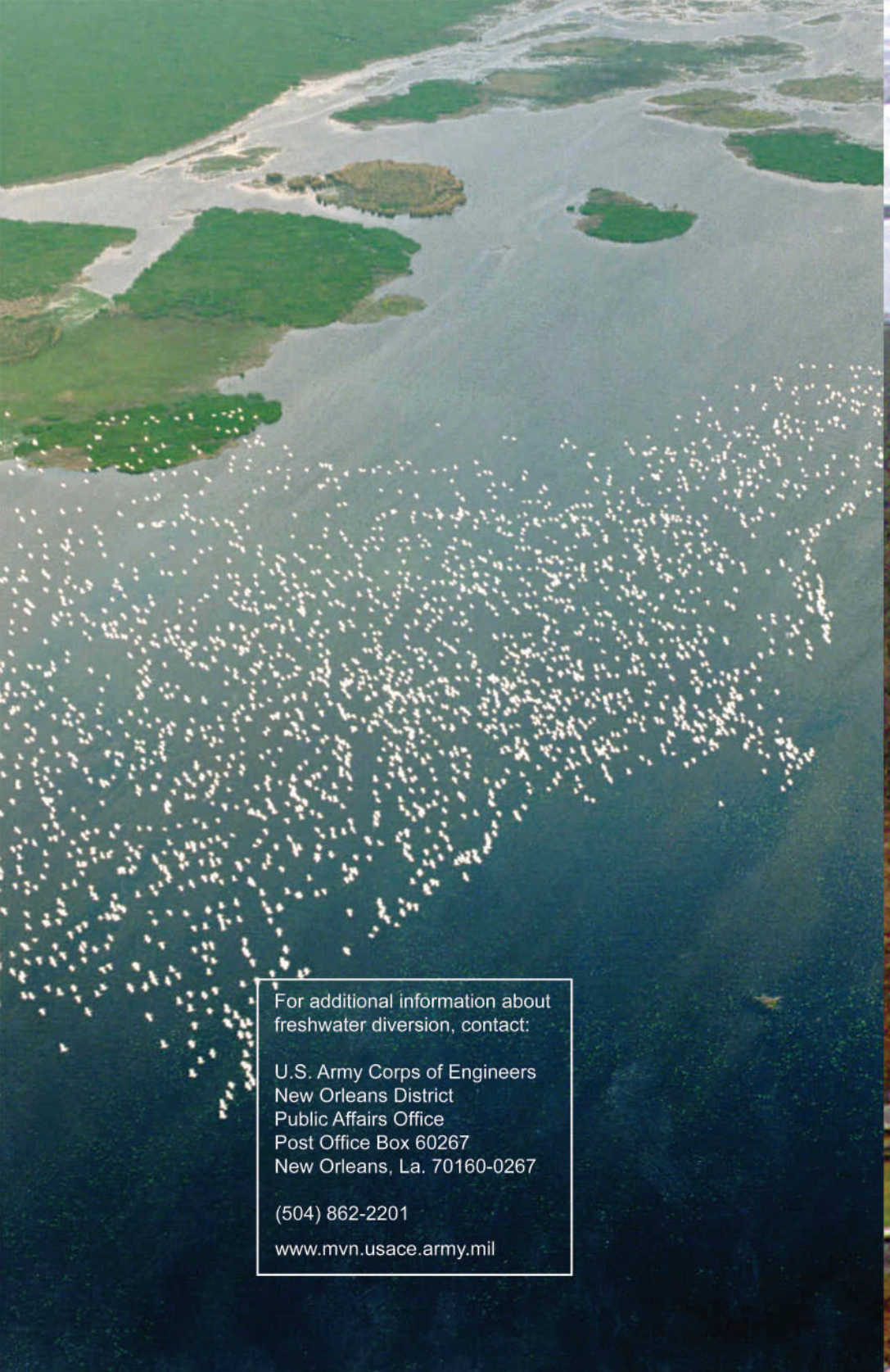

For additional information about freshwater diversion, contact:

