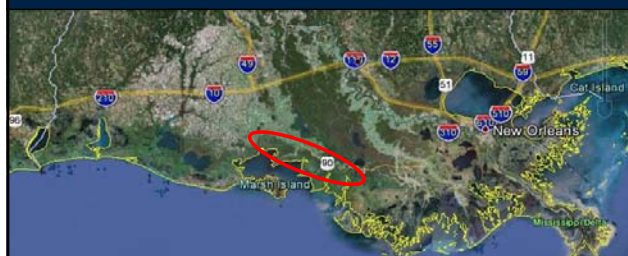




Jesse Troxler-Graduate Research Assistant
Population demographics of black bears in coastal Louisiana
3 year mark-recapture study
St. Mary & Iberia Parish, LA



The slide features a map of coastal Louisiana with major highways (I-10, I-12, I-55, I-59, I-210, LA-102) and locations like Cat Island, New Orleans, and Marsh Island. A red circle highlights the study area in St. Mary and Iberia Parishes. Logos for the USGS and Louisiana Wildlife & Fisheries are also present.



Louisiana's Coast



- Coastal Fisheries: Top Fisheries Producer in Lower 48, Over \$3 Billion Annually
- Coastal Energy: Top Producer of Domestic Oil, Over \$70 Billion Annually
- Coastal Ports: Largest Port Complex in the World, \$35 Billion Annually & nearly 300,000 jobs



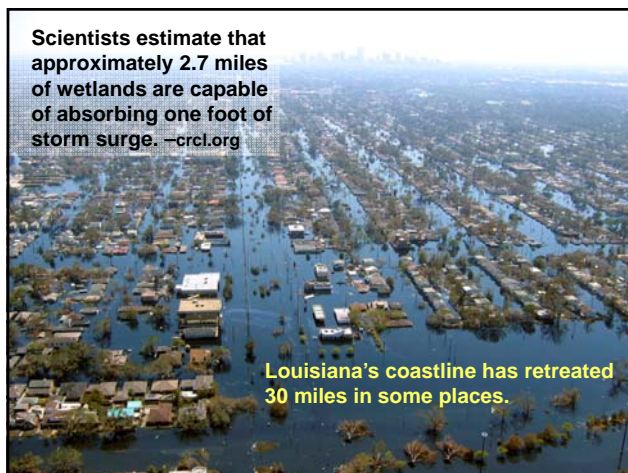
- Coastal Population: over 2 Million Residents
- Louisiana's Unique Heritage and Culture – No \$\$\$

Ecosystem Services \$12-47 billion/year



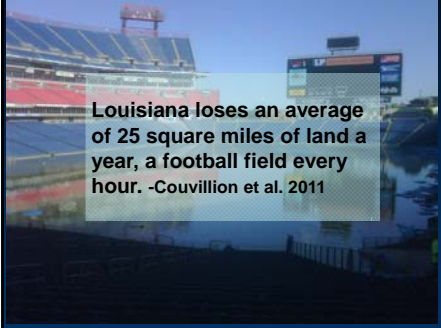
- Estimated value: \$330 billion - \$1.3 trillion
- Hurricane protection
- Water supply/quality
- Climate stability
- Food production
- Fur and alligator production
- Recreation
- Habitat
- Waste treatment
- Earth Economics

Scientists estimate that approximately 2.7 miles of wetlands are capable of absorbing one foot of storm surge. —crcl.org

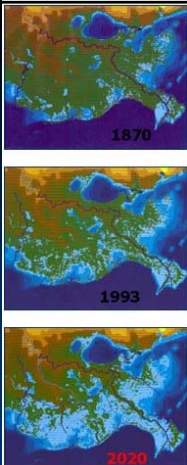


Louisiana's coastline has retreated 30 miles in some places.

Land Loss



Louisiana loses an average of 25 square miles of land a year, a football field every hour. -Couvillion et al. 2011



Land Loss




Since the 1930s, nearly 1,900 square miles of marsh, swamp and barrier islands have disintegrated into open water. - Audobon.org

Land Loss

By 2050, Louisiana is projected to lose approximately 640,000 acres of coastal marshes, swamps and barrier islands. - restoreorretreat.org



*Historical and Projected Land Loss in the Deltaic Plain

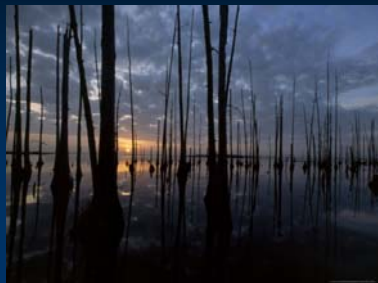


WHY?

