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**LOUISIANA COASTAL WETLANDS  
RESTORATION PLAN** *D. V. [signature]*



**MAIN REPORT AND  
ENVIRONMENTAL IMPACT STATEMENT**

**PREPARED BY:**

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

**November 1993**

***Dedicated to Charles W. "Bill" Savant  
(January 16, 1950 to September 21, 1993)***

This report is dedicated to the memory of Bill Savant, whose view of life and love of nature were exemplified in his work to preserve the coastal wetlands of Louisiana. The successful completion of this report is due in large measure to Bill's dedicated efforts.

Honest, amiable, sincere, kind and intelligent are words that best describe Bill Savant--a true conservationist who loved the land and all its resources. He committed his life to conservation and everyone who met him or worked with him couldn't help but like his zeal, enthusiasm and personality.

From his humble, rural beginnings near Opelousas, Louisiana, to his final interagency assignment as a soil conservationist serving to protect one of Louisiana's most vital resources, Bill never faltered in his dedication and commitment to conservation. A Magna Cum Laude graduate of Nicholls State University, Bill used his scientific background, simple understanding of life and years of experience in Louisiana's coastal zone to help make coastal conservation programs work and prosper. He was an expert in coastal programs--learning many of the marshes' secrets by working and creating in them.



Bill loved to work with people. He had the unique characteristic of being able to communicate easily and comfortably with everyone, as well as being liked almost immediately. Although he was a large man, his gentle nature always prevailed--he never got angry, even under difficult circumstances in life and on the job.

Bill's view of life and his love of nature live on with his wife Bobbie and two sons, Bret and Jason. His dedication to conservation and work in trying to save Louisiana's coastal marshes will live on for many years into the future.

Coastal Wetlands Planning, Protection and Restoration  
Act

Louisiana Coastal Wetlands  
Restoration Plan

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# Louisiana Coastal Wetlands Restoration Plan

## Executive Summary

## EXECUTIVE SUMMARY

### INTRODUCTION

The Coastal Wetlands Planning, Protection and Restoration Act (Public Law 101-646, Title III--CWPPRA) was enacted and signed into law by President Bush in 1990. The Act directed that a Task Force consisting of representatives of five federal agencies and the State of Louisiana develop a "comprehensive approach to restore and prevent the loss of coastal wetlands in Louisiana." This legislation provided the first national mandate for a restorative action of this magnitude. Even more importantly, the Act began the prudent process of reinvesting in restoration a tiny fraction of the billions of dollars that these coastal wetlands provide every year in renewable (fish and wildlife) and non-renewable (oil and gas) resources.

The Louisiana coastal plain remains the largest expanse of coastal wetlands in the contiguous United States. It comprises 25 and 69 percent of the fresh and salt marshes, respectively, found on the gulf coast. This translates to 15 and 40 percent of those ecotypes remaining in the contiguous United States. The future of Louisiana's coastal marshes is therefore vitally important to the ecological future of the Nation.

The deterioration of these wetlands is now understood to have been greatly accelerated by human activities which have been critical to the economic growth of the Nation. The unforeseen loss of these coastal wetlands now threatens the future of this region and is a national tragedy in the making. Arresting and reversing the loss of the Mississippi River's deltaic wetlands has become a new national priority, as witnessed by the statement made by the Honorable Bruce Babbitt, Secretary of the Interior, at the April 17, 1993, signing ceremony for the first CWPPRA projects:

The coastal wetland issue I would characterize as simply the single most important environmental issue of our times. The wetlands are, without any question, the richest and most threatened ecosystem in this country. And in turn the coastal wetlands, where fresh water meets salt water, where land meets sea, are truly the most fragile, delicate, and important link of all.

The State of Louisiana's recognition of this problem can be traced through the success of its Coastal Zone Management program, established in 1980. Since its inception, the program has helped reduce wetlands loss due to development from 3,000 to 800 acres per year. The concern of private citizens and landowners was made clear in 1989 when an amendment to the Louisiana constitution establishing a dedicated trust fund for coastal wetlands restoration was adopted by a three to one margin. Congress, recognizing the environmental and economic threat posed by the continued loss of these coastal wetlands, was quick to act on this declaration of public support through the passage of the Coastal Wetlands Planning, Protection and Restoration Act.