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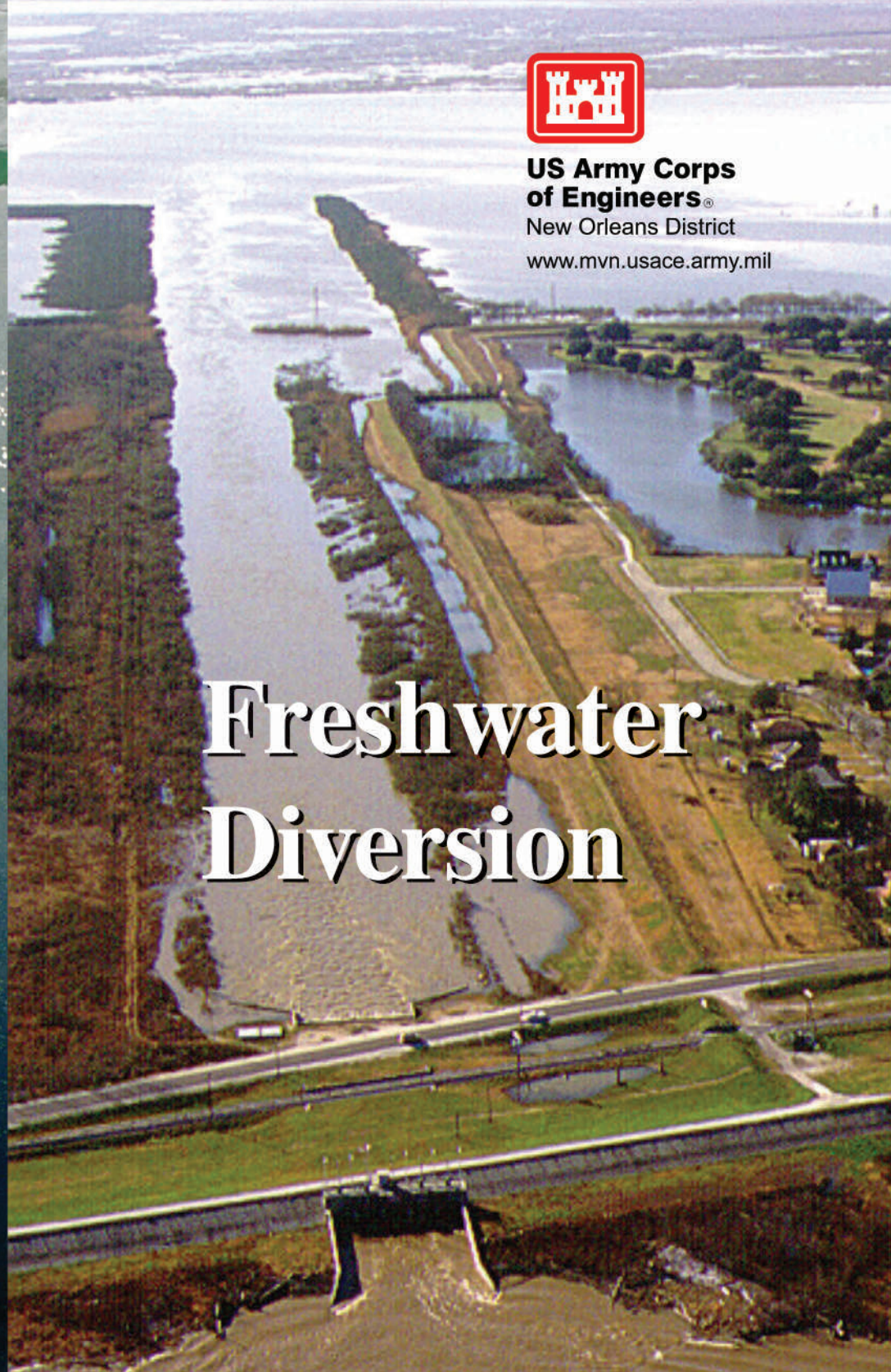

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Freshwater Diversion

FACT: Louisiana's coastal wetlands are disappearing at the rate of 25-35 square miles per year – that's nearly 25,000 acres.

FACT: In this century, the state of Louisiana lost between 600,000 and 900,000 acres of valuable coastal vegetative wetlands. Estimates reveal that another 328,000 acres will be lost between now and the year 2050.

FACT: A commitment to establish highly productive, cost-effective, and long-term diversion and coastal restoration projects is essential if Louisiana's coastal wetlands are to be saved.

Front cover: Caernarvon Freshwater Diversion Structure
Back cover: Migratory birds fly over a Terrebonne Parish marsh

Wetlands provide a way of life, and a wealth of natural and economic resources for both Louisiana and the United States.

The loss of Louisiana's coastal wetlands has become a national concern that requires immediate action. Coastal erosion has already depleted valuable resources vital to the economy and well-being of coastal communities throughout Louisiana and the nation. These resources will continue to disappear if we do not reverse the trend.

Implementing long-term comprehensive plans is the backbone of any environmental effort. The U.S. Army Corps of Engineers is in a unique position to help protect our coastal wetlands and, in cooperation with the state of Louisiana, and federal and local agencies, is committed to that end.

Public awareness of the problem is vital for the support and success of the program. The Corps, state and parish agencies, business interests and concerned citizens must work hand in hand. The common goal of this plan is to cooperatively and effectively confront the national problem of coastal wetland loss in Louisiana. Hurricanes Katrina and Rita in 2005 have made clear the vulnerability of the state's population to hurricane storm surge from wetland loss.

