquisition) is determined by the flood depth (where flood depth is determined by the difference in the average ground elevation and the base flood elevation). For example, in census blocks where the difference in the average ground elevation and the base flood elevation is projected to be less than three feet, all homes would be floodproofed; alternately, in census blocks where the flood depth is projected to be greater than three feet, all homes would be elevated to theBFE+1. As noted, a variation of this project using a target elevation of BFE+4 was also evaluated. All nonstructural projects in the 2012 Coastal Master Plan are assumed to be voluntary in nature.

Additional information about the nonstructural projects evaluated in the master plan is presented in Section 3.10. Table 5 presents the nonstructural projects evaluated in the master plan.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
ABB.100.1	Abbeville BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Ver.
ABB.100.2	Abbeville BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4b	Ver.
ACA.050.1	Acadia Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Aca.
ACA.050.2	Acadia Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Aca.
ALG.100.1	Algiers BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Orl.
ALG.100.2	Algiers BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Orl.
ASC.050.1	Ascension Parish – Rural Areas BFE+1[1]	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Asc.
ASC.050.2	Ascension Parish – Rural Areas BFE+4[1]	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Asc.
ASU.050.1	Assumption Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a	Asu.
ASU.050.2	Assumption Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a	Asu.
BAL.100.1	Baldwin/Charenton BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	StM.
BAL.100.2	Baldwin/Charenton BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b	StM.
BBL.100.1	Bayou Blue BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a	Laf.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
BBL.100.2	Bayou Blue BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a	Laf.
BCH.100.1	Belle Chasse BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Plaq.
BCH.100.2	Belle Chasse BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Plaq.
BVI.100.1	Bayou Vista BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	StM.
BVI.100.2	Bayou Vista BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b	StM.
CAL.050.1	Calcasieu Parish – Rural AreasBFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Cal.
CAL.050.2	Calcasieu Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Cal.
CAM.050.1	Cameron Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Cam.
CAM.050.2	Cameron Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Cam.
CHA.100.1	Arabi/Chalmette/ Meraux BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StB.
CHA.100.2	Arabi/Chalmette/ Meraux BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StB.
DES.100.1	Destrehan/New Sarpy/Norco BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StC.
DES.100.2	Destrehan/New Sarpy/Norco BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StC.
FRA.100.1	Franklin BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	StM.
FRA.100.2	Franklin BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b	StM.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
HOU.100.1	Houma BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a	Ter.
HOU.100.2	Houma BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a	Ter.
IBE.050.1	Iberia Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	Ibe.
IBE.050.2	Iberia Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b	Ibe.
IBE.050.3	South Iberia Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot[1]	PU 3b	Ibe.
IBE.050.4	South Iberia Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b	Ibe.
IBV.050.1	Iberville Parish – Rural Areas BFE+1[1]	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a	Ibv.
IBV.050.2	Iberville Parish – Rural Areas BFE+4[1]	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a	Ibv.
JEA.100.1	Jeanerette BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	Ibe.
JEA.100.2	Jeanerette BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU3b	Ibe.
JED.050.1	Jefferson Davis Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	JDv.
JED.050.2	Jefferson Davis Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	JDv.
JEF.050.1	Jefferson Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Jef.
JEF.050.2	Jefferson Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Jef.
LAC.100.1	Lacombe BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StT.
LAC.100.2	Lacombe BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StT.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
LAF.050.1	Lafourche Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2/3a	Laf.
LAF.050.2	Lafourche Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU2/3a	Laf.
LAP.100.1	LaPlace/Reserve BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	StJo.
LAP.100.2	LaPlace/Reserve BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	StJo.
LAR.100.1	Larose/Cut Off/ Galliano/Golden Meadow BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2/3a	Laf.
LAR.100.2	Larose/Cut Off/ Galliano/Golden Meadow BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2/3a	Laf.
LCH.500.1	Lake Charles/Prien BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Cal.
LCH.500.2	Lake Charles/Prien BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Cal.
LFT.100.1	Lafitte/Jean Lafitte/ Bataria BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Jef.
LFT.100.2	Lafitte/Jean Lafitte/ Bataria BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Jef.
LIV.050.1	Livingston Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Liv.
LIV.050.2	Livingston Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Liv.
LUL.100.1	Luling/Boutte BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	StC.
LUL.100.2	Luling/Boutte BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	StC.
MAN.100.1	Mandeville/ Madisonville BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StT.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
MAN.100.2	Mandeville/ Madisonville BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StT.
MAT.100.1	Mathews/Lockport/ Lockport Heights BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2/3a	Laf.
MAT.100.2	Mathews/Lockport/ Lockport Heights BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2/3a	Laf.
MET.500.1	Metarie/Kenner BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Jef.
MET.500.2	Metarie/Kenner BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Jef.
MOR.100.1	Morgan City BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a/3b	StM.
MOR.100.2	Morgan City BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a/3b	StM.
NOE.100.1	New Orleans East BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Orl.
NOE.100.2	New Orleans East BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Orl.
NOR.500.1	New Orleans BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Orl.
NOR.500.2	New Orleans BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Orl.
ORL.050.1	Orleans Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Orl.
ORL.050.2	Orleans Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Orl.
PAT.100.1	Patterson BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b	StM.
PAT.100.2	Patterson BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU3b	StM.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
PLA.050.1	Plaquemines Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1/2	Plaq.
PLA.050.2	Plaquemines Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1/2	Plaq.
POY.100.1	Poydras/Violet BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StB.
POY.100.2	Poydras/Violet BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StB.
RAC.100.1	Raceland BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2/3a	Laf.
RAC.100.2	Raceland BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2/3a	Laf.
SJB.050.1	Saint John the Baptist Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	StJo.
SJB.050.2	Saint John the Baptist Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	StJo.
SLI.100.1	Slidell BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StT.
SLI.100.2	Slidell BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StT.
SMT.050.1	Saint Martin Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a/3b	StMt.
SMT.050.2	Saint Martin Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a/3b	StMt.
STB.050.1	Saint Bernard Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StB.
STB.050.2	Saint Bernard Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StB.
STC.050.1	Saint Charles Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1/2	StC.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
STC.050.2	Saint Charles Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1/2	StC.
STJ.050.1	Saint James Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1/2	StJa.
STJ.050.2	Saint James Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1/2	StJa.
STM.050.1	Saint Mary Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a/3b	StM.
STM.050.2	Saint Mary Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a/3b	StM.
STR.100.1	Saint Rose BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StC.
STR.100.2	Saint Rose BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StC.
STT.050.1	Saint Tammany Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	StT.
STT.050.2	Saint Tammany Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	StT.
SUL.100.1	Sulphur/Carlyss BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Cal.
SUL.100.2	Sulphur/Carlyss BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Cal.
SVA.100.1	South Vacherie BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	StJa.
SVA.100.2	South Vacherie BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	StJa.
TAN.050.1	Tangipahoa Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 1	Tan.
TAN.050.2	Tangipahoa Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 1	Tan.

Table 5. Nonstructural Projects Evaluated in the 2012 Coastal Master Plan				
Project ID	**Name**	**Description**	**Region**	**Parish**
TER.050.1	Terrebonne Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3a/3b	Ter.
TER.050.2	Terrebonne Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3a/3b	Ter.
VER.050.1	Vermilion Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 3b/4	Ver.
VER.050.2	Vermilion Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b/4	Ver.
VER.050.3	South Vermilion Parish – Rural Areas BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot[1]	PU 3b/4	Ver.
VER.050.4	South Vermilion Parish – Rural Areas BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 3b/4	Ver.
WAG.100.1	Avondale/ Waggaman BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Jef.
WAG.100.2	Avondale/ Waggaman BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Jef.
WBK.500.1	West Bank Jefferson Parish BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 2	Jef.
WBK.500.2	West Bank Jefferson Parish BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 2	Jef.
WES.100.1	Westlake/Moss Bluff BFE+1	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 1 foot	PU 4	Cal.
WES.100.2	Westlake/Moss Bluff BFE+4	Floodproof properties 0-3 feet, raise residential properties 3-18 feet, and acquire residential properties >18 feet based upon FEMA's BFE + 4 feet	PU 4	Cal.

Notes to Table 5:

1. Project was analyzed but it was determined that no assets were located within the portion of the project footprint located within the analytical boundary. Consequently no Project Fact Sheet is included in Appendix A2.

2.0 Project Attributes Assumptions

2.1 Task Background

Following development of the candidate projects list, specific project details were required to define project features affecting the landscape and hydrology in the coastal system. This was accomplished by the development of specific attributes for each type of candidate project to provide parameters needed for both the predictive models and the Planning Tool.

2.2 Project Attribute Description

Due to the variety of candidate restoration and risk reduction projects, attribute descriptions were developed for each project evaluated for alternative selection. Attributes for all projects evaluated are presented in the 2012 Coastal Master Plan Project Attributes Table (see Appendix J – Master Plan Data for additional details on this table). This document is intended as a guide for project development and project costs.

2.3 General Attributes Common for all Project Types

The following list of attributes is common for each candidate restoration project and risk reduction project:

Tier*: Tier system used to prioritize the order in which groups of projects were run through the suite of models.

Model Group*: In order to expedite modeling run times, expert judgment was used to group projects with no predicted interactions. All restoration and hurricane risk reduction projects were inserted into one of 50 groups (43 restoration and seven risk reduction groups).

Eco-Hydro Group*: Denotes which of the three Eco-Hydrology models was used to evaluate the project (AA, PB, CP):

a. AA refers to the Atchafalaya Modeling group;
b. PB refers to the Pontchartrain/Barataria Modeling group; and
c. CP refers to the Chenier Plain Modeling group.

Master Plan ID: A unique project identification number, arranged by "Component Planning Unit.Project Type.Sequential Number" (e.g., 001.MC.09) for restoration and structural risk reduction projects and "Community.Risk Reduction Target.Sequential Number" (e.g., WES.100.2) for nonstructural projects.

Name Source: The project name as specified in the source document.

Source*: The source plan or document from which the project was taken.

Project Type: BS=Bank Stabilization, MC=Marsh Creation, DI= Diversion, SP=Shoreline Protection, BH=Barrier Island/Headland Restoration, RC=Ridge Creation/Restoration, HR=Structural Restoration, OR=Oyster Barrier Reef, CO=Multiple Features, HP=Hurricane Protection, and NS=Nonstructural.

Description: Brief description of project features and intent (attribute field listed as "Comments" for nonstructural projects).

Planning Unit: Planning unit(s) in which the project influence/footprint is located.
Parish: Parish(es) in which the project footprint is located.

*Not included as an attribute for nonstructural projects.

2.4 Planning Tool Attributes Common for all Project Types

Note: Project-specific details about Planning/Engineering and Design (P/E&D), Construction, and Operations and Maintenance (O&M) costs are presented by project type in the following sections.

1. **P/E&D Duration*:** Expected length of time to complete all P/E&D activities.
2. **P/E&D Duration Uncertainty Factor*:** Represents the uncertainty associated with the estimated P/E&D duration.
3. **Estimated P/E&D Cost*:** Total estimated cost associated with all aspects of P/E&D phase.
4. **P/E&D Cost Uncertainty Factor*:** Represents the uncertainty associated with the estimated P/E&D cost.
5. **Construction Duration:** Expected length of time to complete all construction activities.
6. **Construction Duration Uncertainty Factor*:** Represents the uncertainty associated with the estimated construction duration.
7. **Estimated Construction Cost:** Total estimated cost associated with all aspects of Construction phase.
8. **Construction Cost Uncertainty Factor*:** Represents the uncertainty associated with the estimated Construction cost.
9. **Estimated O&M Cost:** Total estimated cost associated with all aspects of O&M phase.
10. **O&M Cost Uncertainty Factor*:** Represents the uncertainty associated with the estimated O&M cost.
11. **Prerequisites:** List of other projects that would need to be implemented before the candidate project would be implemented.
12. **Mutually Exclusive Projects:** List of other projects that would not be included in an alternative should the current project be selected.
13. **PU1:** Percent of project influence/footprint within Planning Unit 1.
14. **PU2:** Percent of project influence/footprint within Planning Unit 2.
15. **PU3a:** Percent of project influence/footprint within Planning Unit 3a.
16. **PU3b:** Percent of project influence/footprint within Planning Unit 3b.
17. **PU4:** Percent of project influence/footprint within Planning Unit 4.
18. **Latitude/Longitude:** Centroid of project used for tracking purposes within the Planning Tool.

*Not included as an attribute for nonstructural projects.

2.5 General/Planning Tool Attributes Specific to Project Types

Table 6 presents a list of general and Planning Tool attributes that are specific to project types. Additional information about these attributes is presented by project type in the following sections.

