
APPENDIX Q. Coastal Restoration Projects

1. Coastal Zone:

Impacts To The United States And Louisiana

Coastal wetland loss in Louisiana negatively affects the economies of both the United States and Louisiana. Thus, what happens to Louisiana's coastal wetlands should be of concern to all Americans.

Energy is the lifeblood of the American economy, and Louisiana's coastal wetlands are the main artery. America's economic growth, and, therefore, the economic well-being of America's consumers, depends on access to a stable, secure, and dependable source of energy. Louisiana's coastal wetlands and its network of energy facilities, in the aggregate, accommodate the movement of over 26% of the nation's natural gas supply, as well as, over 26% of the nation's crude oil supply. Together with the facilities in the rest of the state, nearly 34% of the nation's natural gas supply, and over 29% of the nation's crude oil supply, moves through the state of Louisiana and is connected to nearly 50% of U. S. refining capacity. Not considering other value, this volume of crude oil and natural gas flowing through Louisiana's Energy Corridor represents, approximately, \$150 billion in annual energy value, equivalent to about \$50,000 per acre of wetlands (about \$30,000,000 per square mile). In 2001, the U.S. federal government collected over \$5 billion in oil and gas revenues from offshore Louisiana. **(Source: *Louisiana Energy Facts, Annual 2003 and 2004 Reports, LA Department of Natural Resources, Technology Assessment Division*)** Louisiana's coastal wetlands and barrier islands protect this oil and gas infrastructure which includes approximately 14,000 miles of onshore pipelines.

Louisiana's flat, marshy coastline makes tropical storms and hurricane surges especially dangerous. Wetlands work in tandem with flood control levees to provide a natural buffer during storms. Scientists estimate that every 2.7 miles of wetlands reduce storm surge by one foot. A Category 3 hurricane that creates a wall of water 10 feet high today could produce walls of water 18 to 20 feet high in the future if wetlands and barrier islands continue to disappear. Continued wetland loss will result in more devastation from hurricanes possibly threatening the energy supply of the nation and causing extensive loss of life and property for the citizens of Louisiana.

Most of Louisiana's navigation system is located in coastal areas. The Mississippi River carries more commerce than any other waterway in the nation. Five of the 15 busiest ports in the U.S., ranked by total tons, are located in south Louisiana and handle approximately 484 million tons, valued at over \$75 billion. South Louisiana ports carry 21% of the waterborne commerce in the U.S. and ship approximately 57% of all U.S. grain exports. Continued coastal wetland loss negatively affects the economies of the U.S. and Louisiana by increasing costs associated with delays in shipping and with maintaining the nearly 3,000 miles of deep- and shallow-draft channels built with billions of dollars of public investment.

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Louisiana's coastal wetlands can also play an important role in combating the "dead zone" in the Gulf of Mexico. Scientists estimate that approximately one million metric tons of nitrogen from the Mississippi River flow into the Gulf of Mexico every year, most of which is from human sources throughout the entire Mississippi River basin. This is strongly linked to the growing "dead zone" in the Gulf of Mexico. Reintroducing nutrient rich river water into Louisiana's coastal wetlands to restore them could have a significant beneficial impact on Gulf hypoxia. A team of prominent national scientists recently concluded that large-scale restoration of wetlands along coastal Louisiana, combined with improved nutrient management practices in the nation's heartland, could reduce nitrogen inputs into the Gulf by as much as 40 percent. Reduction in nitrogen loads of this magnitude from the Mississippi River would significantly reduce the "dead zones" in the Gulf.