Operation

Davis Pond will imitate historic spring floods, providing a controlled flow of fresh water and nutrients from the Mississippi River through four iron-gated 14-foot-square box culverts built into the mainline Mississippi River levee. An inflow channel, 535-feet-long by 85-feet-wide, will direct river water into the structure, while an outflow channel more than 11,000-feet-long by 120-feet-wide will extend behind the structure into a ponding area and, ultimately, into the Barataria Bay estuary. The total project area comprises 10,084 acres, including the 9,300-acre ponding area.

During operation, Davis Pond is able to divert up to 10,650 cfs of fresh water. Diversions through the structure occur under regulated conditions determined by monitoring basin salinities and fish and wildlife resources.

Davis Pond Freshwater Diversion Structure

Conclusion

When all three structures are fully operational, significant improvements in the coastal wetlands and surrounding areas will occur. Desirable salinity conditions in more than 1.4 million acres of coastal wetlands will be re-established, and nearly 60,000 acres of marshland will be saved over a 50-year period. Fish and wildlife populations will benefit. The production of oysters, white shrimp, blue crab, croaker, and menhaden should significantly increase. Diversions will enhance vegetative growth and slow the rate of erosion.

Introduction

The U.S. Army Corps of Engineers and the state of Louisiana have joined forces in the battle against saltwater intrusion and coastal wetland erosion. They have devised a three-part comprehensive plan of freshwater diversion that will establish favorable salinity conditions in the marshes adjacent to the Mississippi River, improve fish and wildlife production, enhance wetland vegetative growth, and reduce coastal wetland loss.

The freshwater diversion plan calls for the introduction of fresh water into the coastal wetlands. This task will be carried out by three major control structures along the banks of the Mississippi River. When the diversion structures are fully operational, desirable salinity conditions will be met in more than 1.4 million acres of wetlands.

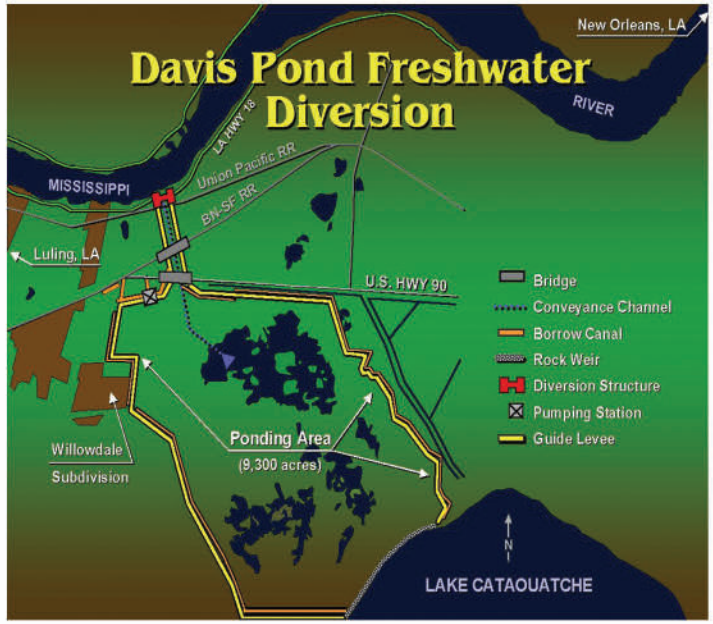
What are the coastal wetlands?

The coastal wetlands of Louisiana are an unbelievably productive and unique habitat for millions of creatures. They provide winter homes for all types of waterfowl and other migratory birds. Fish, shellfish and microscopic organisms of all varieties live in the wetlands.

Coastal wetland habitats in Louisiana support a commercial seafood industry with an annual economic effect in 2003 that exceeded $2 billion. Combined with menhaden landings (not used as seafood), the economic effect of marine fisheries was about $2.6 billion. The combined volume of commercial seafood and menhaden landing has been comparable to the entire volume of commercial fish and shellfish along the Atlantic seaboard and triple that of the remaining United States Gulf Coast. These same wetlands supported a $2 billion sport hunting industry in the state in 2003. The wild and farmed alligator industry was estimated to have an economic effect of $69 million while crawfish was $42 million. Recreational saltwater fishing was estimated at $792 million. More protected areas along the coast have supported agricultural production. Discoveries, explorations, and technical advances have led to extensive offshore mineral production, including oil, gas, salt, sand, and sulphur.

Our coastal wetlands are extremely important for North American bird species. Two examples include some of the largest numbers of wading birds and shorebird nesting colonies in the nation, and the largest population of southern bald eagles found along the Gulf Coast.