The Louisiana Coastal Wetlands Restoration Plan presented here is a product of communication, coordination, and cooperation not only among the designated participants from the state and federal agencies, but also through the formal, and more often informal, involvement of numerous local government agencies, the academic community, private environmental and business groups, and countless motivated individuals with good ideas. This process has from the beginning involved difficult choices; it is far from perfect today and evolving still. All

involved agree, however, on two important findings that form the core of the entire Restoration Plan.

- First, by phasing in an adequate investment now, it is technically feasible to significantly slow or reverse coastal wetlands loss and thereby protect, sustain, and enhance the most valuable environmental and economic assets of the region.
- Second, the no-action alternative condemns the Nation to a far more expensive course of uncoordinated and increasingly futile emergency efforts to protect existing investments in the economic infrastructure without hope of achieving sustainability.

During the preparation of this plan the Task Force has actively pursued its mission, fulfilling a second CWPPRA directive of submitting a series of annual Priority Project Lists. To date three of these lists have been submitted, authorizing 48 projects for construction to hold the line against wetland loss. With the State of Louisiana providing a 25 percent share of the cost, over \$120 million has already been directed to this effort. This Restoration Plan, however, is the first major step in responding to the direction of the Congress "to restore and prevent the loss of coastal wetlands in Louisiana." The plan proposes specific projects to restore on a regional scale the natural processes which were responsible for the great productivity of the coastal ecosystem and which will, in the long term, maintain the value of this resource to the Nation.

### WHAT'S AT STAKE

When Louisiana became a state in 1812 over 16 million acres of wetlands were incorporated into the resources of the United States. Approximately 4.5 million acres of this total were what would now be considered coastal wetlands. Approximately 74 percent, or 3.3 million acres, of Louisiana's coastal wetlands were still inventoried as such in 1989. However, more than a million acres of coastal wetlands have been lost just within the last 60 years. Current estimates of the loss rate range between 25 and 35 square miles annually (16,000 to 22,000 acres), or about an acre every 25 minutes. This accounts for nearly 80 percent of all coastal wetlands loss in the United States today.

The Mississippi River built the coastal wetlands of Louisiana by depositing enormous volumes of sediment and nutrients, eroded from the vast interior of North America, on the continental shelf at its mouth (Figure 1 illustrates the various delta lobes created as the river changed its course over time). For the last several thousand years, dominance of the building process resulted in a net increase of more than four million acres of coastal wetlands, as well as the creation of an extensive skeleton of higher natural levee ridges along past and present channels in the deltaic plain and the beaches of the chenier plain. The landscape this produced gave rise to one of the most productive ecosystems on earth. Only the most intensively managed agricultural systems, artificially subsidized by large inputs of energy and fertilizer, can rival the ability of these estuarine wetlands to convert sunlight and carbon dioxide into food.