The Louisiana coastal wetland system represents critical breeding, spawning, foraging, and/or nursery grounds for a variety of fish and shellfish species. No other state or area in the country supports the number and kind of species Louisiana produces. Louisiana is the nation's largest shrimp (~36%), oyster (~50%), and blue crab (~26%) producer. Dockside revenues for commercial fisheries in coastal Louisiana were \$342 million in 2001, the latest year for which statistics are available. The fish and shellfish harvested from Louisiana waters are shipped to local, state, national, and international markets. Coastal Louisiana's wetlands contain a diversity of habitats and populations of fish and wildlife resources enjoyed by humans. In 2001, 1.6 million people engaged in fishing, hunting and wildlife watching activities, expending a total of \$1.6 billion in Louisiana. Total recreational retail sales for hunting, fishing, boating, and wildlife watching in 2001 was estimated at \$3.1 billion, with a total economic benefit of \$6.2 billion. Dramatic declines in the commercial fishing species have been predicted due to coastal wetland loss. Additionally, there are 25 threatened or endangered species in the Louisiana coastal zone, including offshore Gulf waters, that are dependent on coastal wetlands for their continued existence.

A study of Louisiana's coastal infrastructure in 2004 indicated a total asset value of \$95.9 billion. As coastal wetland loss continues, communities will need to retreat inland abandoning their infrastructure or relocating it. Both of these alternatives would cost enormous amounts of money.

Another issue related to wetland deterioration is the increasing threat to public water supplies in coastal Louisiana due to saltwater intrusion. Salty Gulf water now reaches farther north than ever before, affecting water for drinking supplies, agriculture and other commercial uses. In 1999, saltwater intrusion in the GIWW forced Terrebonne Parish to switch its raw water source for drinking water. Wetlands losses are so severe that some towns in the Barataria-Terrebonne estuary will need alternative sources for drinking water by the year 2013.

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2. Louisiana Coastal Restoration Efforts:

Early State and Federal Coastal Restoration Efforts

Louisiana has been responding to wetlands loss issues since the early 1930s. Early efforts include projects on various lands owned or managed by the State (such as state wildlife refuges), investments by private landowners to protect their properties from erosion, and the development of state and federal regulatory programs to reduce impacts associated with development activities. Coastal planning efforts escalated in the 1970s with the passage of the Federal Coastal Zone Management Act of 1972. Louisiana adopted and began participating in the federal program in 1978. The State significantly increased its commitment to coastal restoration in 1989 with the passage of Act 6. This law created both the State Wetland Authority (a cabinet level committee to advise the Governor regarding coastal issues) within the Office of the Governor, and the Office of Coastal Restoration and Management within the Department of Natural Resources. Act 6 also created a statutorily dedicated Wetlands Conservation and Restoration Trust Fund which dedicates a portion of the state's revenues from severance taxes on mineral production (e.g., oil and gas) to finance coastal restoration efforts. Currently, the fund provides approximately \$25 million per year. The general public of Louisiana strongly believes in the State's investment in coastal restoration. In 2003, Louisiana voters approved a constitutional amendment establishing the Louisiana Coastal Restoration Fund wherein up to 20% of securitized revenues from the Master Tobacco Settlement Agreement may be used to match federal funds for coastal restoration.

Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)

In November 1990, as a federal response to the State's commitment to undertaking an aggressive coastal restoration program, the Coastal Wetlands Planning, Protection and Restoration Act (Title III of Public Law 101-646) was passed by Congress. The Act mandated the Secretary of the Army to convene a Task Force of five federal agencies and the State of Louisiana to initiate a process to identify and prepare a list of coastal wetlands restoration projects in Louisiana to provide for the long-term conservation of such wetlands and dependent fish and wildlife. The Task Force accomplishes this mandate by approving restoration projects on annual Priority Project Lists (PPLs).

The original CWPPRA authorization extended through FY 1999. Subsequent legislation has extended authorization through FY 2019. Dedicated funding for CWPPRA is provided by the Budget Reconciliation Act of 1990 (Public Law 101-508, Section 11211) and comes from an excise tax on fishing equipment and fuel taxes on motorboats and small engines. Thus, CWPPRA does not compete for annual funding dollars as do typical civil works projects.