In addition to bird watching, coastal Louisiana offers a diversity of outdoor experiences, including hiking, camping and swamp tours. The ecotourism industry is becoming increasingly valuable as a resource to the state.



Davis Pond will preserve 33,000 acres of marsh and benefit 777,000 acres in the Barataria Basin.

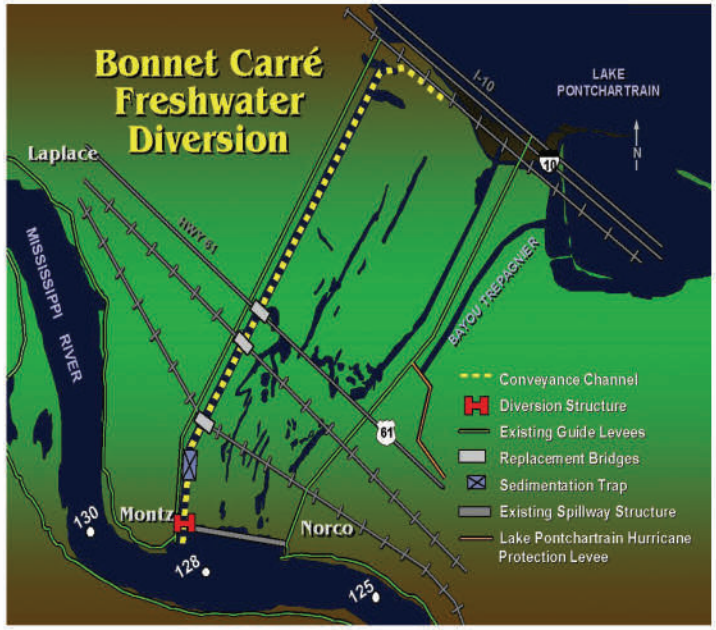
Davis Pond

The Davis Pond Freshwater Diversion Structure is a feature of the Mississippi Delta Region Project, and is located on the west bank of the Mississippi River, 22 miles upstream from New Orleans in St. Charles Parish.

Davis Pond is capable of diverting up to 10,650 cfs of fresh water into the Barataria Basin. The diversion is expected to restore the area to former ecological conditions by controlling salinity and introducing nutrients. A total of 33,000 acres of marsh will be preserved and 777,000 acres will benefit from the project over the next 50 years. By improving existing marsh conditions, the project is expected to provide average annual benefits of $15 million for fish and wildlife, plus $300,000 for recreation.

Davis Pond was authorized by the Flood Control Act of 1965 and modified by the Water Resources Development Acts of 1974, 1986 and 1996. The state of Louisiana agreed to voluntarily contribute 25 percent toward the first costs. The total cost was $121 million. Construction began in January 1997 and was completed in February 2002.

Bonnet Carré diversions would reduce marsh loss by 10,500 acres in the Lake Pontchartrain Basin and western Mississippi Sound.



Bonnet Carré

The Bonnet Carré Freshwater Diversion Structure would be located on the east bank of the Mississippi River, 33 miles upstream from New Orleans within the Bonnet Carré Spillway.

Bonnet Carré is designed to divert up to 25,000 cfs into the Lake Pontchartrain Basin and western Mississippi Sound. This diversion will reduce marsh loss by 10,500 acres over the next 50 years.

Construction of the Bonnet Carré structure was authorized by the Water Resources Development Act of 1988. In October 1990, the Design Memorandum for the structure was sent to Headquarters for approval. Congress determined the cost-sharing allocation to be 75 percent federal and 25 percent state for first costs, and future operation and maintenance costs. The state costs will be shared between Louisiana (20 percent) and Mississippi (5 percent).

At present, the states of Louisiana and Mississippi have not agreed upon a final design of the project. Construction cannot begin until an agreement acceptable to the Corps is reached.

An abundance of mineral reserves and fuel supplies can be found underneath the coastal wetlands. In 2004, Louisiana produced 4 percent of the nation's domestic crude oil and 5.7 percent of its domestic natural gas. Most of this petroleum was extracted from Louisiana's coastal wetlands and offshore waters. Another 27 percent of the crude petroleum production in the U.S. was extracted from federal Gulf waters. About 15 percent of all natural gas produced in the U.S.was from federal Gulf waters, much of it adjacent to Louisiana waterbodies. The Louisiana Department of Revenue has reported that severance tax, largely from petroleum and natural gas extractions generated about $680 million during fiscal year 2004-2005.

While the economic purpose and need for the freshwater diversion projects were initially developed for fish and wildlife protection and enhancement, the effects of continuing land loss, erosion, subsidence, sea level rise, and storm damage along the coast have also been recognized.