Table 6. Project Attributes Specific to Project Types		
Attribute	**Description**	**Applicable Project Types**
Operational Regime	Explanation of the operational strategies and triggers for each structure	DI, HR
Created Acres	Total acres of land created or nourished by project	BS, BH, MC, OR, RC, SP
Length	Total length (in linear feet) of project centerline	BS, BH, DI, OR, RC, SP, HP
Fill Volume	Total estimated volume of fill material required to construct the project feature using one initial lift based on the target elevation at TY0	BS, BH, MC, RC, SP
Cut Volume	Total dredge volume required for project	BS, BH, MC, RC
Borrow Source	Borrow area(s) required to construct project feature(s)	BS, BH, MC
Fill Source	Numerical code corresponding to an identified borrow source/region from which fill material will be obtained (used by Planning Tool for sediment constraint application)	BH, MC
Dune Elevation	Dune crest elevation	BH
Beach Elevation	Beach crest elevation	BH
Dune Volume	Design volume based on the barrier island design template and an initial advanced volume equal to 100% of the design volume	BH
Beach Volume	Design volume based on the barrier island design template and an initial advanced volume equal to 100% of the design volume	BH
Marsh Volume	Total estimated volume of marsh fill material required to construct the back barrier marsh component of a Barrier Island/Headland project	BH
Elevation	Top of crown elevation	OR, RC, SP
Elevation TY0	Marsh elevation at Target Year 0	BH, MC
Elevation TY5	Marsh elevation at Target Year 5	BH, MC
ElevationTY25	Marsh elevation at Target Year 25	BH, MC
Elevation TY50	Marsh elevation at Target Year 50	BH, MC
Invert Elevation	Invert elevation of control structure (if known)	HR
Opening Area	Area of control structure opening (if known)	DI, HR
Discharge	Peak design flow through the structure and channel	DI
River	Numerical code corresponding to river that is the source of fresh water for a diversion project (used by Planning Tool for river flow constraint application)	DI
Predominant Structure Type	Predominant risk reduction structure present in project	HP
Footprint (Acres)	Levee footprint based on the length and width of each levee	HP
Existing Average Elevation (Ft)	Average surface elevation within project footprint	HP
Design Elevation (Ft)	Target height of proposed protection features	HP

2.6 Detailed Project Attribute Assumptions and Rationale (Excluding Non-Structural)

2.6.1 Project Feature Development

In an effort to delineate project features for the candidate projects, conceptual restoration feature design templates were developed for each type of restoration project. These templates are based on current design methodologies and lessons learned from recently constructed restoration projects. The templates were used to populate the project attributes for each project. The conceptual restoration design templates are shown in Figures 2-5 at the end of this appendix.

2.6.2 Project Total Cost Development and Rationale

Project cost estimates were developed for each project type and are typically based on the conceptual design of known project features. The conceptual restoration feature design templates, historical cost data, and the cost methodology developed by the CWPPRA Engineering and Environmental Workgroup and the Coastal Protection and Restoration Authority's Restoration Engineering Division were used to develop cost estimates for restoration projects. Conceptual structural protection feature design templates, historical cost data, and the cost methodology developed by the Coastal Protection and Restoration Authority's Flood Protection Division were likewise used to develop cost estimates for structural protection projects. When applicable, unit prices from recently bid projects in other coastal programs were also used to develop unit cost parameters.

2.6.3 Project Total Cost Breakdown

The following criteria were assumed for the development of the Project Total Cost. Project total cost estimates are presented in the Project Fact Sheets in Appendix A2.

- The estimated construction cost was developed using the unit cost method of estimation using both a detailed and systems approach. Estimated construction bid items, unit costs, and quantities were developed for each candidate project type.
- A 20% contingency was used to develop the final estimated construction cost for restoration projects (except for marsh creation projects, which used a 15% contingency) and is based on current practice for coastal projects. A 30% contingency was applied to the levee portions of structural protection projects (see Section 3.9 for additional detail). Contingency is a dollar amount intended to provide an allowance for costs expected to be part of a project total, but that have not been specifically identified or for which no quantities have been estimated.
- The P/E&D Cost is a percentage of the estimated construction cost. For projects with a construction cost of up to $500 million, P/E&D was estimated at 10% of estimated construction cost (before contingency in the case of restoration projects). For projects with construction costs exceeding $500 million, a linear descending scale between 5% and 10% was used, with 5% of estimated construction cost being used as P/E&D cost for the most expensive projects.

- Construction management cost is a cost for professional services during construction to monitor contractor compliance with contract requirements and to monitor schedules and costs. It is estimated as 5% of the construction cost (before contingency in the case of restoration projects) and is based on the 2007 Master Plan cost estimates.
- The O&M Cost is specific for each project type as described in the subsections below.
- The total cost is the sum of the estimated construction cost (including contingency), the P/E&D cost, the construction management cost, and the O&M cost.

Note: Construction costs do not reflect secondary cost considerations such as community relocations, mitigation, or dredging costs from induced shoaling that may occur as a result of project effects. We understand that such secondary factors must be explored for large-scale projects prior to implementation but were unable to develop realistic estimates for these factors within the available timeframe because of the high degree of uncertainty associated with such issues at this early stage of planning. Additional discussion of secondary cost considerations and strategies for minimizing them is presented in Appendix F – Implementation and Adaptive Management.

2.6.4 Planning/Engineering and Design Cost and Duration Rationale

The estimated P/E&D costs and project durations were developed based on a review of past projects and current design and construction practices. Tables 7 and 8 were developed to provide guidelines for estimating uncertainty in projects costs and durations. The uncertainty factor acknowledges that project components are not fully developed and defined at the planning level, that projects may or may not be more complex and costly than proposed, or that selected costs are higher than anticipated. The range of uncertainty defines an anticipated window within which costs and durations are expected to fall based on the project complexity and outside influences.

Note: The P/E&D cost and duration does not reflect the time and efforts associated with obtaining landowner agreements, servitudes, environmental regulatory compliance permits, and contracting agreements.

Table 7. Project Cost Uncertainty Ranges[1]				
Project Type	**Project Scale/ Component**	**Estimated Construction Cost Uncertainty (% of Cost)**	**P/E&D Cost Uncertainty (% of Cost)**	**O&M Cost Uncertainty (% of Cost)**
Bank Stabilization	< 5 miles 5-10 miles > 10 miles	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 40 %
Barrier Island/Headland	< 3 miles 3-10 miles > 10 miles	10 - 20 % 20 - 40 % 40 - 50 %	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 40 %
Diversion[1]	5,000 cfs 50,000 cfs 250,000 cfs Channel Realignment	10 - 30 % 30 - 40 % 40 - 50 % 50 - 80 %	10 - 20 % 20 - 30 % 30 - 50 % 50 - 80 %	10 - 20 % 20 - 30 % 30 - 50 % 50 - 80 %
Hydrologic Restoration	< 500 cfs > 500 cfs Spillway	10 - 30 % 20 - 40 % 50 - 80 %	10 - 20 % 20 - 40 % 40 - 60 %	10 - 20 % 20 - 40 % 50 - 70 %
Marsh Creation	< 2,000 acres 2,000-5,000 acres > 5,000 acres	10 - 20 % 20 - 30 % 30 - 50 %	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 20 - 30 %
Oyster Barrier Reef	< 5 miles 5-10 miles 10 miles	20 - 30 % 30 - 40 % 40 - 50 %	20 - 40 % 20 - 40 % 20 - 40 %	20 - 30 % 30 - 40 % 40 - 50 %
Ridge Restoration	< 3 miles 3-10 miles > 10 miles	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 50 %
Shoreline Protection	< 8 miles 8-20 miles > 20 miles	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 40 %	10 - 20 % 20 - 30 % 30 - 50 %
Structural Protection	Levee T-Wall Floodgate Pump Station Project Total	35 - 80 % 35 % 30 - 35 % 25 % 35 - 75 %	30 - 45 % 30 - 45 % 30 - 45 % 30 - 45 % 30 - 45 %	30 % 30 % 30 % 30 % 30 %
Nonstructural	Floodproofing-Res. Floodproofing-Nonres. Elevation (3-14') Elevation (14-18') Acquisition	20 - 50 % 30 - 80 % 20 - 50 % 40 - 60 % 20 – 40 %	N/A N/A N/A N/A N/A	N/A N/A N/A N/A N/A

Notes to Table 7:

1. Ranges provided in this table were used as guidelines for estimating project uncertainty. Project-specific considerations sometimes led to the assignment of an uncertainty factor outside the suggested range.
2. Multi-diversion projects and diversions with long conveyance channels were generally assigned larger uncertainty factors than other diversions of equivalent capacities because of the added complexity of these projects.

Table 8. Estimated Project Duration Uncertainty Ranges[1]				
Project Type	**Description**	**Construction Duration Uncertainty (Years)**	**P/E&D Duration (Years)**	**Construction Duration (Years)**
Bank Stabilization	< 15 miles	10 - 20 %	2	1
	15 – 40 miles	20 - 30 %	3	2
	> 40 miles	30 - 40 %	3	3-4
Barrier Island/Headland	< 3 miles	20 - 30 %	2	1
	3-10 miles	30 - 40 %	2	2
	> 10 miles	40 - 50 %	3	3
Diversion[2]	5,000 cfs	10 - 20 %	3	2
	20,000-50,000 cfs	20 - 30 %	4	2
	250,000 cfs	30 - 50 %	5	3
	Channel Realignment	50 - 70 %	7	7
Hydrologic Restoration	< 500 cfs	10 - 30 %	2	1
	> 500 cfs	20 - 40 %	2-3	2
	Locks	30 - 50 %	3	3
Marsh Creation[3]	<5,000 acres	20 - 30 %	2-3	1-3
	5,000-15,000 acres	30 - 50 %	3	3-7
	>15,000 acres	30 - 50 %	3	Project-specific
Oyster Barrier Reef	< 10 miles	20 - 30 %	2	2
	> 10 miles	30 - 40 %	3	3
Ridge Restoration	< 3 miles	10 - 20 %	2	2
	3 - 10 miles	20 - 30 %	2	2
	> 10 miles	30 - 40 %	2	2
Shoreline Protection	< 8 miles	10 - 20 %	2	2
	8 - 20 miles	15 - 25 %	3	3
	> 20 miles	25 - 40 %	3	4
Structural Protection	All projects	30 - 75%	1-2	1-5
Nonstructural	All projects	N/A	N/A	N/A

Notes to Table 8:

1. Ranges provided in this table were used as guidelines for estimating project uncertainty. Project-specific considerations sometimes led to the assignment of an uncertainty factor outside the suggested range.
2. Multi-diversion projects and diversions with long conveyance channels were generally assigned longer P/E&D and construction durations than other diversions of equivalent capacities because of the added complexity of these projects.
3. Marsh creation construction durations are project-specific because of the wide range of pumping distances involved among various projects. Duration ranges are therefore more variable than those of other projects. Construction durations of marsh creation "child" projects (see Note 1 of Table 2) were estimated as a fraction of the "parent" project's duration based on the percentage of the "parent" project's area included within the "child" project.

3.0 Project Attribute Assumptions for Each Project Type

The following sections present information about the principal project attribute assumptions for each project type.

3.1 Bank Stabilization (BS)

Bank stabilization projects are defined as the onshore placement of earthen fill and vegetative plantings and are primarily used to reduce wave energies and maintain shorelines in open bays and lakes. Conceptual design templates and costs were developed for bank stabilization projects using recently designed projects. Large-scale project features and costs that significantly exceed the size of recently designed projects are based on scaling of these features.

The cost of a bank stabilization project is primarily influenced by the in-situ material properties, wave conditions, and geographic location. Vegetative plantings will be required during O&M cycles. The uncertainty in design, costs, and duration increases with project size.

3.1.1 Bank Stabilization (Earthen Fill) Project Assumptions and Attributes

Note: Project 001.BH.01 was modeled as a bank stabilization project rather than a barrier island/headland project due to model constraints. The project area was not contained in the Barrier Morphology model's grid and was therefore modeled in the Wetland Morphology Model. Project attributes for this project is discussed in the barrier island/headland project section below.

1. **Created Acres:** Total acres or land created or nourished by project.
2. **Length:** Total length (in linear feet) of project.
3. **Cut Volume:** Total dredge volume required for project. *Note: Bank stabilization projects assumed an in-situ source (i.e., material immediately adjacent to project site). We assumed sediment constraints do not apply to in-situ material sources. All other material sources are assumed to have a finite amount of material and are subject to the Planning Tool's sediment constraint analysis (see Appendix E – Decision Support Tools – Planning Tool). Cut volume is not applicable for in-situ borrow sources.*
4. **Borrow Source:** The borrow area(s) required to construct the feature(s). *Note: Bank stabilization projects assumed an in-situ source (i.e., material immediately adjacent to project site).*
5. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes the following bid items: mobilization and demobilization, access and flotation channels, earthen fill, vegetative plantings, and surveys.
6. **Estimated Operation and Maintenance Cost:** Includes O&M costs for a 50-year project lifespan. It includes the following bid items: vegetative plantings (TY5, TY15, and TY25) and profile surveys (TY5, TY15, TY25, TY35, and TY50).

Bank Stabilization Project Landscape Feature Assumptions (See Figure 2):

- Geometry:
  - A crown elevation of +4.0 ft NAVD88 to be maintained for the duration of the project.
  - A 50-foot crown width; 50:1-bay /25:1-marsh side slopes.
- Placement of material on shoreline edge; plantings on shoreline edge at 50% coverage.

Bank Stabilization Project Cost Assumptions:

- Access and flotation channels included.
- Using in-situ material placed by mechanical dredge.
- Vegetative plantings included in O&M cost to ensure that 30% of the area has vegetative coverage.