Under the current authorization and funding, about \$50 - \$60 million in federal funds are received per year for the CWPPRA program. Thus, over the life of the currently authorized program approximately \$2 billion will be available, including non-federal matching funds or

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in-kind services. The State of Louisiana, serving as the local sponsor to all CWPPRA projects through its Department of Natural Resources, is the primary party responsible for ensuring the long-term operation, maintenance, and monitoring for constructed projects. In general, the federal funds are matched at a cost sharing ratio of 15% non-federal in the CWPPRA program, including the long-term operation, maintenance, and monitoring efforts.

Despite the successes of the CWPPRA program, it became evident in the late 1990s that Louisiana's coastal restoration needs were far greater than could be addressed by CWPPRA. At that time it was estimated that CWPPRA would prevent less than 15% of the predicted wetland loss in coastal Louisiana.

CWPPRA Program Structure

Section 303(a)(1) of the CWPPRA directs the Secretary of the Army to convene the Louisiana Coastal Wetlands Conservation and Restoration Task Force, to consist of one member each from five federal agencies and the local cost share sponsor, which is the State of Louisiana. The federal agencies of CWPPRA include: (1) the U.S. Department of the Interior represented by the U.S. Fish & Wildlife Service (USFWS), (2) the U.S. Department of Agriculture represented by the Natural Resources Conservation Service (NRCS), (3) the U.S. Department of Commerce represented by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, (4) the U.S. Department of the Army represented by the U.S. Army Corps of Engineers, and (5) the U.S. Environmental Protection Agency. The Louisiana Governor's Office represents the State of Louisiana on the Task Force.

The Task Force established several interagency committees and working groups (i.e., Technical Committee, Planning and Evaluation Subcommittee, Environmental and Engineering Work Groups, etc.) to do the actual project planning and engineering. While the agencies sitting on the Task Force possess considerable expertise regarding Louisiana's coastal wetlands problems, the Task Force recognized the need to incorporate another invaluable resource: the state's academic community. The Task Force therefore retained the services of well-qualified scientists through the Louisiana Universities Marine Consortium (LUMCON) to provide scientific advisors to aid various work groups and to help guide program direction.

Current CWPPRA Projects (Priority Project Lists 1-14)

Currently, 116 projects (not including demonstration projects and three near-term LCA proposed projects: Mississippi River Reintroduction into Bayou Lafourche; River Reintroduction into Maurepas Swamp; and Delta Building Diversion at Myrtle Grove) have been selected on fourteen annual Priority Project Lists (PPLs). After selection on a PPL, projects proceed to design. If warranted, and if construction funds are available, projects are subsequently approved for construction.

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Seventy-five projects have been constructed , are under construction or have been approved for construction across Louisiana's disappearing coastal wetlands; these projects will benefit (re-establish or protect) a total of 66,651 net acres at a cost of \$649.7 million. Another 40 projects are being designed; they will benefit an additional 34,094 net acres at a cost of \$890 million.

Along the Mississippi River, the CWPPRA projects focus on reintroduction of freshwater, nutrients and sediments to adjacent marshes and swamps. For example, south of Venice, Louisiana, the West Bay Sediment Diversion project will re-establish over 9,800 acres of marsh. This new marsh will help protect Venice and lower Plaquemines Parish from storm surges. Several river reintroduction projects in Breton Sound Basin will also help protect Plaquemines parish levees. In the Pontchartrain Basin, three projects have re-established and protected significant fish and wildlife habitat on the Bayou Sauvage National Urban Wildlife Refuge. These projects will improve the recreational opportunities for New Orleans metropolitan area residents.

The lower Barataria Basin is losing wetlands rapidly. Protection of the Barataria Basin Landbridge via a single project from a program with an annual budget of about \$40 to \$50 million would have been improbable. However, twelve projects, costing over \$253 million, have been selected over several PPLs to strengthen the landbridge that spans the basin from east to west. These projects will slow future marsh loss by re-establishing or protecting over 5,400 acres and thus help preserve infrastructure such as the GIWW, the Larose to Golden Meadow Hurricane Protection levee and Plaquemines Parish levees.