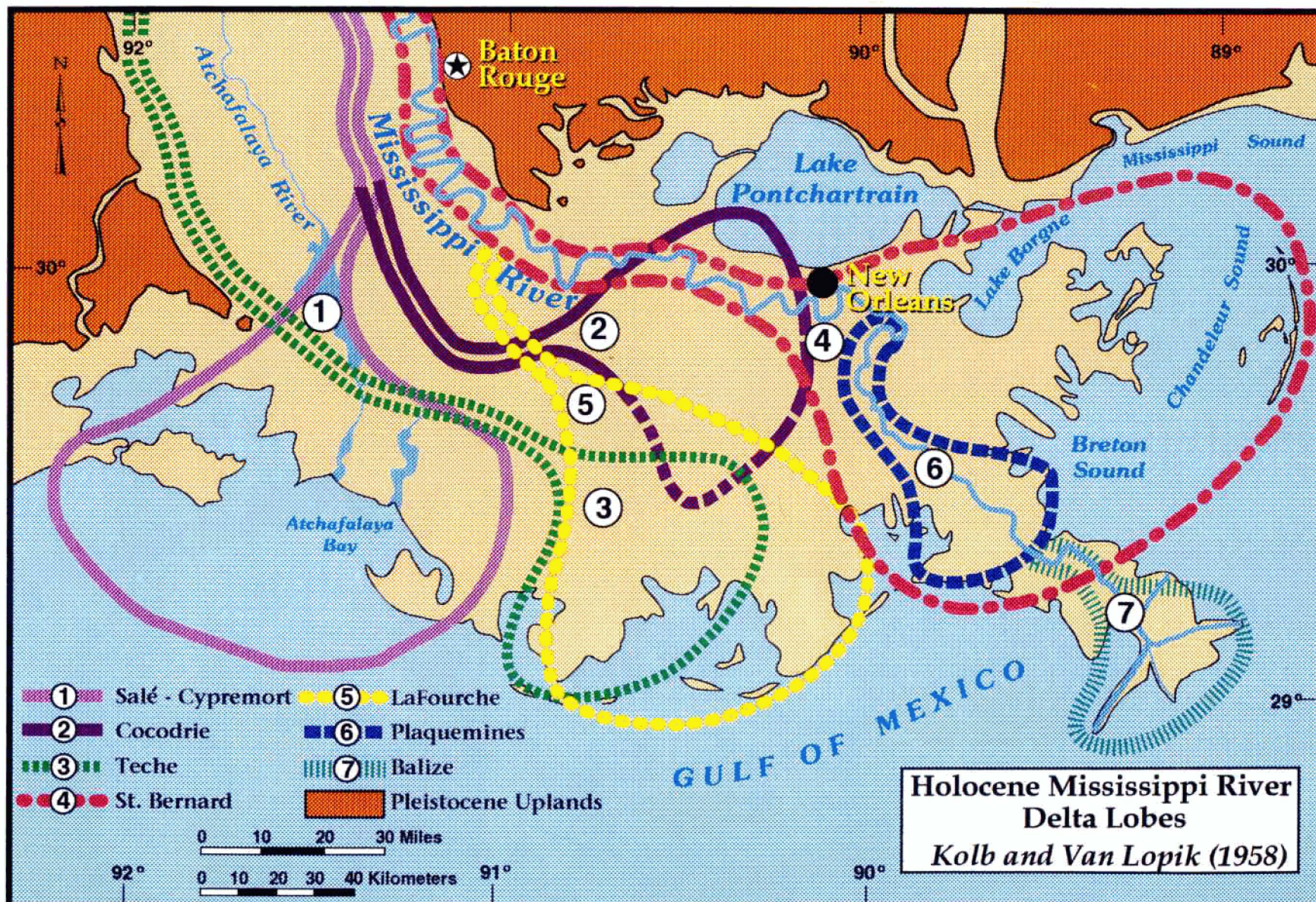


Figure 1. Mississippi River Delta Lobes.



The most visible result of this productivity is the fact that Louisiana's coastal wetlands support a commercial harvest of fish and shellfish comparable in volume to that of the entire Atlantic Seaboard. The market value of the fisheries harvest supported by the state's wetlands averages almost \$1 billion annually. Recreational activities, tourism, and other uses of the resource add several hundred million more to the economy each year, and these values do not count the intangible worth of an incredibly diverse wildlife habitat--home to 70 bald eagle nesting pairs, hundreds of thousands of nesting wading birds and seabirds, and five million wintering waterfowl whose summer homes extend over much of North America.

By themselves, these economic and habitat values, which depend on the biological productivity of Louisiana's coastal wetlands, merit national attention. An equally important dimension of their value derives from the fact that these wetlands protect an internationally significant commercial-industrial complex from the destructive forces of storm-driven waves and tides. This complex includes deep-draft ports carrying 25 percent of the nation's export commodities by tonnage, and the most active segment of the nation's intracoastal waterways. Natural gas fields in the coastal zone and adjacent offshore areas produce 21 percent of the nation's annual output, valued at \$7.4 billion. Petroleum refining industries in the coastal zone produce \$30 billion annually for the domestic market nation-wide. In addition, coastal Louisiana is home to over 2 million people who, ultimately, convert these resources into the products the nation consumes. When investments in facilities, supporting service activities, and the urban infrastructure are totaled, the capital investment in the Louisiana coast adds up to more than \$100 billion.