Bank Stabilization Project Duration Assumptions:

- Surveying:
  - Preconstruction and magnetometer survey: 1 day per 2 mile reach.
- Equipment:
  - Mechanical dredge/barge used for flotation using in-situ material: clamshell bucket; access and flotation production rate of 400 feet/day excavation, placement, and shaping; 1 dredge < 5 miles; 2 dredges for 5-10 miles; 3 dredges > 10 miles.
- Acceptance (Project Site Closure):
  - Construction acceptance period: 7 days per 4-mile reach.
- Higher uncertainty for large-scale projects (see Table 8 for project duration uncertainty ranges).

3.2 Barrier Island/Headland Restoration (BH)

Barrier island/headland restoration projects primarily rely on nearshore and/or offshore sediment sources to obtain the required borrow volume to construct the project features. Approximately 60% to 70% of the total construction cost of this type of project is dictated by the unit cost of the beach/dune fill material. This marsh fill unit cost is typically influenced by the type of material to be dredged, the dredging distance, payment method, and dredging experience. Approximately 15% to 30% of the total construction cost is derived from the mobilization and demobilization of construction equipment. This cost is influenced by the project size, borrow source, dredging distance, pipeline corridor, dredging equipment, dredging volume, manpower, and contractor risk. Projects along the Gulf of Mexico are typically at greater risk from storm affects and may require several demobilizations due to storm impacts. Larger dredging volumes may require several dredges, several pipeline corridors, and several borrow sources.

Due to the use of large offshore sediment sources, permitting of these borrow sources would require a longer period for permit review and approval and could lengthen the time to finalize the design and implement construction. Consequently, the uncertainty in design, costs, and duration increases with project size.

3.2.1 Barrier Island/Headland Project Assumptions and Attributes

1. **Created Acres:** Total acres of land created or nourished by project.
2. **Length:** Total length (in linear feet) of project.
3. **Cut Volume:** Total dredge volume required for project.

4. **Borrow Source:** The borrow area(s) required to construct the feature(s). For further project development, the source of material should be optimized using material from shoals, relic channels, the Mississippi River, or other. A 500-foot buffer should be used near existing inland pipelines and a 1,500-foot buffer for offshore pipelines.
5. **Fill Source:** Field used by Planning Tool sediment constraint application (see Appendix E – Decision Support Tools – Planning Tool for additional discussion of the Planning Tool's constraint analysis). The number corresponds to a particular borrow source/region (e.g., Breton Sound).
6. **Dune Elevation:** The dune crest elevation at TY0.
7. **Beach Elevation:** The beach crest elevation at TY0.
8. **Dune Volume:** Design volume based on the barrier island design template.
9. **Beach Volume:** Design volume based on the barrier island design template.
10. **Marsh Volume:** Total estimated volume of marsh fill material required to construct the project feature using one initial lift based on the target marsh fill elevation at TY0, +3.0 ft NAVD88. The typical section for a barrier island/headland project is shown in Figure 3 and was used to determine template volumes.
11. **Elevation at Target Year 0:** Marsh elevation at target year 0.
12. **Elevation at Target Year 5:** Marsh elevation at target year 5.
13. **Elevation at Target Year 25:** Marsh elevation at target year 25.
14. **Elevation at Target Year 50:** Marsh elevation at target year 50.
15. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes the following bid items: mobilization and demobilization, access channels, beach fill, dune fill, marsh fill, earthen containment dikes, navigation aids, sand fencing, surveys, and vegetative plantings.
16. **Estimated Operation and Maintenance Cost:** Includes O&M costs for a 50-year project lifespan. O&M costs include the following bid items: sand fencing- replacement (TY5, TY15, TY25, TY35, and TY50), vegetative plantings (TY5, TY15, and TY25), containment dike gapping (TY1, TY3, and TY5), and profile surveys (TY5, TY15, TY25, TY35, and TY50).

Barrier Island/Headland Project Landscape Feature Assumptions (See Figure 3):

- Geometry:
  - Barrier Island: A beach and dune feature with sand fencing; a dune crest elevation of +6.0 ft NAVD88, a width of 300 feet, and a 45(H): 1(V) slope; 1,500-foot marsh platform; target marsh fill elevation of +3.0 ft NAVD88 at TY0 for back barrier marsh platform.
  - Headland: A beach and dune feature with sand fencing; a dune crest elevation of +7.0 ft NAVD88, a width of 300 feet, and a 45(H): 1(V) slope; beach dune at +5.0 ft NAVD88; 1,000-foot marsh platform; target marsh fill elevation of +3.0 ft NAVD88 at TY0 for back barrier marsh platform.
- Design templates are based on the LCA Barataria Basin Barrier Shoreline Project for both barrier island and headland projects.

Barrier Island/Headland Project Cost Assumptions:

- Borrow Source and Pipeline Corridor:
  - Borrow Source Quantity: Sufficient borrow source volume to build each conceptual candidate project was assumed. However, a borrow source evaluation will be required to identify potential borrow source location(s) and available sediment for portfolio or preliminary project development.
  - Borrow Source Material Type: Unit costs for marsh fill adjusted accordingly based on source location and material type.
  - Geographic Location: Use of sediment sources outside the system (including the Mississippi River, Atchafalaya River, and the Gulf of Mexico beyond the depth of closure) was maximized. The borrow source location could significantly impact the cost of the project. Therefore, a dredging implementation plan will be required to optimize preliminary project development features by further evaluation of the borrow source location(s), available sediment, dredging logistics, implementation, and environmental criteria.
    - Eastern: Projects located east of Caminada Headland assumed the lesser of the distance to the Mississippi River or 20 miles for the pumping distance.
    - Western: Projects located west of Caminada Headland assumed Ship Shoal as the borrow source with a maximum pumping distance of 20 miles.
  - *Dredge Types:* A 30-inch hydraulic cutter suction pipeline dredge shall be utilized.
    - 1 dredge utilized for projects < 2,000 acres.
    - 2 dredges utilized for projects 2,000-5,000 acres.
    - 3 dredges utilized for projects > 5,000 acres.
  - *Pumping Distance:* The maximum distance from the proposed beach/dune fill area(s) to the borrow source.
    - A maximum pumping distance of 20 miles for a 30-inch dredge with a minimum of 4 booster pumps.
    - A maximum pumping distance of 5 miles without a booster pump.
  - *Pipeline Corridor:* The hydraulic dredging pipeline route required to deliver the sediment slurry from the borrow source to the beach/dune fill area(s). The pipeline corridor is required to be maintained throughout construction.
    - One pipeline corridor per dredge.
    - Pipeline will last for the duration of construction; 1 mile of welded pipe per booster pump.
    - 20% land based pipe and 80% marine based pipe.
    - Marsh buggies utilized per pipeline for outfall work in fill area(s).
    - Navigational obstructions not considered.
- Beach/Dune Fill Area(s):

  - Fill volume was determined using design template. Fill volume assumptions based on the LCA Barataria Basin Barrier Shoreline Project.
  - Beach/Dune fill volume determined using a cut-to-fill ratio of 1.30 and based on the volume in place.
  - Open water areas at elevation -1.5 ft NAD88.
  - Existing marsh areas at elevation +1.0 ft NAVD88.
- Back Barrier Marsh Platform:
  - Projects with pre-existing shapefile data: Divided footprint acreage by the marsh creation description acreage to determine the percent marsh creation acreage. The remaining acreage was assumed to be marsh nourishment.
  - No acreage data: Used most recent aerials on SONRIS to estimate percent water/marsh.
  - No data given: Assumed 70% marsh creation and 30% marsh nourishment.
- Earthen Containment Dike:
  - Containment dike volumes adjusted from aerial photograph analysis.
  - Containment dikes placed along the perimeter of the proposed marsh fill areas and in the interior to create cells; 1,000-acre cells utilized for projects.
  - Constructed using marsh buggy hoe and in-situ material.
    - Optimized marsh buggy quantity based on project size and production rates.

Barrier Island/Headland Project Duration Assumptions:

- Mobilization and Demobilization:
  - Dredge mobilization/demobilization assumed to occur during pipeline corridor placement and removal.
- Surveying:
  - Preconstruction and magnetometer survey of fill area(s) assumed to occur prior to pipeline corridor placement: 7 days per 2,000 acres.
  - Borrow area survey duration not included.
- Earthen Containment Dike (marsh platform):
  - Production rate of 300 feet/day using a multiple lift system.
  - Interior cells constructed prior to marsh material placement.
  - Optimized marsh buggy equipment based on project size.
- Pipeline Corridor:
  - Sufficient pipeline material for proposed corridors.
  - Pipeline delivery and installation: 6 days/mile of pipeline.
  - Pipeline removal: 3 days/mile of pipeline.

  - Separate pipeline corridor crews working simultaneously on each pipeline corridor.
- Dredging:
  - 30 days/year for maintenance downtime.
  - 15 days/year for weather delay downtime.
  - 20,000 CY/day production rate for a 30-inch dredge.
- Vegetative Plantings:
  - Sufficient plants (and appropriate types) assumed available.
  - Plantings will keep pace with the marsh fill placement; wait additional acceptance time of 30 days for last cell to begin planting.
  - Vegetative planting rate: 6 acres/day.
- Acceptance (Project Site Closure):
  - Construction acceptance period: 30 days for last cell.
- Higher uncertainty for larger scale projects (see Table 8 for project duration uncertainty ranges).

3.3 Diversion and Channel Realignment (DI)

Diversion and channel realignment projects are primarily located near the Mississippi River and rely on the nutrients and sediments present in freshwater flows to deliver benefits to the outfall area. Conceptual design templates were developed for candidate diversion projects with flows of 5,000 cubic feet per second (cfs), 50,000 cfs, and 250,000 cfs. Smaller diversion features and costs are based on current studies and higher conveyance channel velocities to deliver sediment to the outfall areas. Detailed reach-specific sediment and bathymetric data analyses are recommended to optimize sediment capture. Wider channels were assumed for conveyance channels not proposed for delivering sediment. Larger diversion features and costs are based on scaling of these features.

The cost of a diversion is affected by river stage, outfall stage, sediment data, dredging requirements, inflow and outfall channel geometry and lengths, infrastructure crossings, control structure type, and operational plan. Diversions with capacities greater than 10,650 cfs have not been designed or constructed in the Louisiana coastal zone for restoration projects. Therefore, the uncertainty in design, costs, and duration increases with diversion capacity above this threshold.

3.3.1 Diversion and Channel Realignment Project Assumptions and Attributes

1. **Operational Regime:** Explanation of the operational strategies and triggers for each structure.
2. **Length:** Total length (in linear feet) of project conveyance channel.
3. **Opening Area:** Horizontal distance of the inflow and outflow conveyance channels (if known).
4. **Discharge:** Peak design flow through the structure and channel (e.g., 5,000 cfs, 50,000 cfs, 250,000 cfs, or other).

5. **River:** Numerical code corresponding to the river that serves as the source of fresh water for the project (used by Planning Tool for the river flow constraint application).
6. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes all costs pertaining to facilitate the construction of the inflow/outflow channels, control structure, roadway bridges, pipeline relocations, and guide levees.
7. **Estimated Operation and Maintenance Cost:** Includes O&M costs for a 50-year project lifespan. The O&M costs are calculated as a percentage of construction cost.

Diversion and Channel Realignment Project Landscape Feature Assumptions:

- Geometry:
  - Inflow channel extending 1,000 feet from the Mississippi River bank; control structure located 1,000 feet from Mississippi River bank.
  - A gated control structure appropriate for proposed flows.
  - Extended outfall channel 1,000 feet into existing basin and/or beyond the existing basin side hurricane protection system.
  - Earthen guide levees on both sides of the channel; earthen levee tie-ins assumed for existing Mississippi River Levee; a 20-foot crown width; 4:1 side slopes; Mississippi River levee crown elevation adjusted due to location and known data.
  - Sail-through lock structure in Mississippi River Federal Navigation Channel to accommodate navigation (channel realignment projects only).
- Conveyance channels sized for maximum proposed flows and high velocities for potential sediment capture and delivery to outfall area.
- A 24-inch scour protection layer for inflow and outflow channel underlain with non-woven geotextile.
- A woven geotextile assumed for guide levee stability support due to soft soils.
- Design templates are based on the Myrtle Grove Delta Building Diversion Modeling Effort.

Diversion and Channel Realignment Project Cost Assumptions:

- Mississippi River hydraulic dredging volumes assumed during construction; this volume increases with diversion size.
- Excavation volumes based on required channel geometry.
- Earthen levee volumes based on guide levee geometry using in-situ material.
- Riprap tonnage based on a 24-inch rock layer for 100% of the channel for 5,000 - 50,000 cfs diversions; reduced to only channel side slopes for larger diversions.
- A gated control structure with wing walls.
- Highway bridges based on average LADOTD costs for a four-lane slab span bridge.
- A minimum pipeline infrastructure crossing cost.

Diversion and Channel Realignment Project Duration Assumptions:

- Based on a construction duration derived from the Davis Pond Diversion Project.
- Higher uncertainty for larger diversions (see Table 8 for project duration uncertainty ranges).