Terrebonne Basin's front line of defense against storms and hurricanes is its barrier islands and barrier shoreline. These islands absorb the most destructive element of tropical storms and hurricanes by reducing the height of storm surge, thereby helping to protect residents, infrastructure and wetlands of Terrebonne Basin. The islands are especially valuable in protecting oil and gas infrastructure in the bays behind the islands. In addition, these barrier islands provide valuable and rare wildlife habitat. To date, CWPPRA has selected 11 projects (along with two demonstration projects) on these islands costing over \$156 million. Over 20 miles and nearly 4,800 acres of barrier islands/shoreline will be reestablished or protected. Like the Barataria Basin Landbridge projects, these projects act in synergy to address regional or landscape level needs.

In the emerging Atchafalaya Delta, three projects increase the land-building capability of the Atchafalaya River. In the Chenier Plain, 33 projects have been selected on PPLs 1 -14. In this area of lower land loss with no major sediment source, CWPPRA projects focus on shoreline protection, marsh creation, and hydrologic restoration and will re-establish or protect a total of over 27,880 acres. Wetlands re-established or protected by these projects will help protect infrastructure such as towns, roads and the GIWW.

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The 100,745 acres of wetlands benefited by CWPPRA projects on PPLs 1-14 will help protect Louisiana's citizens and infrastructure, including its energy corridor, from damaging storm surges as well as insure that Louisiana's nationally significant commercial fisheries will continue to provide fish and shellfish to the nation and the world.

Future CWPPRA Projects(Priority Project List 15 and beyond)

Assuming that all projects on PPLs 1 through 14 will be built as money becomes available in future years, projects from PPLs 1 through 14 will cost \$51,700 for each acre reestablished or protected. Based on current estimates, through 2019, approximately \$350 million will be available to fund projects to be approved on PPLs 15 and beyond. Therefore, using the average cost cited above, the remaining CWPPRA authorization could result in an additional 6,770 acres re-established or protected.

Coast 2050, the Louisiana Coastal Area (LCA) Study and Other Restoration Efforts

In response to this identified additional restoration need, the CWPPRA Task Force and the State Wetland Authority initiated development of the Coast 2050 Plan. The Plan, completed in December 1998, used a regional approach to strategic planning, involved the public through 65 workshops and provided an important long-term vision for coastal Louisiana. The Coast 2050 Regional and Coastwide Ecosystem Strategies have been used in CWPPRA project development and review since approval of the Coast 2050 Plan in 1998. The Coast 2050 Plan became the basis for the U.S. Army Corps of Engineers' May 1999 report, "*Analysis of the Louisiana Coastal Area, Louisiana—Ecosystem Restoration.*" This reconnaissance level effort expressed a federal interest in proceeding to the feasibility phase. In 2000, it was envisioned that a series of feasibility reports would be prepared by the Corps of Engineers and the State over a 10-year period.

In 2002, the Corps of Engineers and the State of Louisiana, with federal CWPPRA agency involvement, initiated the *Louisiana Coastal Area (LCA) Comprehensive Coastwide Ecosystem Restoration Study*. In FY 2004, recognition of scientific and engineering uncertainties pertaining to some of the restoration features under consideration led to the determination by the administration that the study should begin with the development and implementation of a near-term restoration plan that identifies highly cost effective restoration features that address the most critical needs of coastal Louisiana, as well as large-scale and long-term restoration concepts and a Science and Technology Program.

The LCA started as a comprehensive coastwide restoration plan with a cost of about \$14 billion. At the request of the administration, it is now a \$1.9 billion plan that focuses on near-term critical projects, a Science and Technology Board, demonstration projects and several long-term studies. Projects which operate under the WRDA (Water Resources Development Act) process such as LCA, could take significantly longer to begin construction than CWPPRA or

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State projects. WRDA projects typically have a year of reconnaissance studies, three to five years of feasibility studies and three to four years of project design. The start of construction for WRDA projects is typically seven to ten years after authorization. LCA, while attempting to shorten this timeline, must operate within the constraints of the WRDA process.