### THE PROBLEM

The natural processes that produced the Mississippi River deltaic plain, first through the creation of the land and later through its maintenance by overflow of sediments and nutrients, are at odds with man's desire to comfortably inhabit the area and develop its economic resources. In the eighteenth century, when Europeans began settling in significant numbers along the region's numerous low natural ridges, they began constructing local levees to protect themselves from the annual floods of the river. Later, in the nineteenth century, when the power of steam was harnessed for navigation, Congress initiated actions to clear the Mississippi and maintain it as the nation's most important commercial waterway. In the twentieth century, oil and gas exploration, land reclamation projects, and construction of ports and navigation channels further developed the economic potential of the region and the Nation. By the 1940's, massive flood control levees along the entire course of the Lower Mississippi had effectively confined it to a single channel and controlled the threat posed by annual river floods.

Today flood control projects (such as levees) ensure that most fresh water and sediment now bypass the area where they would naturally build and nourish wetlands; these valuable resources are directed to the deep waters of the Gulf of Mexico. The wetlands continue to sink or subside as they have always done. Deprived of their natural sustenance, the plants that define the surface of the land die off, unable to maintain themselves within the intermittently flooded zone in which they are adapted to live. Once denuded, the fragile substrate is left exposed to the erosive tidal environment.



This problem is compounded in many locales where artificial channels dredged for navigation and oil and gas development provide efficient conduits for seawater to penetrate far inland, and for the limited amount of fresh water provided by local rainfall to drain rapidly seaward. The banks of dredged material piled along these channels, as well as embankments constructed for roads and railroads, further disrupt natural cycles of flooding and draining and isolate large areas of estuaries from the remaining non-riverine sources of sediments and nutrients.

The cumulative effect of human activities has been to tilt the balance between land building and land loss drastically in the direction of loss. As recently as the 1970's the loss rate for Louisiana's coastal wetlands was as high as 40 square miles per year. The current rate of loss is about 25 square miles per year, much of which is due to the residual effects of past human activity.

Today Louisiana, which contains about 40 percent of the estuarine wetlands in the lower forty-eight states, is suffering 80 percent of all coastal wetlands losses. Currently, land building has virtually stopped in the deltaic plain and amounts to only a few hundreds of acres each year in the Atchafalaya River delta and along the eastern shoreline of the chenier plain. Land loss, while most dramatic in several inland hot spots, is ubiquitous and takes many forms, including the destruction of barrier islands; shoreline retreat along the margins of lakes, canals, and the gulf coast; and, perhaps more importantly, in the formation, expansion, and coalescing of ponds in the marsh. Paradoxically, deterioration of the system is believed to have contributed to a short-term increase in fisheries production, but the long-term prospect is for a significant decline (30 percent over the next 50 years) and a future shoreline far inland of its present location (Figure 2).

These losses will have impacts well beyond the borders of Louisiana. The impact on commercial fisheries alone will be enormous: by the year 2041, the harvest will decline by 30 percent. Loss of this resource will aggravate our Nation's trade deficit and place at risk the nearly 50,000 jobs directly related to fishing, processing, and wholesaling activities. In addition, populations of migratory birds and other animals directly dependent on the marsh and swamp will decrease dramatically, an impact which will be felt in much of North America, where these species spend part of their life cycle.

A number of other food staples or basic minerals, such as sugar, rice, salt, sulphur, and lime, are also produced in coastal Louisiana. Lost production of these basic items will impact national markets.

The coastal marshes help protect southern Louisiana from flooding and are integral to the design of the \$12 billion worth of flood control works which protect the regional infrastructure. Continued loss of these wetlands will lead to loss or increased maintenance and replacement costs for highways, ports, waterways, railroads, pipelines, oil and gas facilities, and other features. As the coast deteriorates, billions of dollars of infrastructure will be surrendered to the Gulf of Mexico, and billions more will be spent protecting the remainder. Ultimately American consumers and taxpayers will pay these costs.

## THE PLAN

It was recognized early in the plan's formulation that the small project orientation of the priority project program could not, of itself, give rise to a comprehensive coastwide Restoration Plan. Accordingly, a basin planning