Coastal Louisiana has lost an average of 34 square miles of land, primarily marsh, per year for the last 50 years. From 1932 to 2000, coastal Louisiana lost 1,900 square miles of land, roughly an area the size of the state of Delaware. If nothing more is done to stop this land loss, Louisiana could potentially lose approximately 700 additional square miles of land, or an area about equal to the size of the greater Washington D.C.- Baltimore area, in the next 50 years.

Causes

- Natural Subsidence
- Levees
- Canals
- Hurricanes
- Invasives
- Sea level rise



Mississippi River

- Basin drains 41% of the 48 conterminous United States
- Yearly mean discharge of ~ 580 km³ of water and 200,000,000 metric tons of suspended sediment to the Gulf of Mexico
- ½ mile across
- 200 ft deep
- 600,000 cfs



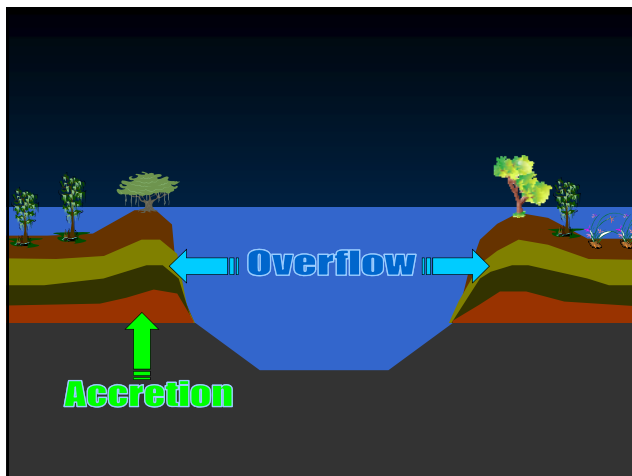
History Lesson

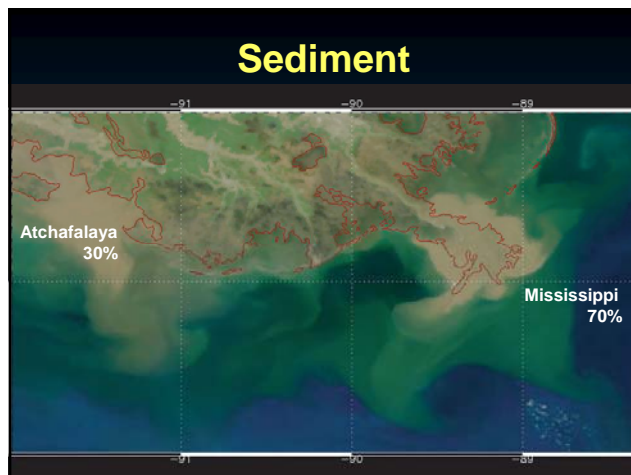
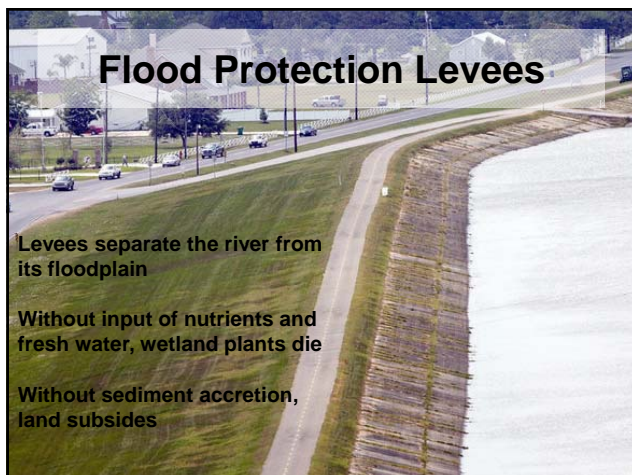
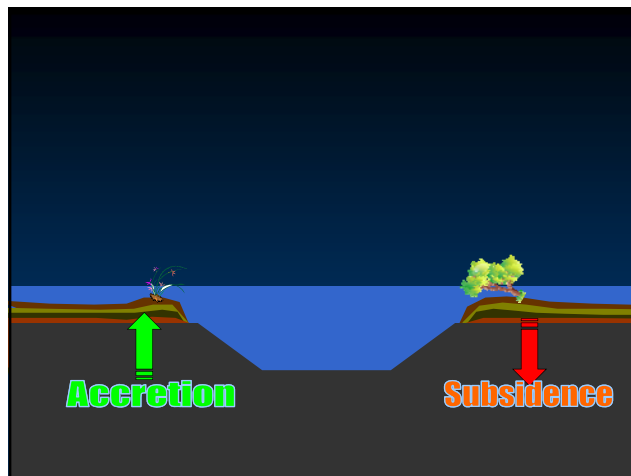