Simply by their presence, wetlands serve as a buffer for tidal surges caused by hurricanes and storms. For every 2.7 miles of marsh, a hurricane's storm surge is reduced by about one foot.

As you can see, the wetlands provide a wealth of natural and economic resources for both Louisiana and the United States. At the present rates of saltwater intrusion and erosion, however, our state and nation will suffer significant physical, environmental, economic and recreational losses in future years.

To understand why the coastal wetlands are disappearing, it helps to first understand how the wetlands were formed.

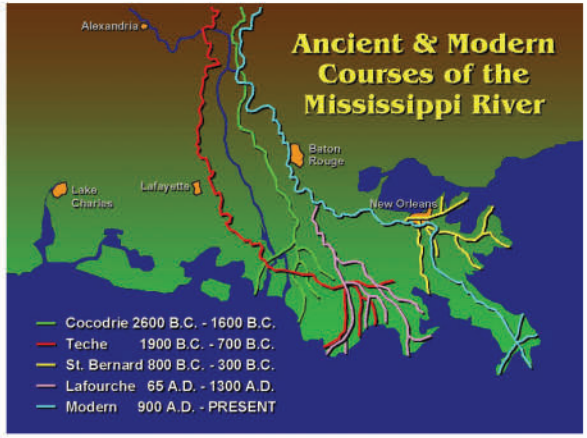
Oil companies tap into a rich abundance of mineral reserves and fuel supplies beneath the coastal wetlands.

Formation of the coastal wetlands

Since the sea reached its present level 5-6,000 years ago, the Mississippi River has migrated back and forth across southeastern and central Louisiana in a series of course changes. It was during these shifts toward the shortest path to the Gulf of Mexico that the mighty Mississippi created new land on the Gulf's northern shore.

The river naturally picks up sediment and carries it downstream. As the water reaches the mouth, it slows, and the suspended sediment drops. This sediment accumulates on the developing delta beneath the waters and creates new land – the coastal wetlands.

When the Mississippi changed course, the mouth of the river shifted to conform to the new channel. Land previously created now became inundated from tidal overflow as the sediment load deposited in other regions. Four major deltas are the result of these course changes: the Teche, St. Bernard, Lafourche, and the modern Mississippi. The Mississippi has remained in its present course for the past 900 years. Since then, close to 400 square miles of new land have been built in the northern Gulf of Mexico.



Since 2600 B.C., the Mississippi River has changed course four times, creating major deltas.

Each spring season, the Mississippi fills with all the sediment-rich water of its many tributaries. In former years, it used to frequently overflow its banks, providing the land with essential fresh water, nutrients and sediments needed to revitalize vegetation, restore the delta and create the coastal wetlands.

Caernarvon's five box culverts.

Operation

Caernarvon is a five-box culvert, with each culvert measuring 15 feet square. The culverts can allow a maximum flow of 8,000 cubic feet per second (cfs) to Big Mar through an outflow channel approximately 1.5 miles long. The facility includes a 128-acre dredged material disposal area, and a 1,790-acre overflow area (Big Mar).

Five vertical lift gates control the water flow at Caernarvon. These are cast iron, 15-foot-square sluice gates, operated by electric hoist motors. It takes a half-hour to open or close the gates, 1.5 hours if local emergency power is required.

Caernarvon is designed to pass flows primarily in the months of January through May. Lesser amounts will be diverted in other months. The operation of the structure depends on the need to supplement rainfall to maintain the desired salinity ranges.

The state, in cooperation with a federal and state interagency technical working group, oversees the operation of Caernarvon. Plaquemines Parish provides the manpower to operate the structure.

Oyster industry productivity on public seed grounds, a key link in the viability of the state's oyster industry, has increased more than three times over. Since operations began, the average number of largemouth bass caught has almost doubled and the number of waterfowl using the marsh has increased dramatically. And similar increases have been noted in the number of alligator and muskrat nests.

The Caernarvon Freshwater Diversion Structure is a feature of the Mississippi Delta Region Project. It was authorized by the Flood Control Act of 1965. The Water Resources Development Act of 1986 authorized Caernarvon to be built at 100 percent federal expense. However, the Local Cooperation Agreement, signed by the state of Louisiana and the assistant secretary of the Army for civil works in 1987, provided for the state to voluntarily share 25 percent of the project's first costs, as well as the required 25 percent of operation and maintenance costs.

The total cost of construction was $26.2 million, with $19.7 million as the federal government share, and $6.5 million as Louisiana's share.

Oyster productivity on public seed grounds has increased more than three times over since Caernarvon began operating in 1991.