## Louisiana Coastline in the Year 2040

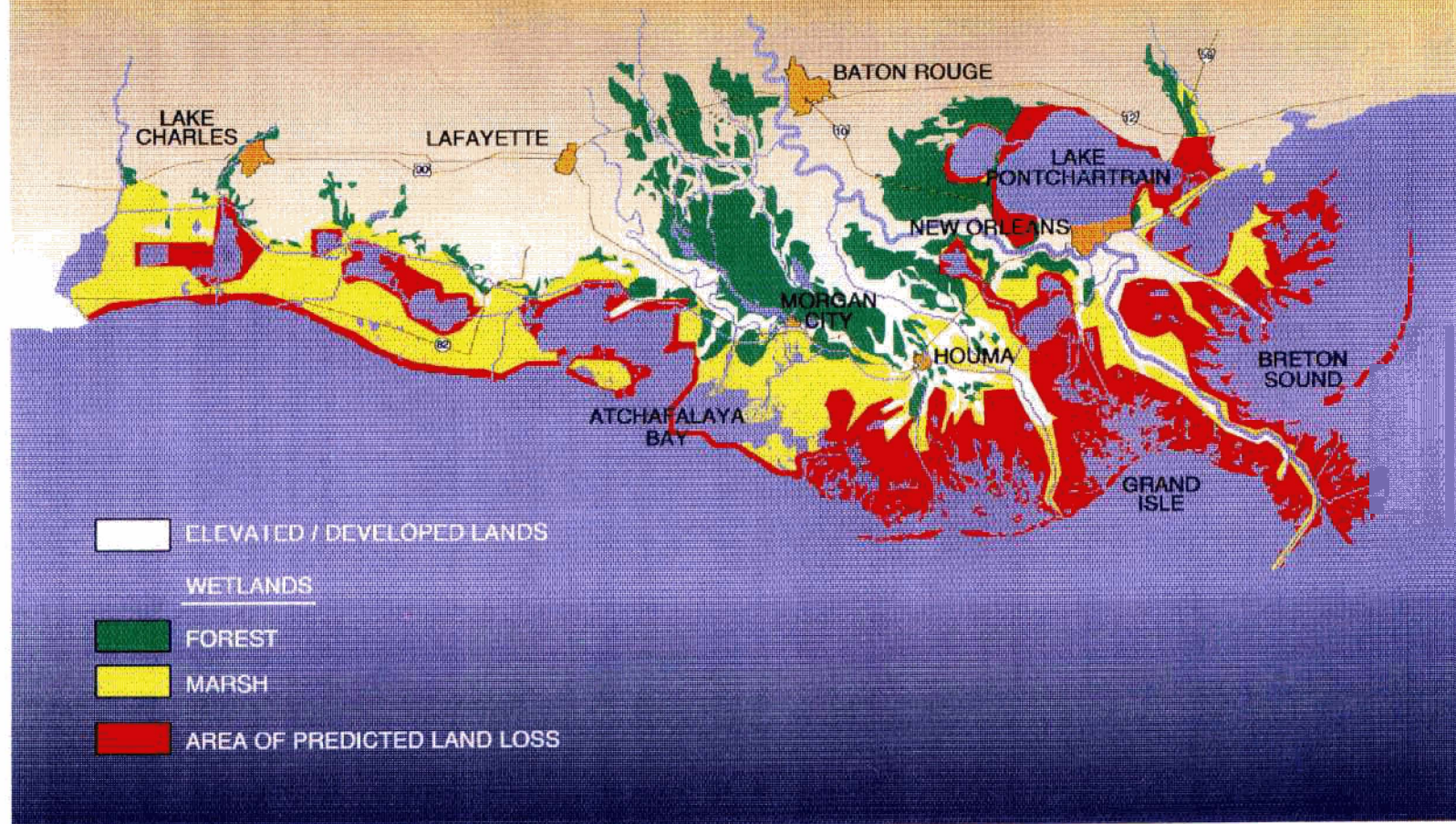


Figure 2. Projected Louisiana Coastline in 2040.



initiative, distinct from the priority project program, was initiated. Nine watersheds, or basins, were distinguished in Louisiana's coastal zone on the basis of their geology and hydrology (see Plate 1). Basin "captains" were designated by the Task Force, and interagency teams were assembled to develop restoration strategies at this level. A team of academic scientists was retained to facilitate and advise this process, and an extensive effort was undertaken to solicit input from local government officials and the public. The result was a set of nine distinct strategic plans reflecting the significant differences among the basins. Through this process the restoration priorities in each basin were established. The basin plans call for numerous short-term projects to be built using the Priority Project List process. Marsh restoration tools such as hydrologic restoration, shoreline protection, marsh creation with dredged material, marsh management, etc. will be used in each basin to preserve or create marsh. In most basins, there are major projects which collectively form the major long-term components of the plan.