Mississippi River

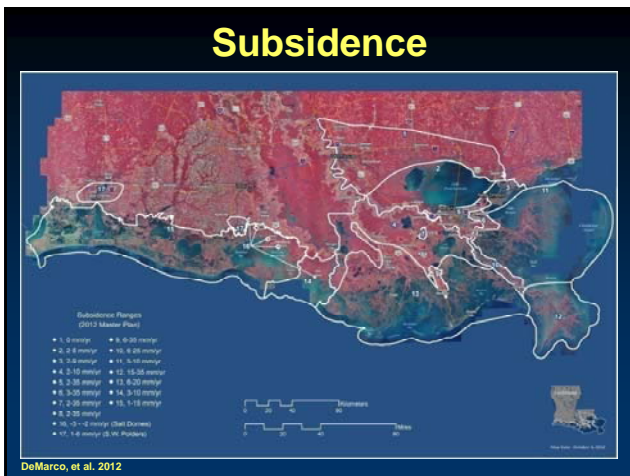


- Atchafalaya River a distributary of the Mississippi
- Mississippi River changing course in early 1900's
- Old River Control Structure completed in 1964
- 70:30 split

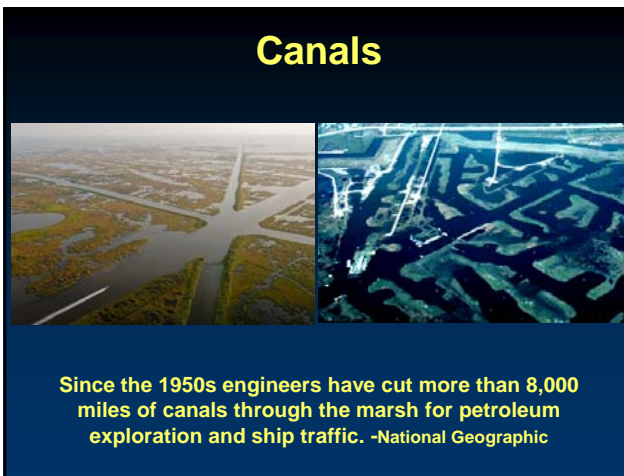




Subsidence

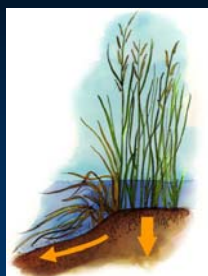


Canals



Canals

- Canals allow saltwater to enter marshes and swamps.
- Salt water kills plants
- Wave action erodes soil
- Storm surges travel unimpeded



Hurricanes

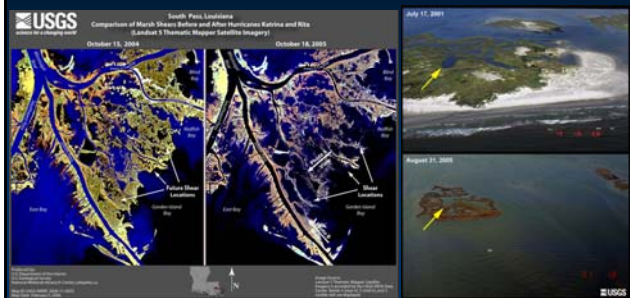
The net reduction in land from 2004 to 2008 (849.5 km²) exceeded that from 1978 to 2004 (743.3 km²) -USGS

Coastal wetlands flooding in southeast Louisiana, pre- and post-Katrina.