But as America grew the floods devastated developed areas, culminating in the great 1927 flood. As lives and homes were destroyed, flood control became a primary concern. Consequently, river populations began constructing levees. Eventually, as water routes became a primary source of trade, the levees were progressively extended to the mouth of the Mississippi, both for flood control and to keep the river open for navigation.

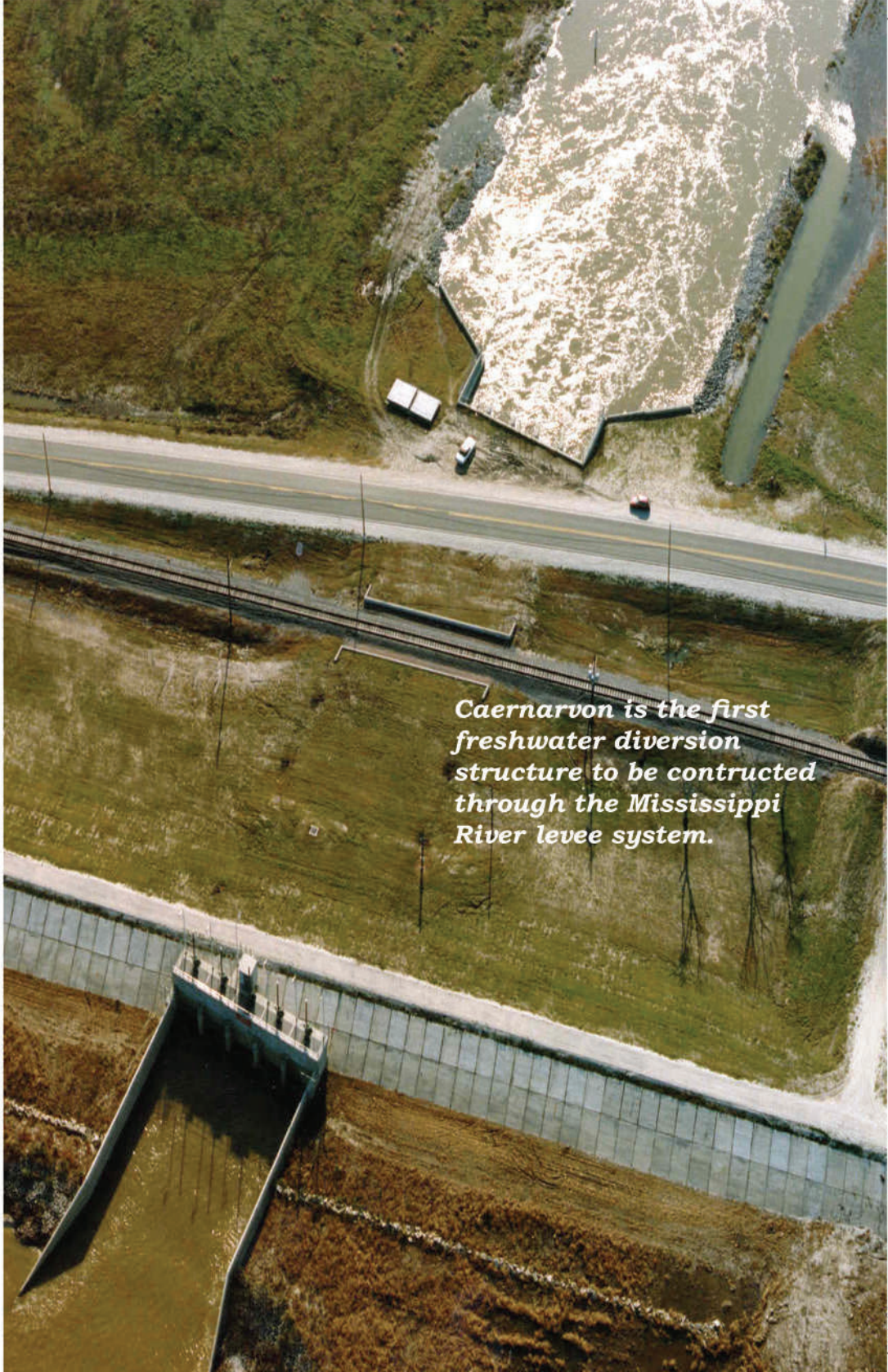
Levees, built by land owners as early as 1717, are constructed for flood control and to aid navigation.

Causes of saltwater intrusion and wetland loss

The causes of saltwater intrusion and coastal erosion are varied. It's not possible to single out one specific cause. Rather, several contributing factors interact with one another, feeding upon the others' destruction and multiplying their effects on our coast. The current rate of land lost per year in Louisiana is approximately 25-35 square miles.