The Restoration Plan presented here calls for significant changes in existing management of the lower Mississippi and Atchafalaya rivers to greatly increase sediment and freshwater input into coastal estuaries and restart the natural processes of land building and maintenance (see Figure 3). Specifically, the plan includes such concepts as: (1) a phased abandonment of the existing "bird's foot" delta in favor of a new delta in the shallow waters of an adjacent estuary, possibly Breton Sound, (2) multiple diversions into the Barataria Basin, (3) reactivation of old distributary channels, and (4) seasonal increases in flow down the Atchafalaya River. Additionally, several large projects are identified to reverse hydrologic modifications by (5) rebuilding barrier island chains and (6) controlling tidal flows through large navigation channels. The goal is to restore the natural processes that can bring about sustainability with the lowest requirement for future manipulation. All this is developed based upon a realistic understanding of the countering effects of subsidence and projected sea level rise.

Although designed to work largely within the constraints of the existing infrastructure, regional-scale projects cannot be implemented without accompanying modifications to vital navigation, transportation, flood protection, and oil and gas extraction and conveyance systems. Regional projects, therefore, require urgent additional investigation and involve funding well beyond that currently authorized. The plan presented here involves an estimated investment of \$1 billion to \$3 billion over the next 20 years to produce a sustainable system. Table 1 summarizes the estimated cost for each of the hydrologic basins. Implementation of the plan would prevent 65 percent of projected wetland loss over the next 20 years.

## IMPLEMENTATION

This report presents a wide variety of projects aimed at addressing the problems facing Louisiana's coastal wetlands, from both a defensive, protective posture and a more pro-active, restorative stance. Because it is recognized that implementation of the full restoration plan will take decades to realize, projects of many scales are proposed. Some basin plans are designed to slow land loss in the near-term and preserve the opportunity for the long-term elements of the plan.

The Task Force has adopted a two-phase implementation process executed on parallel tracks. This approach reflects the fact that while the problems and potential

Table 1  
Restoration Plan Summary

Basin	Projected Marsh Loss 20 Years (Acres)	Acres Created, Protected, or Restored (Acres)	Total Benefited Area (Acres) <sup>1/</sup>	Estimated Cost (\$)
Pontchartrain <sup>2/</sup>	57,800	16,900	36,500	132,738,000
Breton Sound <sup>3/</sup>	13,400	5,200	9,600	11,367,000
Mississippi River Delta <sup>4/</sup>	21,400	85,900	89,200	452,630,000
Barataria <sup>5/</sup>	76,200	23,100	51,200	114,658,000
Terrebonne	87,800	32,300	106,400	309,809,000
Atchafalaya <sup>6/</sup>	-6,800	8,500	16,500	19,388,000
Teche/Vermilion	14,700	4,800	9,800	34,039,000
Mermentau	39,600	9,900	20,900	72,929,000
Calcasieu/Sabine	21,900	24,800	91,800	136,460,000
<b>Total</b>	<b>326,000</b>	<b>211,400</b>	<b>431,900</b>	<b>1,284,018,000</b>

Costs and benefits for Short-Term Critical and Short-Term Supporting projects only are included unless noted otherwise.

<sup>1/</sup> Total benefited acreage consists of acres created, protected, or restored; acres of submerged aquatic vegetation; and acres enhanced.

<sup>2/</sup> Does not include the Bonnet Carré Freshwater Diversion project, authorized under separate legislation.

<sup>3/</sup> Costs and benefits include a sediment diversion at Bohemia.

<sup>4/</sup> Costs and benefits of the major Mississippi River Diversion have been adjusted to reflect a 20-year project life. The principal action recommended in this basin would result in created wetlands in the Breton Sound Basin; however, the costs and benefits are shown in the Mississippi River Delta Basin.

<sup>5/</sup> Does not include the Davis Pond Freshwater Diversion project, authorized under separate legislation.

<sup>6/</sup> Costs and benefits include long-term Delta Management project.

"-" indicates gain in wetlands.

solutions regarding loss of Louisiana's coastal wetlands are generally well understood, there is still much to be learned with regard to the effectiveness of specific approaches. The first phase is a largely defensive, short-term approach; the objective is to prevent additional loss of wetlands, particularly in areas with critical loss or limited opportunity for restoration. The second phase provides long-term solutions: large-scale, generally complex projects which have the potential for major impacts on wetland loss.