Hurricanes

The net reduction in land from 2004 to 2008 (849.5 km²) exceeded that from 1978 to 2004 (743.3 km²) -USGS

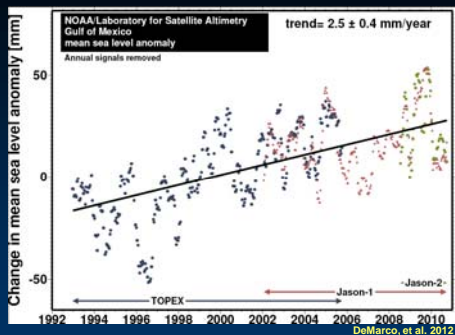


Invasive Nutria

- Introduced from South America in 1930's
- Promoted as biological control for aquatic weeds in 1940's
- Fur market declined in mid 1980's



Sea Level Rise



- Sea level rise accelerating
- 1 meter by 2100 –LA Coastal Protection and Restoration Authority
- DeMarco, et al. 2012

SO WHAT?

Wildlife Values

- Wetland habitats are the most biologically productive on earth
- Approximately 735 species of birds, finfish, shellfish, reptiles, amphibians, and mammals spend all or part of their life cycle in the estuary. -btnep.org



© 2011 Image Bank 1

Audobon Louisiana Birds of Conservation Concern

- Mottled Duck
- Brown Pelican
- Little Blue Heron
- Reddish Egret
- Swallow-tailed Kite
- Clapper Rail
- Snowy Plover
- Wilson's Plover
- Piping Plover
- American Oystercatcher
- Ruddy Turnstone
- Red Knot
- Sanderling
- Western Sandpiper
- Short-billed Dowitcher
- Black Skimmer
- Prothonotary Warbler
- Swainson's Warbler
- Cerulean Warbler
- Seaside Sparrow
- Least Tern



Piping Plover



Reddish Egret



Swallow-tailed kite



Brown Pelican

5 million migratory birds using Mississippi and Central flyways winter here. -lacoast.gov



“supports up to 40% of the nations waterfowl during the winter and 40% of the nation’s raptors, shorebirds, and waterfowl during migration.”
-Melanie Driscoll, Audobon

The location of this region along the central gulf coast provides a "jumping off point" for many migrants crossing the gulf on their way south during winter migration and "returning point" for those coming back in the spring. -btnep.org



Fisheries



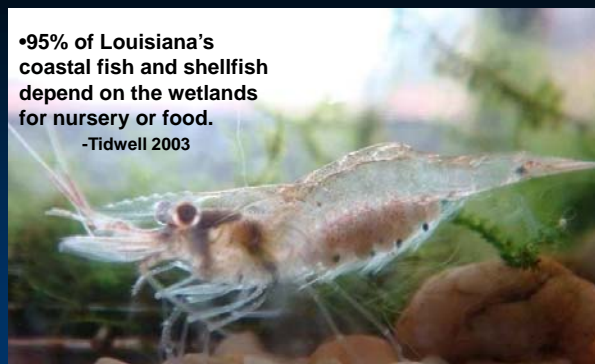
LA's commercial fisheries are the most bountiful of the lower 48 states, providing 25 - 35% of the nation's total catch. LA is first in the annual harvest of oysters, shrimp, crabs, crawfish, red snapper, wild catfish, sea trout and mullet.

-restoreorretreat.org

Fisheries

•95% of Louisiana's coastal fish and shellfish depend on the wetlands for nursery or food.

-Tidwell 2003



Fisheries



Without restoration, by 2050, the annual loss of commercial fisheries will be nearly \$550 million. For recreational fisheries, the total loss will be close to \$200 million a year.