3.4 Hydrologic Restoration (HR)

Hydrologic Restoration projects are primarily used to convey freshwater to proposed outfall areas, or to improve water circulation and reduce saltwater intrusion within a hydrologic system. Conceptual design templates were developed for candidate hydrologic restoration projects using past projects and proposals. Smaller hydrologic restoration features and costs are based on current studies and projects. Larger features and costs are based on scaling of these features. No surveying or modeling has been done for the proposed candidate projects.

The cost of a hydrologic restoration project is influenced by the water stage, inflow and outfall channel dimensions and lengths, project scale, control structure type, and operational plan. Uncertainty in design, costs, and duration increases with project size.

3.4.1 Hydrologic Restoration Project Assumptions and Attributes

1. **Operational Regime:** Explanation of the operational strategies and triggers for each structure.
2. **Invert Elevation:** Invert elevation of the control structure (if known).
3. **Opening Area:** Area of control structure opening (if known).
4. **Estimated Construction Cost (2010):** Includes construction and construction Management costs. It includes all costs pertaining to construction of the hydrologic restoration feature.
5. **Estimated Operation and Maintenance Costs:** Includes O&M costs for a 50-year project lifespan. The O&M costs were calculated as a percentage of construction cost.

Hydrologic Restoration Project Landscape Feature Assumptions:

- For features that require refurbishment of existing structures or culverts, structures were assumed to convey 400 cfs. The inverts were assumed to be elevation -2.0 ft NAVD88.
- Excavated channels assumed for restoring hydraulic circulation.
- Salinity control structures assumed to consist of a rock dike, barge gate, sector gate, or lock structure. Project descriptions indicate which type of structure was assumed.

Hydrologic Restoration Project Cost Assumptions:

- For features that require restoring hydraulic circulation within a system, 90,000 linear feet of excavation per 25,000 acres was assumed. No invert or flow calculation pattern was assumed for this type of hydrologic restoration project due to the large amount of variation within the system.
- Projects located on the GIWW that improve or increase freshwater mobility have been assumed to involve hydraulic dredging along the length of the project within the GIWW to an average of 5 feet from the mud line.

- Costs are based on current studies and recent projects.
- Larger projects are based on scaling of these features.

Hydrologic Restoration Project Duration Assumptions:

- Higher uncertainty for larger projects (see Table 8 for project duration uncertainty ranges).

3.5 Marsh Creation (MC)

Marsh creation projects have historically relied on nearshore or Mississippi River sediment sources to obtain the required borrow volume to construct the project features. Approximately 60% to 70% of the total construction cost of this type of project is dictated by the unit cost of the marsh fill material. This marsh fill unit cost is typically influenced by the type of material to be dredged, the dredging distance, payment method, fuel costs, and dredging experience. Approximately 20% to 30% of the total construction cost is derived from the mobilization and demobilization of construction equipment. This cost is influenced by the project size, borrow source, dredging distance, pipeline corridor, dredging equipment, dredging volume, manpower, and contractor risk. Projects near the Gulf of Mexico are typically more at risk from storm effects. Larger dredging volumes may require several dredges, several pipeline corridors, and several borrow sources.

Marsh creation projects are constructed primarily in open water areas or areas with deteriorated marsh. Conceptual design templates were developed for candidate Marsh Creation projects using data from recently designed and constructed projects (see Figure 4). Smaller marsh creation projects (less than 2,000 acres) features and costs are based on current projects. Larger marsh creation features and costs are based on scaling of these features and have not been constructed to date at this larger scale. Therefore, the uncertainty in design, costs, and duration increases with project size. Costs pertaining to oyster lease acquisition are not included.

3.5.1 Marsh Creation Project Assumptions and Attributes

1. **Created Acres:** Total acres of land created or nourished by project.
2. **Fill Volume:** The total estimated volume of marsh fill material required to construct the project feature using one initial lift based on the target marsh elevation at TY0.
3. **Cut Volume:** Total dredge volume required for project.
4. **Borrow Source:** The borrow area(s) required to construct the feature(s). For further project development, the source of material should be optimized using material from shoals, relic channels, the Mississippi River, or other. A 500-foot buffer should be used near existing inland pipelines and a 1,500-foot buffer for offshore pipelines.
5. **Fill Source:** The borrow area(s) required to construct the marsh feature(s). For further project development, the source of material may be optimized using offshore and river sources. A hydraulic dredge cut of 10 feet may be used to determine the borrow area acreage. A 500-foot buffer may be used near existing inland pipelines and a 1,500-foot buffer for offshore pipelines.
6. **Elevation at Target Year 0:** Refers to marsh elevation at target year 0.

7. **Elevation at Target Year 5:** Refers to marsh elevation at target year 5.
8. **Elevation at Target Year 25:** Refers to marsh elevation at target year 25.
9. **Elevation at Target Year 50:** Refers to marsh elevation at target year 50.
10. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes the following bid items: mobilization and demobilization, marsh fill, earthen containment dikes, surveys, and vegetative plantings.
11. **Estimated Operation and Maintenance Cost:** This cost includes the O&M costs for a 50-year project lifespan. It includes the following bid items: vegetative plantings (TY5, TY15, and TY25), containment dike gapping (TY1, TY3, and TY5), and profile surveys (TY5, TY15, TY25, TY35, and TY50).

Marsh Creation Project Landscape Feature Assumptions (See Figure 4):

- Geometry:
  - Marsh Creation Fill Area: One initial marsh fill lift placed to the target marsh fill elevation at TY0 as derived from the regional settlement curves; maximum target marsh fill elevation of +3.2 ft NAVD88.
  - Earthen Containment Dikes: A crest width of 5 feet, side slopes of 4(H):1(V); crown elevation of +4.5 ft NAVD88 assumed to be maintained during construction; constructed using in-situ material.
    - Interior earthen containment dikes utilized for marsh fill placement as required for acceptance and dewatering using 1,000-acre cells.

Marsh Creation Project Cost Assumptions:

- Borrow Source and Pipeline Corridor:
  - *Borrow Source Quantity:* Sufficient borrow source volume to build each conceptual candidate project was assumed. However, a borrow source evaluation will be required to identify potential borrow source location(s) and available sediment for portfolio or preliminary project development.
  - *Borrow Source Material Type:* Unit costs for marsh fill adjusted accordingly based on the source location and material type. The following assumptions were used to develop marsh fill unit costs:
    - Dredge cut depth of 30 feet.
    - Fuel cost of $3.50/gallon.
    - Mississippi River: included 5 additional miles of pumping distance for projects needing in excess of 4 million cubic yards of material.
    - Dredge Material: 85% sand, 5% mud.
    - Pipeline: 1% flow line, 49% submerged, 50% shoreline pipe.
  - *Geographic Location:* Use of sediment sources outside the system (including the Mississippi River, Atchafalaya River, and the Gulf of Mexico beyond the depth of closure)

was maximized. The borrow source location could significantly impact the cost of the project. Therefore, a dredging implementation plan will be required to optimize preliminary project development features by further evaluation of the borrow source location(s), available sediment, dredging logistics, implementation, and environmental criteria.

- *Dredge Types:* A 30-inch hydraulic cutter suction pipeline dredge was assumed for river and offshore dredging. A 20-inch hydraulic cutter suction pipeline dredge was assumed for interior waterbody dredging.
    - 1 dredge utilized for projects < 2,000 acres.
    - 2 dredges utilized for projects 2,000-5,000 acres.
    - 3 dredges utilized for projects > 5,000 acres.
- *Dredging Depth:* Depth in feet below mud line.
    - A maximum inland dredging depth of 10 feet.
- *Pumping Distance:* The maximum distance from the proposed marsh fill area(s) to the borrow source.
    - A maximum pumping distance of 19 miles for both a 20-inch and 30-inch dredge with a minimum of four booster pumps. A 30-mile maximum was also used in specific locations.
    - A maximum pumping distance of 5 miles without a booster pump.
- *Pipeline Corridor:* The hydraulic dredging pipeline route required to deliver the sediment slurry from the borrow source to the marsh fill area(s). The pipeline corridor is required to be maintained throughout construction.
    - One pipeline corridor per dredge.
    - Pipeline will last for the duration of construction; 1 mile of welded pipe per booster pump.
    - 50% land-based pipe and 50% marine-based pipe.
    - Marsh buggies utilized per pipeline for outfall work in marsh fill area(s).
    - Navigational obstructions not considered.

- Marsh Creation Fill Area(s):
    - Marsh fill volume determined by the Wetland Morphology model from GIS shapefiles of project footprints using the following rules:
        - Open water areas within the project polygon were filled to 100% land; this new land was then built to a project-specific target elevation of either 2.5 ft or 3.2 ft NAVD88 as specified in the Project Attributes Table column Elev_TY0 (see Appendix J - Master Plan Data for additional details about the Attributes table).
        - Open water areas with water bottom elevations lower than -5.0 feet NAVD 88 were excluded.

        - Nourishment of existing land within the project polygon was not considered in the computations.
    - Marsh Acreages provided by the Wetland Morphology model based on surface footprint of filled areas.
- Earthen Containment Dike:
    - Containment dikes placed along the perimeter of the proposed marsh fill areas and in the interior to create cells; 1,000-acre cells utilized for projects.
    - Constructed using marsh buggy hoe and in-situ material.
        - Optimized marsh buggy quantity based on project size and production rates.

Marsh Creation Project Duration Assumptions:

- Mobilization and Demobilization:
    - Dredge mobilization/demobilization will occur during pipeline corridor placement and removal.
- Surveying:
    - Preconstruction and magnetometer survey of fill area(s) will occur prior to pipeline corridor placement: 7 days per 2,000 acres.
    - Borrow area survey duration not included.
- Earthen Containment Dike:
    - Production rate of 300 feet/day using a multiple lift system.
    - Two interior cells constructed prior to material placement; remaining dikes to be constructed in tandem with marsh fill placement.
    - Optimized marsh buggy equipment based on project size.
- Pipeline Corridor:
    - Sufficient pipeline material for proposed corridors.
    - Pipeline delivery and installation: 6 days/mile of pipeline.
    - Pipeline removal: 3 days/mile of pipeline.
    - Separate pipeline corridor crews working simultaneously on each pipeline corridor.
- Dredging of Marsh Creation Fill Area(s):
    - 30 days/year for maintenance downtime.
    - 15 days/ year for weather delay downtime.
    - 12,000 CY/day production rate for a 20-inch dredge.
    - 20,000 CY/day production rate for a 30-inch dredge.
- Vegetative Plantings:
    - Sufficient plants (and appropriate types) assumed available.

- Plantings will keep pace with the marsh fill placement; wait additional acceptance time of 30 days for last cell to begin planting.
- Vegetative planting rate: 6 acres/day.

- Acceptance (Project Site Closure):
  - Construction acceptance period: 30 days for last cell.
- Higher uncertainty for larger scale projects (see Table 8 for project duration uncertainty ranges).

3.6 Oyster Barrier Reef (OR)

Oyster Barrier Reef projects are defined as bioengineered oyster reefs to improve oyster cultivation and to reduce wave energies on shorelines in open bays and lakes. Conceptual design templates were developed for oyster barrier reef projects using proposed demonstration projects (see Figure 2). Smaller features and costs are based on recently designed projects. Larger features and costs are based on scaling of these features.

The cost of an oyster barrier reef project is primarily influenced by the underlying soil conditions, construction access, local wave conditions, and geographic location. Additional material may be required during construction and for O&M as a result of weak soil conditions. Uncertainty in design, costs, and duration increases with project size. Current methodologies are under development through a demonstration project.

3.6.1 Oyster Barrier Reef (Bioengineered Armor Units, Other) Project Assumptions and Attributes

1. **Created Acres:** Corresponds to acres of reef area. *Note: Reef area could be underwater.*
2. **Length:** Length along the centerline of the project.
3. **Elevation:** Top of reef crown elevation.
4. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes the following bid items: mobilization and demobilization, access and flotation channels, woven geotextile fabric, marine mattress, surveys, and navigation aids.
5. **Estimated Operation and Maintenance Cost:** Includes O&M costs for a 50-year project lifespan. It includes the following bid items: repair and profile surveys (TY5, TY15, TY25, TY35, and TY50)

Oyster Barrier Reef Project Landscape Feature Assumptions (See Figure 2):

- Oyster Barrier Reef Geometry:
  - Base width of approximately 60 feet; units to be placed near mean high water elevation and assumed to be maintained for the duration of the project.
- Reef Material:
  - A stackable concrete armor unit capable of resisting wave forces and supporting oysters.

Oyster Barrier Reef Project Cost Assumptions:

- For open water area, an average water bottom elevation of -5.0 ft NAVD88 was assumed for volume calculations. Additional volume was included to account for initial and long-term consolidation settlement.
- Access channels placed with a 60-foot bottom width.
- Flotation channels placed along barrier with an 80-foot bottom width; draft at 7.0 feet.
- A geotextile/rock marine mattress placed under rock.
- A 50-foot fish access placed every 1,000 feet.
- Navigational aids placed every 1,000 feet.