Other state and federal programs are providing assistance by protecting and restoring wetlands in south Louisiana. Some examples include NRCS's Small Watershed Program, NOAA's Community Based Restoration program, and the Corps' Continuing Authorities Program; these programs complement ongoing restoration activities by providing mechanisms to "fill in the blanks" in the restoration landscape.

Need For Continued Action

Life is changing every day in south Louisiana because of coastal land loss. Across the State's coastal zone, communities and a unique culture are threatened, jobs are being lost, and habitats are diminishing. Although the most immediate effects of land loss are felt in south Louisiana, the problem impacts the rest of the nation as well. Louisiana's coastal wetlands support the second largest fishery in the United States, are utilized by over five million migratory waterfowl, and provide critical stopover habitat to millions of neotropical migratory birds on their journey across the Gulf of Mexico. As this habitat disappears, all of these valuable functions will decline. Nearly 2 million people live in the coastal zone of Louisiana. The region's ports, inland navigation routes, and oil and gas infrastructure influence the flow of energy and other essential resources throughout the United States. Without the coastal Louisiana ecosystem, many of these residents and assets would be at increased risk from storms and flooding.

Restoration efforts such as CWPPRA will continue to operate in tandem with other existing and proposed restoration programs. If the LCA plan is authorized and funds for implementation are appropriated, it would fund large restoration projects that are generally beyond the current scope of current restoration efforts. While the large and complex projects planned to be implemented under LCA are vital to the long term sustainability of the coastal landscape, there is still a vital unmet need to address smaller hot-spots of land loss and habitat degradation which require more timely responses than are possible through traditional federal water resources planning. Without this ability to stabilize rapidly degrading areas through current restoration programs, long-term and large-scale restoration will become incrementally more difficult and costly to implement.

Deterioration of Louisiana's coastal wetlands is a complex problem requiring complex solutions. Effectively offsetting on-going wetland loss will require "all hands on deck." Continued implementation of state only projects, WRDA projects such as large-scale diversions, CWPPRA, and complete LCA implementation will be required to address the loss of Louisiana's coastal wetlands.

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LCA Monitoring:

The LCA Science and Technology Program, because of its mission to reduce uncertainties associated with the restoration of coastal Louisiana's ecosystems, will perform extensive modeling of the Louisiana Coastal Area, including; hydraulic, hydrologic, water quality, land building, habitat switching, and other aspects of the coast related to ecosystem restoration. This modeling requires extensive data sets to support the assessment of restoration efforts and ecosystem forecasting of system response. As such, Coastal Louisiana Ecosystem Assessment and Restoration (CLEAR), on behalf of LCA, has developed a system-wide assessment and monitoring plan to incorporate all on-going monitoring in the waters of coastal Louisiana. The result is the identification of relevant monitoring stations throughout the coastal area, as listed in the table below.

The following table lists examples of data acquisition and ecosystem forecasting systems with current applications in the northern Gulf of Mexico.