During the past century, the levee system, while ensuring the socioeconomic prosperity of the region, also prevented the historical overflows and deposition of sediments in the river's flood plain. Levees also prevent the natural overflow of essential fresh water, nutrients and sediment into the wetlands. Fresh water and sediment is now mostly funneled out into the deeper waters of the Gulf of Mexico, where they do not create new lands.

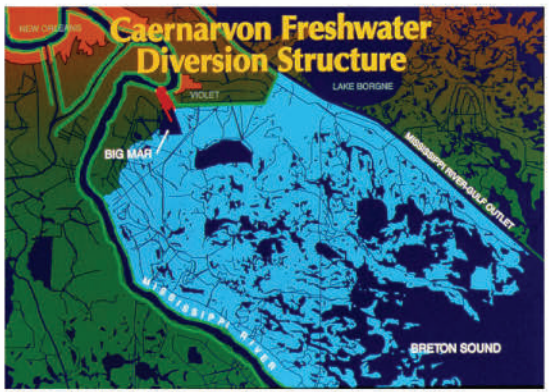
Wetlands provide valuable breeding grounds and habitat for a wide variety of animals, such as the endangered bald eagle, the crawfish and the brown pelican.



Caernarvon is the first freshwater diversion structure to be contructed through the Mississippi River levee system.

Caernarvon

The Caernarvon Freshwater Diversion Structure is a feature of the Mississippi Delta Region Project, and is located on the east bank of the Mississippi River, 15 miles downstream from New Orleans, just below the community of Caernarvon. The structure, constructed from 1988 to 1991, diverts fresh Mississippi River water into Breton Sound Basin, a remnant of a Mississippi River lobe, the abandoned St. Bernard Delta. The basin is 50 miles long and 20 miles wide at the Gulf. The project was designed to increase fish and wildlife productivity by re-establishing favorable salinity conditions.



Estimates reveal that Caernarvon will preserve more than 16,000 acres of coastal wetlands during its 50-year project life span. Shown is the area of impact.

A 46-year, long-term monitoring phase, designed by the Corps and closely coordinated among the natural resource agencies, is being used as a guide in operating the structure. Responsibilities include the monitoring of water quality, water supply, salinity, rainfall, and fish and wildlife production.

Since 1988 the aerial coverage of freshwater marsh plants has increased over six times, and the acreage of brackish marsh has decreased due to conversion to intermediate marsh. The acreage of salt marsh vegetation has also been greatly reduced. Results show a net increase in marshland of 148.8 acres since 1990, increasing at an annual rate of 14.53 acres.

Hurricane Katrina destroyed 40.9 sq. miles (26,176 acres) in the project footprint in 2005. However, having the freshwater diversion structure in place provides us the capability of reducing the impact of high-salinity Gulf waters on marshes in the area, which would help in restoring these wetlands. This demonstrates the potential of these structures beyond ecosystem enhancement.

Global sea level is predicted to rise about 1.2 feet by the year 2100. Combined with the natural forces of subsidence and compaction of the land, saline Gulf waters are invading freshwater habitats.

Wetlands which are not tolerant to salt are being killed and replaced by open water because of saltwater intrusion. This can be intensified by other factors.

In developing industrial facilities, canals were cut through the wetlands for navigation, mineral reserve access and drainage. Salt water easily intrudes into the freshwater areas through the canals. This channelization also exposes the coast to increased erosion by interrupting the flow of fresh water and sediment into the marshes.

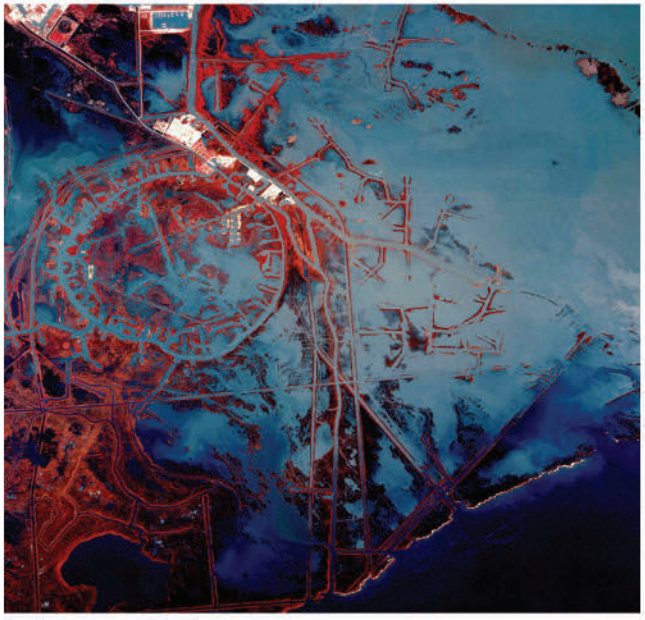
Coastal communities, like this one on the Barataria Bay Waterway, are vulnerable to hurricane tidal surges and flooding.