Oyster Barrier Reef Project Duration Assumptions:

- Surveying:
  - Preconstruction and magnetometer survey: 1 day per 2-mile reach.
- Equipment:
  - Mechanical dredge/barge used for flotation and access: clamshell bucket; access and flotation production rate of 400 feet/day excavation and 600 feet/day for channel backfilling and backfilling; 1 dredge < 5 miles; 2 dredges for 5-10 miles; 3 dredges > 10 miles; 1 dredge for backfilling.
  - Crane/barge used for unit placement: production rate of 400 feet/day; 1 crane < 10 miles; 2 cranes > 10 miles.
- Acceptance (Project Site Closure):
  - Construction acceptance period: 7 days per 4-mile reach.
- Higher uncertainty for large-scale projects (see Table 8 for project duration uncertainty ranges).

3.7 Ridge Creation/Restoration (RC)

Ridge creation/restoration projects are intended to reestablish historic ridges to reduce storm surge and restore natural hydrologic patterns. Conceptual design templates were developed for candidate ridge creation/restoration projects using existing projects (see Figure 4). Smaller ridge creation/restoration features and costs are based on current studies. Larger features and costs are based on scaling of these features.

Large-scale ridge creation/restoration projects have not been constructed to date. The cost of a ridge creation/restoration project is influenced by the project length, in-situ soil conditions, and geographic location. The uncertainty in design, costs, and duration therefore increases with project size.

3.7.1 Ridge Creation/Restoration Project Assumptions and Attributes

1. **Created Acres:** Total acres of land restored by project.
2. **Length:** Length along the centerline of the feature.
3. **Fill Volume:** The total estimated volume of fill material required to construct the project feature using one initial lift to target elevation at TY0.
4. **Cut Volume:** Total dredge volume required for project.
5. **Elevation:** Top of the ridge crown elevation.
6. **Estimated Construction Cost (2010):** Includes construction and construction management cost. An average water bottom elevation of -1.5 ft NAVD88 for open water areas and an average marsh elevation of +1.0 ft NAVD88 were assumed for volume calculations. It includes the following bid items: mobilization and demobilization, earthen fill, surveys, vegetative plantings. Reforestation and filling of low areas assumed for chenier restoration projects.
7. **Estimated Operation and Maintenance Cost:** This cost includes the O&M costs for a 50-year project lifespan. It includes the following bid items: vegetative plantings (TY5, TY15, and TY25), earthen fill (TY5, TY15, and TY25), and profile surveys (TY5, TY15, TY25, TY35, and TY50) for RC projects. Four events assumed for tallow eradication.

Ridge Creation/Restoration Project Landscape Feature Assumptions (See Figure 4):

- Geometry:
  - A crest width of 50 feet, side slopes of 5(H):1(V); crown elevation of +5.0 ft NAVD88 assumed to be maintained for the duration of the project; constructed using in-situ material.
- Plantings to ensure that 50% of the area has vegetative coverage.
- Chenier restoration projects include reforestation and filling of low areas.

Ridge Creation/Restoration Project Cost Assumptions:

- Costs are based on use of in-situ borrow material for the earthen ridge fill material using several lifts.
- O&M costs include vegetative plantings to ensure that 20% of the area has vegetative coverage and additional lifts.

Ridge Creation/Restoration Project Duration Assumptions:

- Surveying:
  - Preconstruction and magnetometer survey: 1 day per 2-mile reach.
- Equipment:
  - Mechanical marsh buggy used for material placement: production rate of 200 feet/day excavation using two lifts; 14 day waiting period prior to second lift; 2 buggies < 5 miles; 4 buggies for 5-10 miles; 6 buggies > 10 miles.
- Acceptance (Project Site Closure):
  - Construction acceptance period: 7 days per 4-mile reach.

- The duration for larger projects will be affected by availability of equipment.
- Higher uncertainty for larger projects (see Table 8 for project duration uncertainty ranges).

3.8 Shoreline Protection (SP)

Shoreline protection projects are defined as nearshore segmented rock breakwaters and are primarily used to reduce wave energies on shorelines in open bays, lakes, and sounds. Conceptual design templates were developed for shoreline protection projects using recent design methodology (see Figure 5). Smaller shoreline protection features and costs are based on recently constructed projects. Larger features and costs are based on scaling of these features.

The cost of a shoreline protection project is primarily influenced by the underlying soil conditions, construction access, local wave conditions, and geographic location. Additional material is usually required during the construction phase and during the O&M phase due to the weak soil conditions. The uncertainty in design, costs, and duration increases with project size.

3.8.1 Shoreline Protection (Segmented Rock Breakwater) Project Assumptions and Attributes

Note: Project 03b.SP.02 was modeled as a shoreline protection project rather than a barrier island/headland project due to model constraints. The project area was not contained in the Barrier Morphology model's grid and was therefore modeled in the Wetland Morphology Model. Project attributes for this project is discussed in the barrier island/headland project section below.

1. **Created Acres:** Total acres of land created by project.
2. **Length:** Length along the centerline of the rock breakwater feature.
3. **Fill Volume:** The total estimated volume of rock required to construct the project feature. An open water contour elevation of -1.0 ft NAVD88 was assumed for volume calculations. Additional volume was included to account for the initial and long term consolidation settlement. A 250-lb. class rock was assumed for the breakwater.
4. **Elevation:** Top of breakwater crown elevation.
5. **Estimated Construction Cost (2010):** Includes construction and construction management costs. It includes the following bid items: mobilization and demobilization, access and flotation channels, woven geotextile fabric, 250-lb. class rock, navigational aids, surveys, and settlement plates.
6. **Estimated Operation and Maintenance Cost:** Includes O&M costs for a 50-year project lifespan. Rock fill maintenance events assumed at years TY5, TY15, and TY25. It includes the following bid items: access and flotation channels (TY5, TY15, and TY 25), rock (TY5, TY15, and TY25 for projects in Southeast Louisiana; TY15 and TY25 for projects in Southwest Louisiana), and profile surveys (TY5, TY15, TY25, TY35, and TY50).

Shoreline Protection Project Landscape Feature Assumptions (See Figure 5):

- Breakwater Geometry:

  - Inland Breakwater: crest width of 4 feet, side slopes of 3(H):1(V); crown elevation of +3.5 ft NAVD88 assumed to be maintained for the duration of the project.
  - Gulf Breakwater: crest width of 5 feet, side slopes of 3(H):1(V); crown elevation of +3.5 ft NAVD88 assumed to be maintained for the duration of the project.
- Breakwater Contour:
  - Inland Breakwater: constructed at the -1.0 ft NAVD88 contour based on calculated wave breaking depth.
  - Gulf Breakwater: constructed at the -1.2 ft NAVD88 contour to account for the formation of salients and tombolos. See *Louisiana Shoreline Erosion Reduction Evaluation for Segmented Rock Breakwaters Technical Memorandum* (Technical Memorandum).
- A stone class of 250 lb. was utilized due to the mean stone diameters and the stone mass required to resist wave forces.
- Average Annual Shoreline Retreat Reduction Factor, as specified in Table 3 of Technical Memorandum, used to develop the erosion reduction percentage per region.

Shoreline Protection Project Cost Assumptions:

- Access channels placed every 15,000 feet with a 60-foot bottom width.
- Flotation channels placed along rock breakwater with an 80-foot bottom width; draft at 6.5 feet.
- A woven geotextile placed under rock; 15% overage to account for overlapping.
- A 50-foot fish access placed every 1,000 feet.
- A rock-to-cubic yard ratio of 1.55 and a 10% rock spillage value (i.e., 10% of rock volume assumed to spill into adjacent areas) were used to determine the rock volume.
- Regional settlement percentages were developed for volume calculations and included in the O&M costs: volumes were determined for years TY5 (50% of volume), TY15 (25% of volume in Southeast Louisiana; 15% of volume in Southwest Louisiana), and TY25 (10% of volume) and were based on constructed projects.
- Navigation aids placed every 1,000 feet.

Shoreline Protection Project Duration Assumptions:

- Surveying:
  - Preconstruction and magnetometer survey: 1 day per 2 mile reach.
- Equipment:
  - Mechanical dredge/barge used for access and flotation: clamshell bucket; access and flotation production rate of 400 feet/day excavation and 600 feet/day for channel backfilling; 1 dredge for < 8 miles; 2 dredges for 8-20 miles; 3 dredges for > 20 miles; 1 dredge for backfilling.

  - Mechanical dredge/barge used for rock placement: rock bucket; production rate of 2000 tons/day; 2 machines > 20 miles; Second lift at 30% of reach required for PU1, PU2, and PU3a.
- Acceptance (Project Site Closure):
  - Construction acceptance period: 7 days per 4 mile reach.

3.9 Structural Protection (HP)

Structural hurricane protection/risk reduction projects evaluated in the 2012 Coastal Master Plan include one or more of the following basic components: earthen levee, concrete T-wall, and floodgates. Floodgates are typically constructed at road, railroad, and water body crossings. Additionally, pump stations are included in the interior of ring levees. Structural protection projects are designed to reduce risk from storm surge damage associated with tropical cyclone events.

Project attributes were developed for candidate structural protection projects using data from recently designed and constructed projects. The cost of a structural protection project is primarily influenced by structure type, underlying soil conditions, construction access, and geographic location. The uncertainty in design, costs, and duration increases with project size.

3.9.1 Structural Protection Project Assumptions and Attributes

1. **Length:** Length along the centerline of the project. Locations of future levees were obtained using locations identified from previous reports and studies, and identifying reasonable tie-in points to other existing structural projects and natural features. The levees were added to the State's GIS database. The length of the GIS centerline for each levee was used as the project length.
2. **Predominant Structure Type:** The predominant structure type for all projects is earthen levee, but each project could be composed of one or more of the following structure types:
    a. *Earthen Levee:* The principal component of each structural protection project is the earthen levee. The following attributes describe earthen levees:
        i. Location: Levees are designated as linear or ring levees. Ring levees typically do not cross water bodies, but will have associated internal drainage pumping. All levee alignments and locations are depicted in a GIS shapefile and were generally taken from the conceptual design report or modification plans for existing levees.
        ii. Length: The length of levees was measured along the centerline using GIS from endpoint to endpoint. The length of gates and T-walls was deducted from the overall length to obtain the earthen levee portion of the project.
        iii. Top height: Top elevations for earthen levees were obtained from the appropriate conceptual design report.
        iv. Side slopes: Typical side slopes used by the U.S. Army Corps of Engineers (USACE) for levee design were assumed for all structural protection projects. These slopes are 4:1 front slopes and 3:1 back slopes.

   v. Top width: A top width of 12 feet was used for all levees as is typical of USACE earthen levee projects and provides reasonable access after levee construction.

b. *Concrete T-wall:* T-walls are typically located at points along the levee where there is a high potential for erosion or insufficient space for an earthen levees. Although T-walls may be constructed at various locations along a levee, for the purposes of this analysis it is assumed that T-walls would only be constructed at junctions with water crossings, railroads, and major roadways (i.e., interstates and state highways). The following attributes were determined to describe T-walls:
   i. Location: T-walls are located on either side of every river, railroad, and interstate and state highway crossings.
   ii. Wall height: T-wall height was set the same as the adjoining earthen levee height.
   iii. Wall thickness: Set at 1.5 feet.
   iv. Wall length: It was assumed that T-walls would be constructed on each side of a river 500 feet landward from the top of bank to the edge of the gate. T-walls are also assumed to extend 500 feet either side of a railroad or major road crossing. Consequently, the minimum length of T-wall at each river, road, and railroad crossing is 1,000 feet.
   v. Base width and thickness: A base thickness of three feet and a base width of 14 feet are assumed for all T-walls.

c. *Floodgate-Land (Road, Railroad):* Floodgates are needed where levees cross a road or railroad. Crossings have been determined for each levee and gate attributes determined for each of these crossings. The following attributes were determined to describe floodgates:
   i. Gate type: Slider gates were assumed at all railroads, interstate, and state highway crossings.
   ii. Location: Only major roads were assumed to have gates. Because of the large number of secondary road crossings, gates were not assigned to these other minor crossings. It is assumed that the cost of the earthen levee through these areas will, to some extent, account for the cost of the additional gate.
   iii. Length: The length of each gate is based on GIS data and set to an opening size of either 110 feet or 220 feet to accommodate road/railroad traffic. For larger roads or railroads, the actual width, including some contingency, was used.
   iv. Gate height: All gate heights are assumed to be two feet higher than the adjoining T-wall height.

d. *Floodgate-Water (Canal Surge Gate):* Floodgates are needed where levees intersect water bodies. Crossings have been determined for each levee and gate attributes determined for each of these crossings. The following attributes were determined to describe floodgates.
   i. Gate type: Either a “sector” gate or “barge” gate were assumed. Sector gates are the gate type of choice at river crossings where the horizontal distance from top of

bank to top of bank is less than 200 feet. Barge gates are the assumed gate type of choice where the horizontal distance from top of bank to top of bank is greater than 200 feet.

ii. Location: All water crossings contain a floodgate.

iii. Length: Sector gates are 56 feet wide. The width of barge gates is determined by the anticipated traffic loads in the river. For rivers where the traffic load is assumed to be "heavy", a gate opening width of 220 feet is assumed; for rivers with a "light" traffic load, the gate opening width is assumed to be 110 feet.

iv. Gate height: All gate heights were set to be two feet higher than the adjoining T-wall height.

e. *Pumps (Internal to Ring Levees):*

i. Pump type: Low-head, high-capacity, axial flow.

ii. Number of pumps: Based on an estimate of pumping rate required for a 10-year, 12-hour storm.

iii. Pump capacity: Assumed to be 250,000 gallons/minute per pump.