	Program Title	Program Acronym	Web Site
1	nowCOAST web mapping portal	NOAA	http://nowcoast.noaa.gov/
2	U.S. Coastal Observing Systems Western Gulf of Mexico	NOAA	http://www.csc.noaa.gov/coos/texas_gulf.html
3	USGS Water Resources	Hydrowatch	http://la.water.usgs.gov/hydrowatch.htm
4	USGS Water Resources	NWIS	http://waterdata.usgs.gov/nwis
5	National Data Buoy Center	NDBC	http://www.ndbc.noaa.gov/
6	National Water Level Observation Network	NWLON	http://www.co-ops.nos.noaa.gov/d_nwlop.html
7	ERDC Wave Data Sites	ERDC	http://sandbar.wes.army.mil/public_html/p_mab2web/htdocs/SouthEast.html
8	USACE Water Control Data	USACE	http://www.mvn.usace.army.mil/eng/edhd/watercon.htm
9	USACE Navigation Data	USACE	http://www.iwr.usace.army.mil/ndc/data/data1.htm
10	EPA Environmental Monitoring and Assessment	EMAP	http://www.epa.gov/emap/html/data.html
11	Louisiana Universities Marine Consortium	LUMCON	http://www.lumcon.edu/
12	LSU Earthscan Lab	LSU	http://www.esl.lsu.edu/
13	Louisiana Agriclimate Information	LSU	http://www.agctr.lsu.edu/weather/
14	UNO Coastal Research Laboratory	UNO	http://coastal.uno.edu/MapsNImagery.htm
15	Louisiana Department of Natural Resources Monitoring Program	LDNR	http://www.dnr.state.la.us/crm/coastres/monitoring.asp
16	Louisiana Department of Environmental Quality	LDEQ	http://www.deq.state.la.us/technology/tmdl/index.htm

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	Program Title	Program Acronym	Web Site
17	Wave-Current-Surge Information System	WAVCIS	http://wavcis.csi.lsu.edu/
18	Long-Term Estuary Assessment Group	LEAG	http://leag.tulane.edu/
19	Louisiana Hydrometeorological Network	JOSS	http://www.joss.ucar.edu/gapp/networks/louisiana/
20	Ocean.US was created by the National Oceanographic Partnership Program - IOOS	IOOS	http://www.ocean.us/
21	Gulf of Mexico Coastal Ocean Observing System	GCOOS	http://www-ocean.tamu.edu/GCOOS/gcoos.html
22	The Ocean Research Interactive Observatory Networks	ORION	http://www.orionocean.org/
23	SURA Coastal Research Initiative	SCOOP	http://www.sura.org/programs/coastal.html
24	Coastal Observation Technology System (COTS)	COTS	http://www.csc.noaa.gov/cots/
25	Tributary Forecasts in the Lower Mississippi River Forecast Center	LMRFC	http://www.srh.noaa.gov/lmrfc/forecast/tributaries/index.shtml
26	Terrestrial Observation & Prediction System	TOPS	http://geo.arc.nasa.gov/sge/ecocast/research/tops.html
27	NASA Ames, Ecological Forecasting Program	NASA	http://geo.arc.nasa.gov/sge/ecocast/index.html
28	An Agent-Based Interface to Terrestrial Ecological Forecasting	REaSON	http://geo.arc.nasa.gov/sge/ecocast/research/reason.html
29	NOAA National Ocean Service Ecological Forecasting	NOAA	http://www.oceanservice.noaa.gov/topics/coasts/ecoforecasting/welcome.html
30	NRL Gulf of Mexico Monitoring and Forecast Systems	NRL	http://www7320.nrlssc.navy.mil/GOM_NFS/observations/observations.htm#_Aircraft_Salinity_Mapper
31	Applied Science Directorate – Stennis Space Center – Ecological Forecasting	NASA	http://www.asd.ssc.nasa.gov/application.aspx?app=ecological
32	Geochemical and Environmental Research Group	GERG	http://www-gerg.tamu.edu/menu_research/gerg_cur_research.htm
33	Global Observing Systems Information Center	GOSIC	http://www.gosic.org/
34	Central Gulf Ocean Observing System	CENGOOS	http://www.cengoos.org/
35	Global Climate Observing System	GCOS	http://www.wmo.ch/web/gcos/gcoshome.html
36	Global Terrestrial Observing System	GTOS	http://www.fao.org/GTOS/
37	Dynalysis of Princeton	Dynalysis	http://www.dynalysis.com/
38	Consortium for Oceanographic Research and Education	CORE	http://www.nopp.org/dev2go.web?anchor=site_map&jump=nopp#nopp