#### NEAR-TERM STRATEGY

The annual priority lists will continue to form the heart of the first phase but will have additional important elements. These lists provide a fast-track process



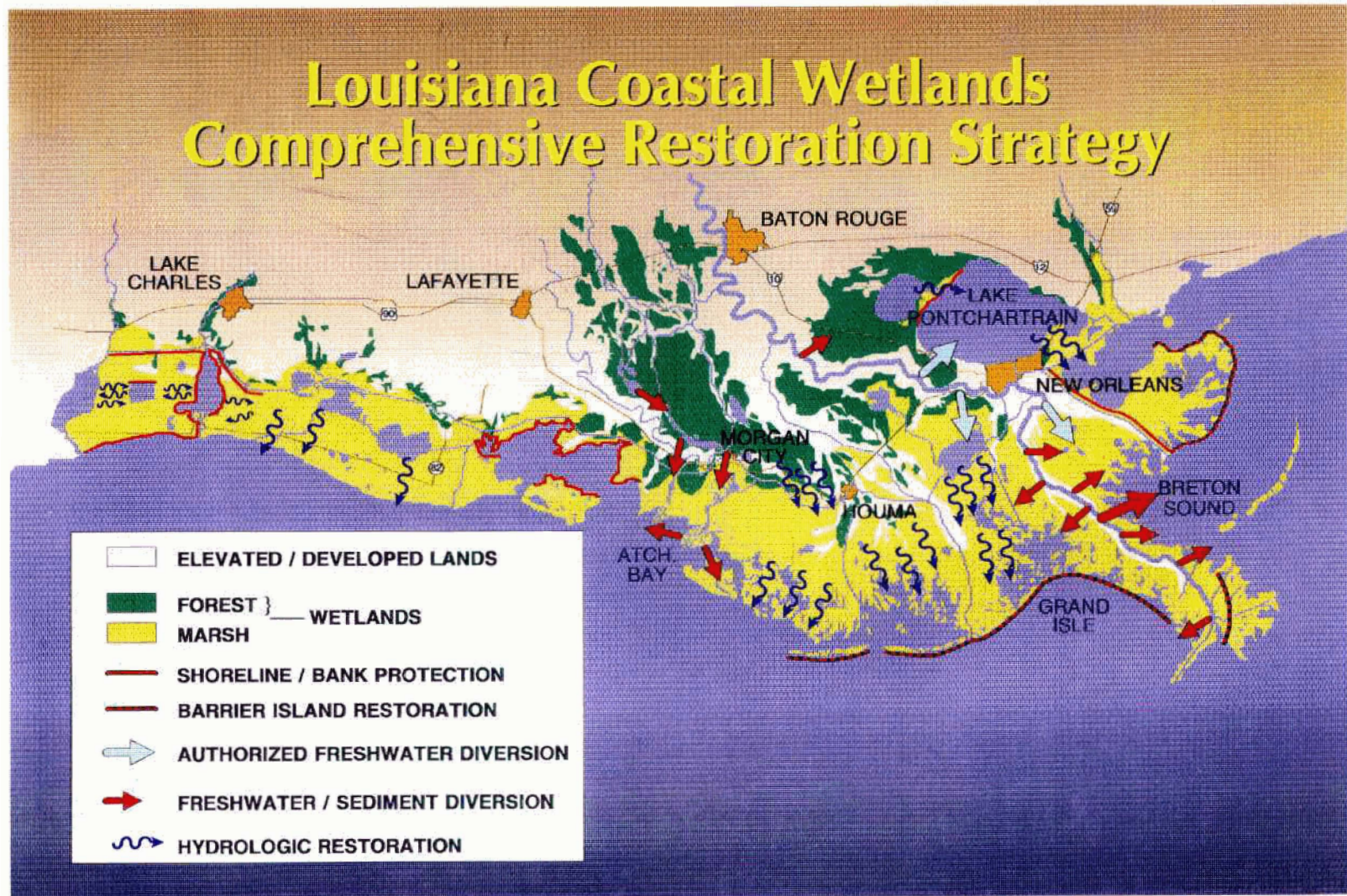


Figure 3. Coastwide Restoration Strategy Map.