3. **Footprint (Acres):** Levee footprints are based on the length and width of each levee. The width is based on slide slopes and the design elevation of the levee minus the existing ground elevation.
4. **Existing Average Elevation:** Average surface elevation within project footprint (either ground surface in unprotected areas or existing crown height when project footprint overlays an existing project system).
5. **Design Elevation:** Target height of proposed protection features. The design elevation is a vertical reference used over time for the material placed in the hurricane risk reduction areas. Design elevations for earthen levees were obtained from the appropriate conceptual design report.

Structural Protection Project Cost and Duration Assumptions:

- **Construction Cost:** Includes construction costs for the levee plus any pump stations, T-walls and/or flood gates. It includes the following bid items: mobilization and demobilization, soil stabilization, hauling costs, fill and compaction, vegetative plantings and other restoration, construction access roads, and other typical components.
  - Cost data for recent Louisiana projects were gathered from a variety of public agencies including local parishes and the USACE. These data sets were then reviewed and evaluated and typical costs for the major components of the levee system were determined.
  - Calculations were based on a unit cost method of estimating (the sum of costs for various project components based on estimated unit costs times the estimated quantities of material) or gross project costs based on the quantity of the major project component. The costs are estimated in current dollars.

- Fill volume was calculated using the length, height, and side slopes of each levee. In order to account for compaction of material, the calculated fill volume includes 1-3 feet of initial subsidence. This allowance is to account for the initial compaction of earth beneath the levee, not long-term subsidence, for which an additional amount of fill volume was added. *Note: A regional borrow approach was assumed for this effort. Appropriate borrow material was assumed to be available within the general region of the proposed structural protection project. Specific locations for fill material were not identified as part of this effort.*

- **Planning/Engineering and Design Cost:** P/E&D costs are intended to capture data acquisition costs, surveys (including geotechnical investigations, property surveys, wetlands delineation and cultural resource evaluation), and other environmental evaluations.
- **Estimated Operation and Maintenance Cost:** Includes annual O&M costs to maintain the intended level of risk reduction. It includes items such as routine inspections and reporting, vegetative plantings, gravel, profile access road maintenance, surveys, and other typical maintenance items.
- **Duration of Project Phases:**
  - P/E&D: In addition to the planning and design of the structural protection project, this phase includes required tasks such as permitting and land acquisition and/or rights-of-way. The estimated duration is a function of the total length of the project.
  - Construction: Construction duration was estimated to be a function of the length of the levee up to a maximum of five years. For very long levee projects it is assumed that the size of the project will require multiple contractors working as a team to complete the project in five years. Floodgates and T-walls are included in the length of the project for estimating the duration.
- **Uncertainty Factors:**
  - Uncertainty factor for each cost estimate: The uncertainty factors are a percentage of the engineering, capital and O&M costs. The range of uncertainty factors for costs is shown in Table 7.
  - Uncertainty factor for project durations: The estimated duration of the capital phases of structural protection projects will be as presented in Table 8 unless there is knowledge for a specific project that suggests a different value. Uncertainty for construction duration is a function of project size and uses the percentage values shown in Table 8.

3.10 Nonstructural (NS)

Nonstructural projects are defined as combinations of residential and nonresidential floodproofing, elevation, and acquisition measures. Additional nonstructural programs including ordinances and land use zoning were also considered in the 2012 Coastal Master Plan but were not evaluated by the Planning Tool for inclusion in an alternative. It is further assumed that all nonstructural projects being evaluated in the master plan are of a voluntary nature.

Two variations of each nonstructural project were developed based on the target elevation (i.e., the elevation to which the structure will be floodproofed or raised). The project target elevations being used are: 1) the base flood elevation (BFE) as found on the Federal Emergency Management Agency's (FEMA) preliminary Digital Flood Insurance Rate Maps (DFIRM) plus one foot (BFE+1) and 2) the BFE plus four feet (BFE+4). Therefore, nonstructural projects are described as residential and non-residential floodproofing (0 ft < flood depth ≤ 3 ft), residential elevation to FEMA's BFE+1 (3 ft < flood depth ≤ 18 ft), and acquisition of residential structures that would need to be elevated greater than 18 feet to reach either the BFE+1 or BFE+4 within the project area.

For residential structures, the risk reduction measure to be implemented (i.e., floodproofing, elevation, or acquisition) will be determined by the flood depth, where flood depth is determined by the difference in the average ground elevation and the BFE. For example, in census blocks where the difference in the average ground elevation and the BFE is projected to be two feet, all homes will be floodproofed; alternately, in census blocks where the flood depth is projected to be eight feet, all homes will be elevated to BFE+1. In census blocks where structures must be elevated beyond 18 feet to achieve the target elevation, those structures will be acquired. As noted, a variation of this project using a target elevation of BFE+4 will also be evaluated.

3.10.1 Nonstructural (Floodproofing, Elevation, Acquisition) Project Assumptions and Attributes

1. **Location:** Because most nonstructural projects are implemented at the local level, project definitions contain a location attribute.
2. **Target Level of Risk Reduction:** The minimum goal for risk reduction coast wide is a 50-year level of risk reduction.
3. **Project Target Elevation:** The project target elevation for structures was determined using the BFE as defined by FEMA's preliminary DFIRMs plus a freeboard amount. To create a consistent coast wide dataset of BFEs, flood elevations were established for the centroid of each census block using the FEMA DFIRM data. In areas where DFIRMs were not available, current effective Flood Insurance Rate Maps were used to determine the BFE. It should also be noted that, in some cases, the Parish DFIRMS are still preliminary and may change prior to final adoption. Many coastal parishes have existing ordinances that require new construction and homes to be elevated to BFE+1 or Advisory Base Flood Elevation plus one foot (ABFE+1) at a minimum. Additionally, a four-foot freeboard is typically the maximum freeboard used in local ordinances. Consequently, project elevation heights are being defined as BFE+1 and BFE+4.
4. **Structural Classifications:** To calculate damage costs, structure classifications are needed. The following structure classifications are defined for nonstructural projects:
    a. Residential:
        i. Single family;
        ii. Small multi-family;
        iii. Large multi-family; and
        iv. Manufactured home.

  b. Nonresidential:
    i. Commercial;
    ii. Industrial; and
    iii. Institutional.

Each nonstructural project addresses all structure classifications; however, any structures not included in the classifications noted above are assumed to be excluded from nonstructural mitigation measures. Costs associated with floodproofing or elevating vary with structure class as does the anticipated participation rates. Each structure class is discussed in more detail below.

5. **Participation Rates:** Nonstructural measures are traditionally voluntary in nature. Anticipated participation rates are, therefore, a critical component of the evaluation process. The range of participation rates has varied widely among nonstructural programs that have been implemented throughout the nation. Some homes are not structurally sound enough to be elevated and historic property issues will prevent some homes from being elevated. Ownership issues will prevent other properties from being elevated, and it is further assumed that some portion of the population will not accept the assistance. Consideration must also be given to the perceived value of the affected property owner. All of these issues indicate that the maximum participation rate will likely be less than 100%. To properly evaluate the full range of potential participation rates, it is important to define both the upper and lower limits of participation as well as intermediate intervals. Consideration must also be given to the potential difference in participation rates for the various nonstructural measures and structure categories. Table 9 presents anticipated participation rates.

Table 9. Anticipated Nonstructural Participation Rates

Nonstructural Measure	Nonstructural Measure			
	Low	Medium	Med-High	High
Floodproofing				
Residential	40%	60%	80%	100%
Non-residential	30%	50%	70%	100%
Elevation				
Single family	30%	50%	70%	100%
Small multi-family	30%	50%	70%	100%
Manufactured home	30%	50%	70%	100%
Acquisition	10%	40%	70%	100%

Nonstructural Project Duration Assumptions:

- Duration periods for nonstructural projects depend greatly on the number of structures involved in the project. Table 10 provides a breakdown of estimated project durations for small and large nonstructural projects based on the nonstructural measure being implemented. Table 11 provides project durations based on an assumed proportion of measures as follows: elevation of 70% of the structures, floodproofing of 20% of the structures, and acquisition of 10% of the structures.

Table 10. Estimated Nonstructural Implementation Duration by Phase						
Phase	**Elevation Projects**		**Floodproofing Projects**		**Acquisition Projects**	
	10 Structures	**2,500 Structures**	**10 Structures**	**2,500 Structures**	**10 Structures**	**2,500 Structures**
Application Processing	1 month	4 months	1 month	3 months	2 months	6 months
Contracting	2 months	12 months	2 months	6 months	4 months	12 months
Construction	3 months	60 months	3 months	30 months	4 months	72 month
Reentry/Closeout	1 month	12 months	1 month	2 month	0 months	0 months
Total Time	7 months	88 months	7 months	41 months	10 months	90 months

Table 11. Estimated Nonstructural Implementation Duration by Project Size	
Number of Structures	**Project Duration**
0 – 10	6 months
11 – 300	24 months
301 – 1,000	48 months
1,001 – 2,500	60 months
> 2,500	84 months

- Because the number of structures involved in any given nonstructural project could not be determined until after the Damage Assessment Tool was run, project durations were assigned by the tool based on the criteria shown in Table 10. It was assumed that the project benefits would accrue linearly over the construction duration.

Nonstructural Project Cost Assumptions:

Nonstructural project costs are categorized by structure class (i.e., structure type). Project costs are also determined by the nonstructural measure that is being applied (i.e., floodproofing, elevation, or acquisition). The following sections are divided by nonstructural measure.

It is assumed that all structures built post-2006 have been constructed to BFE+1. Furthermore, all new construction (TY0) will also be built in compliance with existing local flood damage prevention ordinances which require elevating or floodproofing to BFE+1.

- **Floodproofing:** Floodproofing encompasses two broad categories: dry floodproofing (measures that prevent water from entering a structure [e.g., sealants, shields]) and wet floodproofing (measures that minimize floodwater damages to structures [e.g., raising utilities and equipment, use of waterproof paint and materials]). Each category in turn embodies a wide variety of techniques. For the purposes of the Planning Tool, it is assumed that only dry floodproofing techniques will be employed.

- *Residential Costs*: To determine floodproofing costs for residential structures, data from the 2007 LACPR report and the 1999 Vermillion Parish cost report were utilized. Average inflation rates (see Table 12) were applied to the costs to bring them to 2011 values. *Note: Rates of inflation are calculated using the Current Consumer Price Index published monthly by the Bureau of Labor Statistics (BLS).*

Table 12. Inflation Rates by Month and Year (1999-2011)

Year	Average (%)
2010	1.6
2009	-0.4
2008	3.8
2007	2.8
2006	3.2
2005	3.4
2004	2.7
2003	2.3
2002	1.6
2001	2.8
2000	3.4
1999	2.2

  - 2007 LACPR cost: $72,000 for a 4,000-square foot, brick structure with three doors, floodproofed to a height of three feet equals $18.00 per square foot. Applying average inflation rates from 2008 – 2010 as noted Table 8 results in a cost of $18.91 per square foot of structure.
  - 1999 Vermillion Parish cost: $12 per square foot. Applying average inflation rates from 2000-2010, as noted in the table below results in a cost of $15.69 per square foot of structure.
  - The average of the two costs equals $17.30 per square foot. This assumes a medium-size single family structure.
  - *Small Multi-family Costs*: This classification is generally considered to be duplex apartments where the two attached apartments combined equal roughly the same square footage as a large single family dwelling. There may be additional doors and utilities to be addressed; consequently, the price per square footage for floodproofing is increased by 10% from the residential cost.
  - *Large Multi-family Costs:* Large multi-family structures (apartment buildings) often share common walls, but may have more openings and utilities to be addressed than single family structures and small multi-family structures. To account for the

additional materials and effort associated with floodproofing a large multi-family structure, an additional 10% has been added to the small multi-family costs.

- *Manufactured Home Costs:* The minimum distance between the finished grade under a manufactured home and the bottom of the supporting I-beam is 12 inches. Assuming the I-beam is approximately 12 inches deep, the first floor of manufactured homes would be elevated a minimum of two feet above ground. Given the difficulty in floodproofing manufactured homes and the fact that the home is already a minimum of two feet above grade, all manufactured homes would be elevated rather than floodproofed.
- Table 13 provides the cost for floodproofing of the various residential classes of structures plus a 10% P/E&D cost.

Table 13. Residential Floodproofing Costs by Structure Classification

Structure Classification	Floodproofing Cost/SF	Floodproofing Cost/SF + P/E&D
Single family	$17	$19
Small multi-family	$19	$21
Large multi-family	$21	$23
Manufactured home	N/A	N/A

- *Nonresidential Structures:* Nonresidential structures (e.g., commercial, industrial, and institutional) have a wide variety of floodproofing measures available. Facilities can be dry floodproofed in a manner similar to residential structures. Facilities can also be wet floodproofed. For example, flood waters can be allowed to enter the structure; however, interior walls are made of flood resistant materials and all electrical and mechanical equipment is elevated above the anticipated flood level. Small ring levees around the facility are also an option.
- The variety of facilities in each classification presents an additional complication. Floodproofing a major medical facility, a school, and local government office (all of which are classified as institutional) may each involve substantial differences. The costs in Table 14 provide a basis to determine an average cost to be used for each classification recognizing that there will be a wide range of costs within each classification.