What are we losing?

Louisiana coastal wetlands are a critical asset not only to Louisiana, but to the nation. The region contains about 30 percent of the total coastal wetland area in the lower 48 states. Currently, coastal wetland losses in Louisiana account for 90 percent of the total annual loss.

Saltwater intrusion and coastal wetland destruction severely impact fish and wildlife production. By the year 2045, state commercial fishermen could lose nearly one third of their income, and trappers could lose nearly half of theirs. Overall, the total harvest is projected to decline to about 70 percent of the present level.

If we continue to lose coastal wetlands, breeding grounds for a variety of aquatic lives will diminish, reducing fishery habitat needed to maintain populations. Eventually, native birds will have to relocate, and migratory birds from all over North America will have to find a new winter refuge. Our national symbol, the bald eagle, and Louisiana's state bird, the brown pelican, will have to relocate or perish. Fur-bearing animals and other wildlife will have to seek alternative habitats. Our unique and productive vegetation will be lost or changed to less productive plants.



Coastlines and wetlands are vulnerable to erosion, as shown in this infrared image of an area called the Wagonwheel, near Venice, Louisiana.

Coastal communities will be more vulnerable to hurricane tidal surges and flooding. Levees and floodwalls will have to be shielded from erosion and enlarged to maintain their present level of protection. Additional projects will have to be developed to compensate for the loss of natural protection provided by the wetlands.

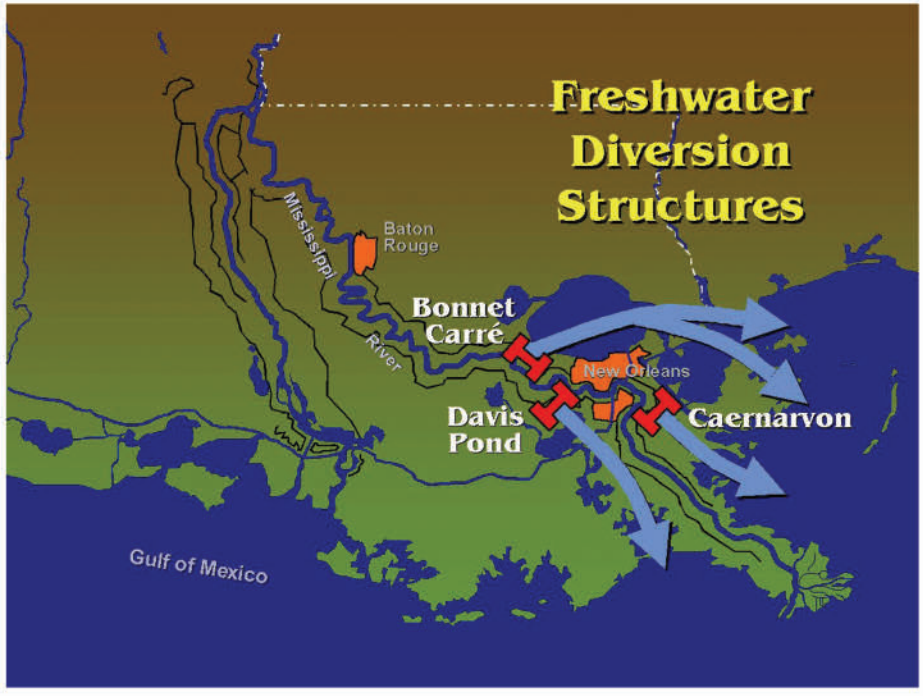
As the loss continues, hundreds of miles of highways, railroad tracks, oil and gas pipelines, water service, electric power, and telephone lines will have to be relocated. Thousands of private businesses and residences will have to be moved or protected.

What can we do?

The U.S. Army Corps of Engineers, in cooperation with the state of Louisiana, has developed a plan of freshwater diversion that mimics historical annual overbank flooding of the Mississippi River. Conditions throughout southeast Louisiana from Bayou Lafourche to the western Mississippi Sound near Gulfport, Miss., are expected to improve dramatically.

In the early planning stages, four diversion areas were studied. Within these areas, 20 potential diversion sites were identified. The Corps analyzed the engineering characteristics, potential environmental, cultural, economic and social effects, and the cost at each site. Five sites were then chosen for a more detailed analysis.

As a result, the Corps decided to build two structures on the east bank of the Mississippi River at Caernarvon and Bonnet Carré, and a third on the west bank at Davis Pond.



Once in operation, the three freshwater diversion structures will save nearly 60,000 acres of marsh.