through which relatively small-scale projects can be rapidly constructed and monitored. Priority list projects can be implemented in a fairly short period of time with no requirement for additional Congressional action. Elements of this first strategy are listed below:

- The Task Force will improve the priority project selection process to streamline project development and selection and to increase the efficiency with which the current funding stream is applied.
- In early 1994, the Task Force, in conjunction with the Citizen Participation Group, will develop and adopt a strategy to increase public involvement in decision-making and the free flow of information between the Task Force and the academic community; input from the public and from the academic community has been an invaluable part of the planning process.
- The Task Force will immediately begin preparation of detailed feasibility studies on some of the large-scale projects enumerated in the preceding section. The complexity of many of these solutions warrants a level of study beyond any initiated to date.
- The Task Force will continue to learn through both project monitoring and demonstration projects.

#### LONG-TERM STRATEGY

The second phase of implementation will entail securing authorization and funding for and construction of the large-scale regional projects that are determined to be feasible. Projects with costs of tens of millions of dollars are not easily accommodated by the present funding stream of about \$40 million per year (including State contributions). As project feasibility studies initiated under the first phase of this process begin to near completion, a parallel effort will introduce them, through the channels of a designated lead federal agency, into the competitive civil works and water resources authorization and funding arenas.

#### PROJECT EVALUATION

The detailed monitoring program established for all CWPPRA-funded restoration projects, including demonstration projects, will ensure accountability by objectively determining the degree to which programmatic and project-specific goals are achieved. The program will also provide a basis for improved project design and operation. Monitoring will adhere to rigorous protocols that were developed, with input from the academic community, by the Task Force's Monitoring Work Group. Monitoring results and associated evaluations for CWPPRA-funded projects will be provided to Congress every three years as required by the Act. An accessible data base, maintained by the State of Louisiana, will encourage the publication of monitoring results, so that the ecosystem management techniques developed in Louisiana can be made available to, and be peer-reviewed by, a national and international audience.

The final obstacles in the implementation of many projects involve social and legal issues. The resolution of many of these issues lies outside the authority of this Task Force. As a result it is imperative that emphasis be placed on actively involving the public and all stakeholders in the restoration process to retain and build public support and confidence as difficult decisions are faced.

## CONCLUSION

Despite the losses of the past century, the wetlands built by the Mississippi River contain an extraordinary diversity of estuarine habitats that range from narrow levee and beach ridges to expanses of forested swamps and fresh, brackish, and saltmarsh prairies. Taken as a whole the unique interplay of habitats, with their watery connections--to each other, to upland areas, to the Gulf of Mexico, and to migratory routes of birds, fish, and other species--combine to place the coastal wetlands created by the Mississippi River among the Nation's most productive and important natural assets. In human terms, these wetlands have historically been a culturally diverse center for social development. More than two million people live within this region. The economic and environmental futures of all residents, whether in the City of New Orleans or in the homesteads of southwest Acadiana, are threatened by the loss of the coastal marshes.

The CWPPRA has provided the first national mandate for action. Even more importantly, the Act has begun the prudent process of reinvesting a small portion of the hugely diverse harvest of this region to assure the sustainability of this uniquely productive system. The process laid out in the Act has produced results, both tangible and intangible, within its first three years that have surprised many and increased confidence of future success.

The Restoration Plan presented here provides guidance, and an estimate of the cost necessary over the next 20 to 50 years, to return Louisiana's coastal wetlands--with all their human and non-human resources--to a self-maintaining and sustaining future. The strategy outlined in this plan presents a technically sound alternative for accomplishing the Task Force vision of "bringing our wetlands gains to the level to meet or exceed our wetlands losses." Its aggressive implementation would entail the investment of an estimated \$1 billion to \$3 billion, or some 10 percent of what the system can be expected to produce in the value of fisheries alone over that same period.

The consequence of not meeting this challenge would be the loss, forever, of an additional half million acres of wetlands over the next twenty years. Along with this natural asset would go their potential to produce billions of dollars in renewable resources on into the future. Ultimately, the Nation would lose billions more in commercial productivity and infrastructure. Twenty years from today, we or our children would face the same decision but with far fewer options. This report presents the Nation with a choice and the information to make an informed decision.