Table 14. Nonresidential Floodproofing Costs by Structure Classification

Structure Classification	Floodproofing Cost Per Square Foot
Commercial	$21
Institutional	$25
Industrial	$26

- *Commercial Floodproofing Costs:* Commercial facilities can range from small fast-food restaurants to large shopping malls. The floodproofing issues and techniques can vary widely. Assuming that techniques similar to those used with small multi-family facilities will be applied with some variation allows the use of that cost structure plus an allowance for additional items. The cost for commercial floodproofing is $19.03 per square foot plus 10%, or approximately $21 per square foot.
- *Institutional Floodproofing Costs*: Institutional facilities can be single or multi-building facilities. While individual structure floodproofing may still be appropriate, these sites may also lend themselves to small ring levees. For the purposes of the master plan, it is assumed that the increase in costs from commercial to institutional is 20%.
- *Industrial Floodproofing Costs:* The standard industrial facility is assumed to be a "large box" facility with extensive electrical and mechanical equipment. Such facilities may include multiple buildings such as a manufacturing facility or warehouse facility with an associated office building. As with institutional facilities, a wide range of floodproofing options is available; however, the cost of such techniques may increase the cost per square foot. For the purposes of the master plan, it is assumed that the increase in costs from commercial to industrial is 25%.
- *Maintenance Costs*: Maintenance costs associated with most floodproofing projects include backflow prevention tests, sealant checks, replacement of seals and gaskets. These costs, however, are generally borne by the structure owner and are not a continuing expense of the State.
- *P/E&D Cost*: A P/E&D cost of 10% is accounted for in the cost for floodproofing of residential structures table above.
- *Uncertainty Range*: More cost data are available and the techniques are more standard for residential floodproofing projects than for nonresidential projects; therefore the range of uncertainty is greater for nonresidential projects. The uncertainty range for floodproofing is presented in Table 7. The project cost range will be equal to the nominal cost plus and minus the cost uncertainty.

- **Elevation:** Elevation projects range from lifts of 3 to 18 feet. Elevation project costs depend on a wide variety of factors including: elevation height, foundation type (e.g., slab vs. foundation walls), construction type (e.g., frame vs. brick veneer), the number of stories, the age and condition of the structure, utilities, and the need for elevators. Cost data also vary widely depending on the source of information.
  - FEMA (2009) publications provide costs from roughly $29 per square foot to $69 per square foot. The LACPR Study used costs from $85 per square foot to $95 per square foot. Other reports, including one from Vermillion Parish (1999) provide costs of approximately $50 per square foot (adjusted to current prices). To provide a consistent basis for

determining costs and one that covers the most common scenarios, the following assumptions were made about house type and elevation costs:

- Foundation wall construction;
- Brick construction;
- Single story; and
- Average of 2,500 square feet.

The LACPR Study is adjusted for Louisiana costs and conditions. The report also provides costs for ranges of elevation. The costs used were: 0-6 feet, $85 per square foot; and 7-15 feet, $95 per square foot of enclosed space (one story only). When adjusted to 2011 costs the elevation project costs become $92 and $103 per square foot, respectively.

- To account for the additional cost of elevating beyond 14 feet, $1 per foot of elevation is added to the cost. Additional engineering costs are captured in the engineering cost section of this report.
- Terrebonne Parish is currently implementing elevation projects and has provided "Reasonable Cost Guidance" based on data from the 2009 State of Louisiana Office of Community Development. This guidance is based on historical data and interviews with contractors. The Parish is currently experiencing costs that fall within the ranges discussed in the guidance document. The Parish has, however, received some feedback from contractors that the guidance document provides an unrealistically low expectation for costs.
- Table 15 is based on a combination of data from the Terrebonne guidance document and the LACPR report. Note: Elevation applies to single family structures, small multi-family, and manufactured homes, only. Large multi-family structures will be floodproofed.

Table 15. Elevation Costs Per Square Foot of Structure

Elevation Height	Elevation Cost Per Square Foot		
	LACPR Adjusted to 2011	Terrebonne 2011	Combined for Master Plan
3-7 feet	$92	$75	$85
7-14 feet	$103	$85	$95
14-18 feet	$107	$90	$100

- *Maintenance Costs*: No additional maintenance costs are associated with elevation projects.
- *P/E&D Costs*: Included in the engineering and design costs are site design considerations, local permitting, and inspection fees. Additional engineering costs are accounted for in elevation projects exceeding 14 feet. The P/E&D costs in Table 16 are accounted for in Table 14 above.

Table 16. P/E&D Costs for Elevation Projects	
Elevation Height	**Engineering and Design Costs**
3-14 feet	10% of construction costs
14-18 feet	15% of construction costs

- *Uncertainty Range*: More cost data are available and the techniques are more standard for elevation projects up to 14 feet. Limited data are available for projects elevating beyond 14 feet; therefore the range of uncertainty is greater for elevation projects beyond 14 feet. The uncertainty range for elevation is presented in Table 7. The project cost range will be equal to the nominal cost plus and minus the cost uncertainty.

- **Acquisition:** Typical acquisition costs range from 1.6-1.8 times the fair market value of the structure. The Damage Assessment Tool contains non-depreciated values (NDV) for each structure classification from the FEMA HAZUS Database. Table 17 presents the multiplication factors for each of the structure classifications. No provision was made in the nonstructural project definitions to acquire nonresidential structures.

Table 17. Acquisition Costs by Structure Classification		
Structure Classification	**Acquisition Multiplier**	**Total Cost**
Single Family Residential	1.6	(NDV x 1.6) + $17,500
Small Multi-family Residential	1.7	(NDV x 1.7) + $17,500
Large Multi-family Residential	1.8	(NDV x 1.8) + $17,500
Manufactured Home	1.6	(NDV x 1.6) + $17,500
Vacant Lots	N/A	$72,500

- Vacant lots may be present in areas targeted for an acquisition project. To prevent future development on these currently vacant lots it is assumed that a permanent, restricted use easement will be purchased. This is consistent with the approach used by the USACE in the LACPR Study. The cost of purchasing the easement includes the lot value, acquisition costs, and maintenance costs. Table 13 includes the cost for acquisition of permanent, restricted use easements on vacant lots.
- *P/E&D Costs*: Typical real estate fees range from 6-8%. However, additional legal fees and processing costs may be associated with acquiring property for demolition and removal. Consequently, the total P/E&D costs are estimated to be 12% of the value of the structure.
- *Uncertainty Range*: The uncertainty range for acquisition is presented in Table 7. The project cost range will be equal to the nominal cost plus and minus the cost uncertainty.

4.0 Reference Documents

USACE, Louisiana Coastal Area Barataria Basin Barrier Shoreline Restoration, Draft Construction Report and Supplemental Environmental Impact Statement, Engineering Appendix A, 2009.

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5.0 Figures

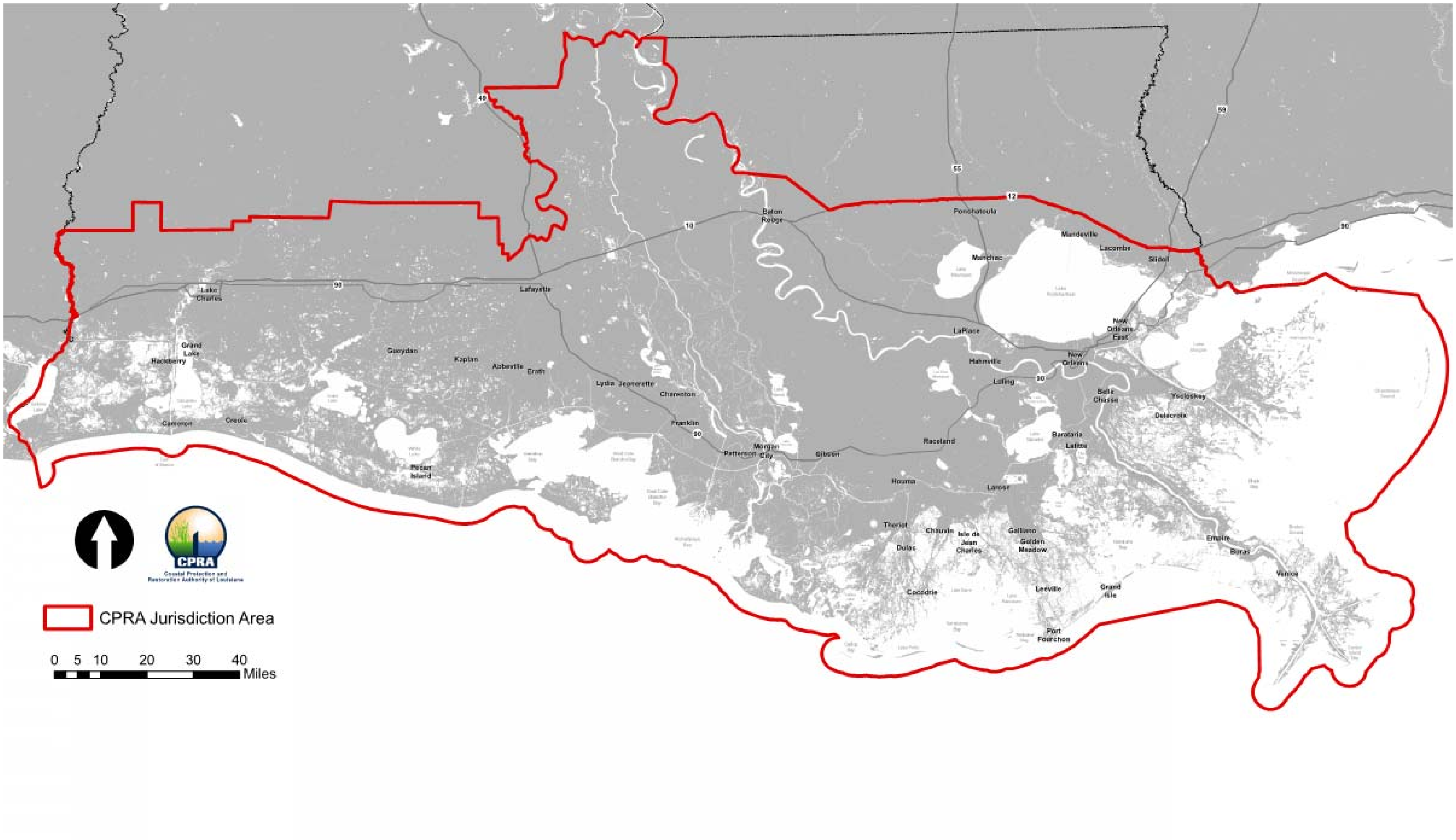

Figure 1. CPRA Jurisdiction Area

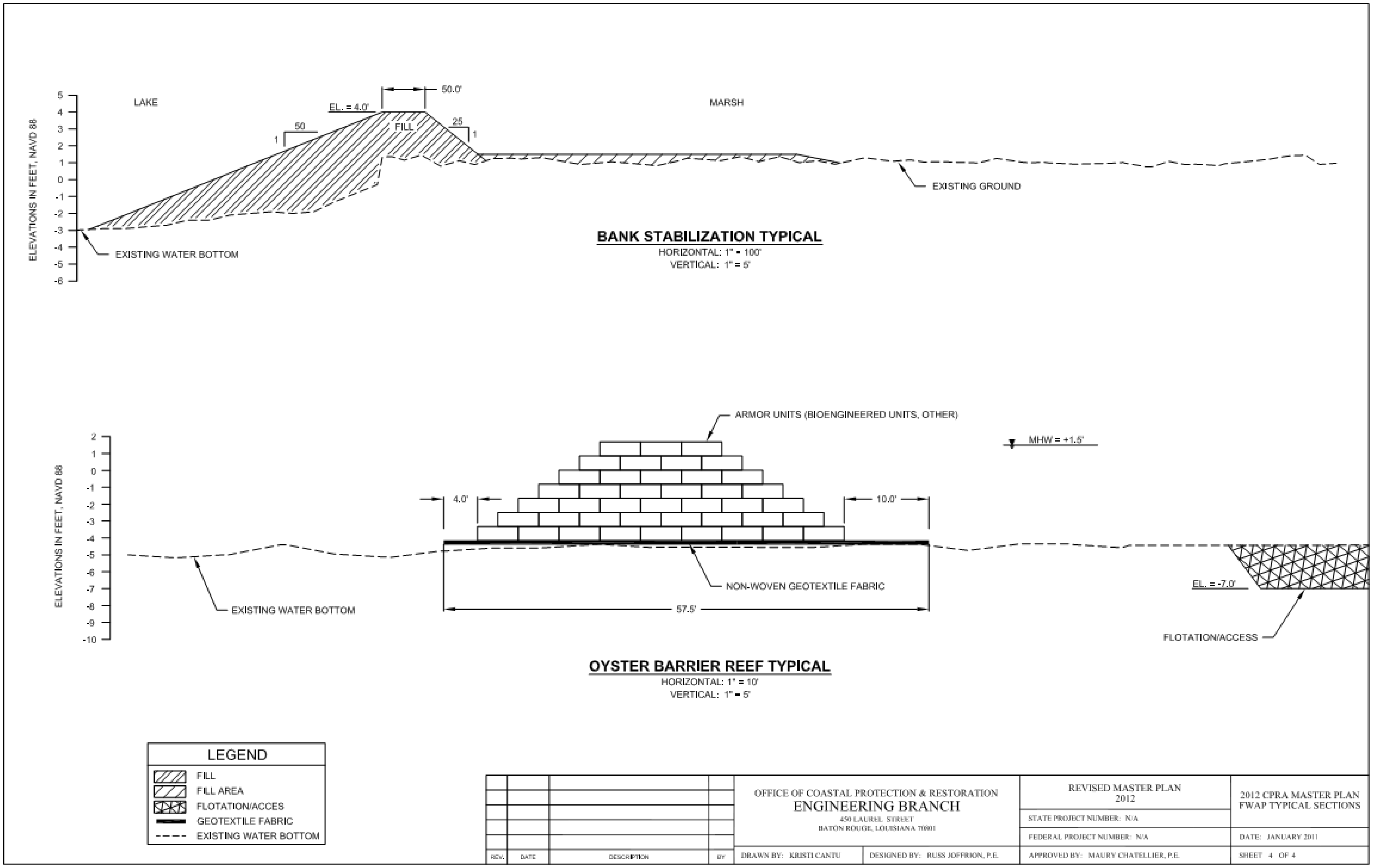

Figure 2. Bank Stabilization and Oyster Reef Conceptual Design Templates

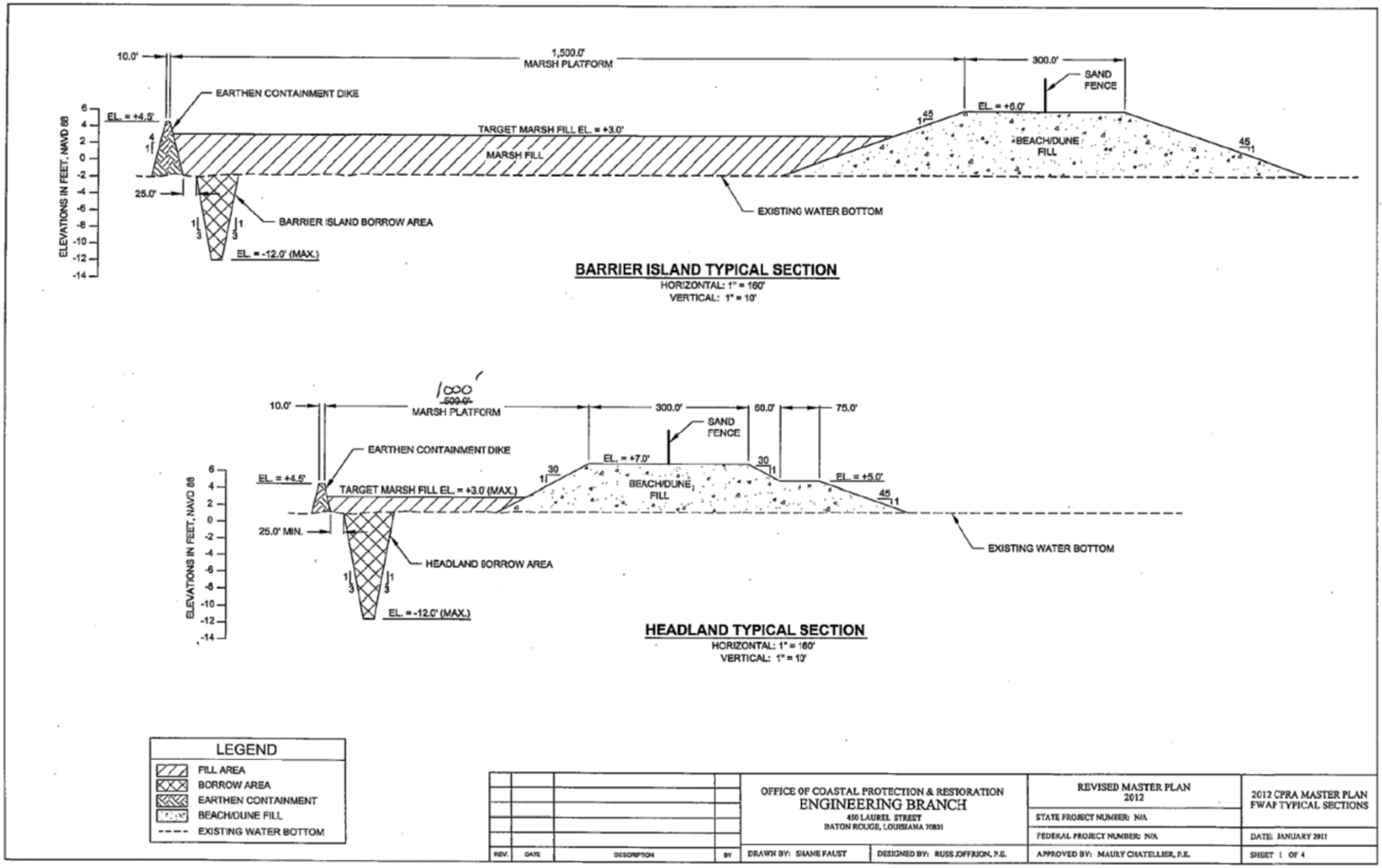

Figure 3. Barrier Island/Headland Conceptual Design Template

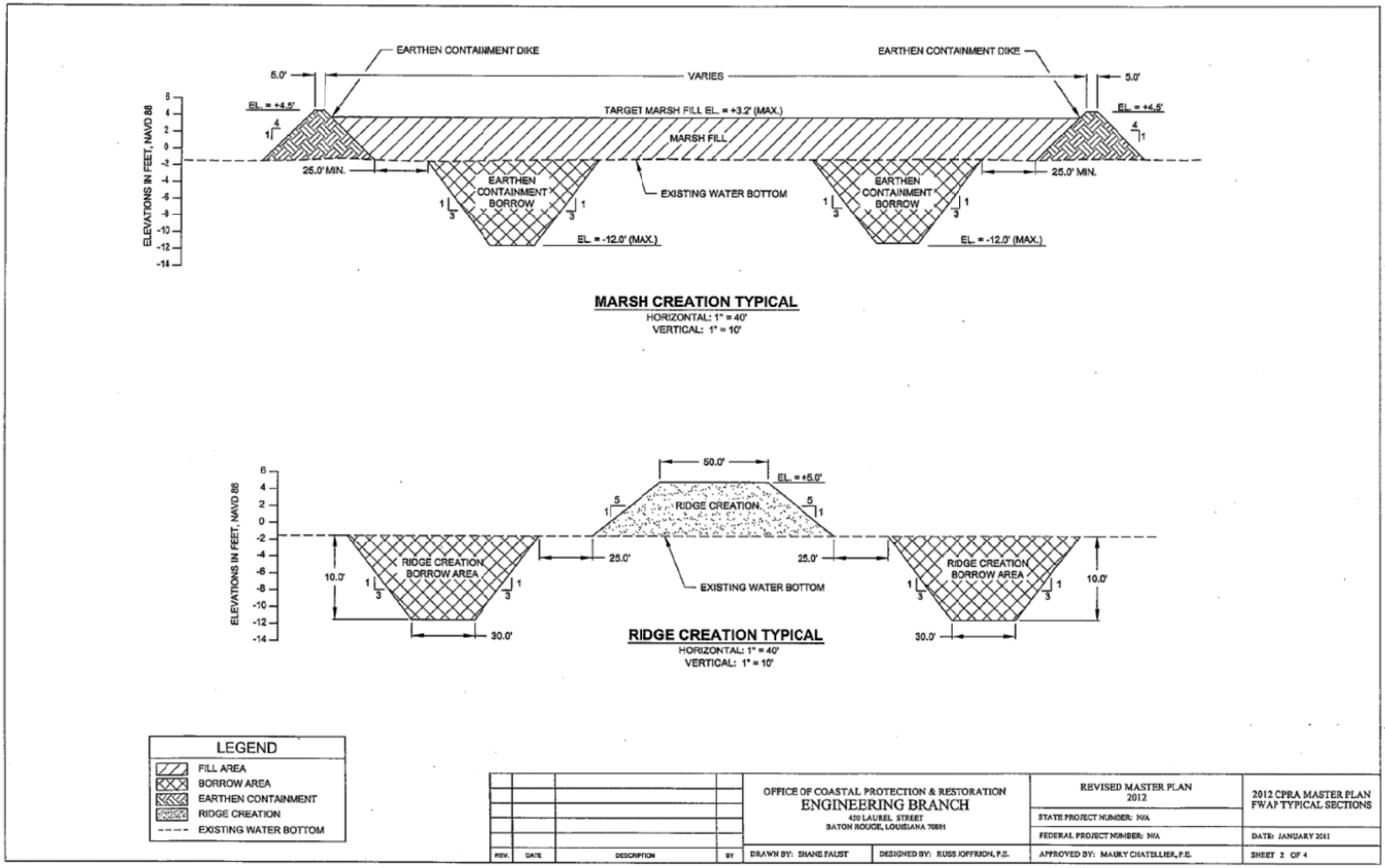

Figure 4. Marsh Creation and Ridge Creation/Restoration Conceptual Design Templates

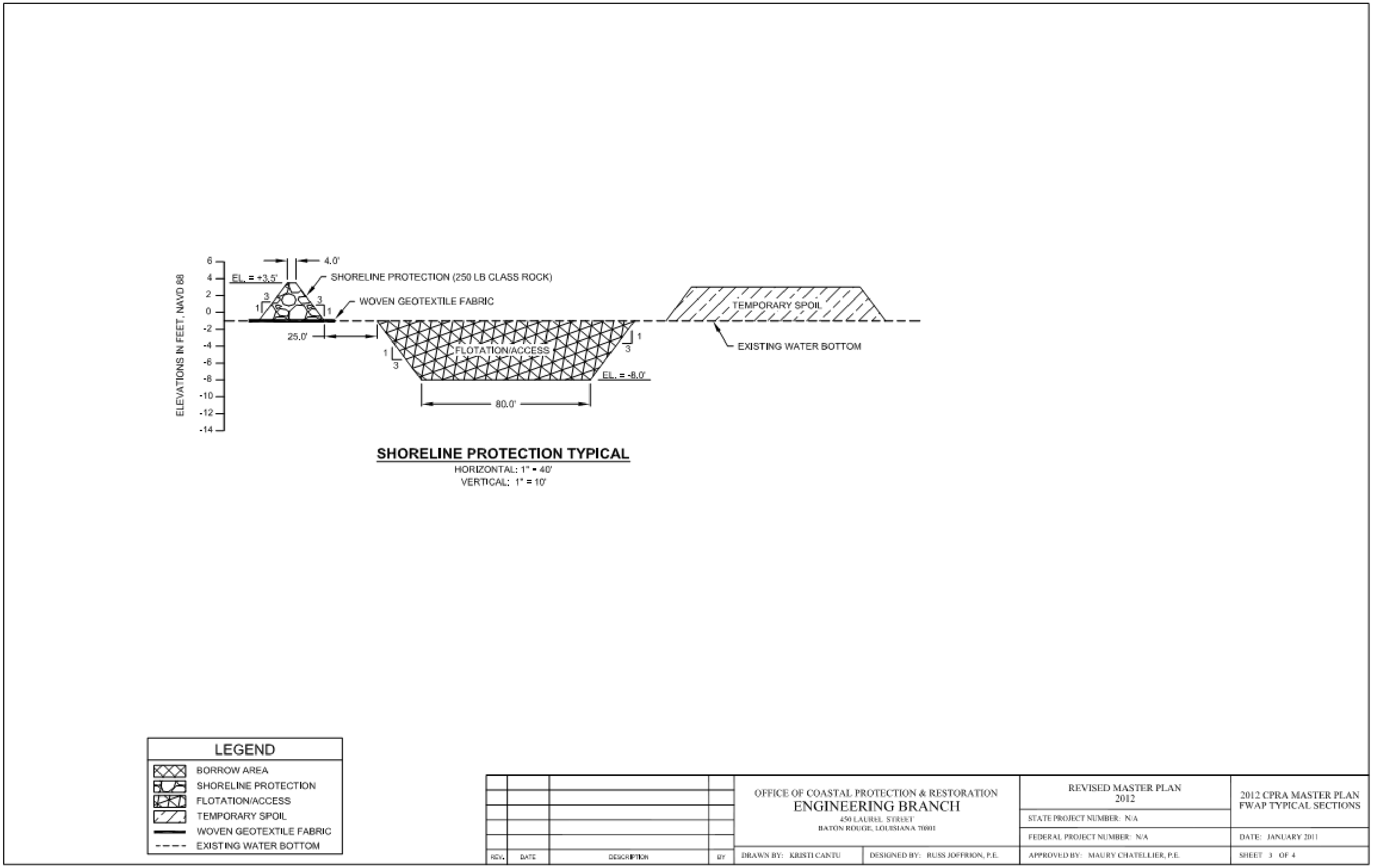

Figure 5. Shoreline Protection Conceptual Design Template