-restoreorretreat.org

Recreation

Recreational Fishing
Employs 20,000

\$1.7 billion

-dnr.louisiana.gov



Recreation

Hunting:
\$975 million

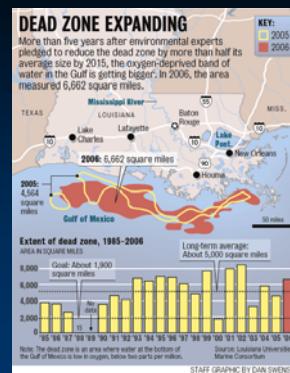


Wildlife Watching: \$517 million



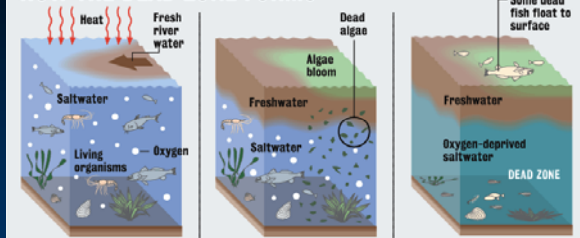
Fur and Alligator Harvest: \$111 million

Water Quality



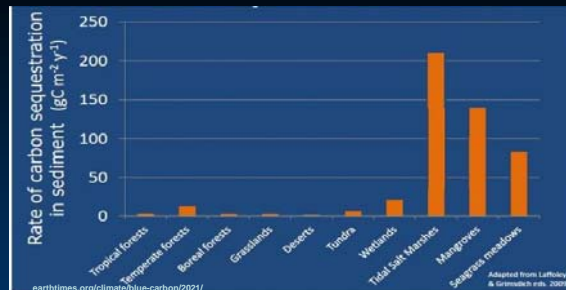
Water Quality

HOW THE DEAD ZONE FORMS



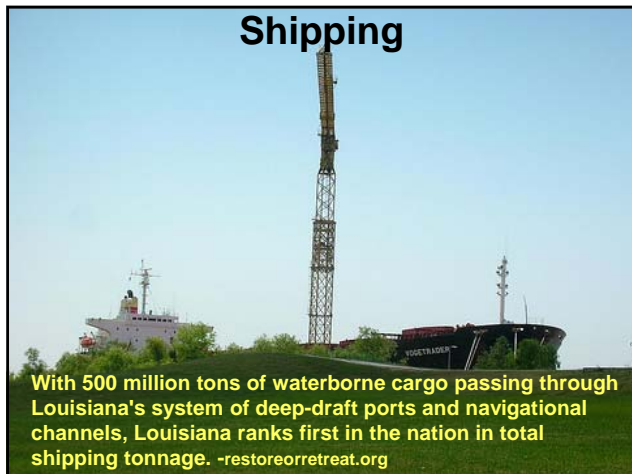
“wetlands and shallow water bottoms with anaerobic sediments are natural sinks for nitrate–nitrogen” (Mitsch et al. 2001)

Carbon



Degraded marsh 4.5 tons CO₂/acre/year
Healthy marsh 11 tons CO₂/acre/yr
Wetland forests 10 tons CO₂/acre/year
-Earth Economics

Shipping



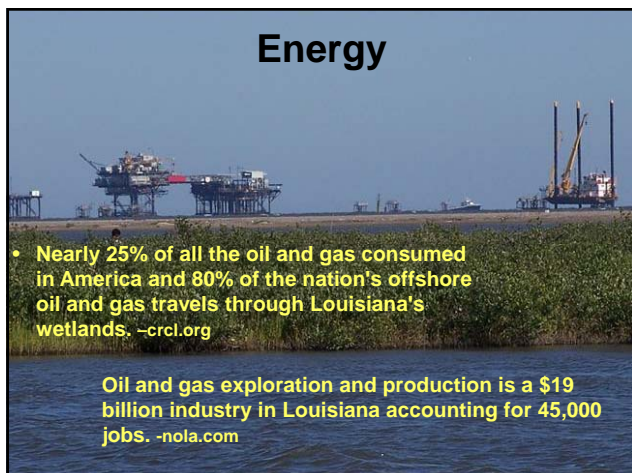
With 500 million tons of waterborne cargo passing through Louisiana's system of deep-draft ports and navigational channels, Louisiana ranks first in the nation in total shipping tonnage. -restoreorretreat.org

Shipping



Without the protection of coastal wetlands and barrier islands, 155 miles of waterways will be exposed to open water in 50 years and billions of taxpayer dollars will have to be spent on increased dredging and maintenance costs. -crcl.org

Energy



- Nearly 25% of all the oil and gas consumed in America and 80% of the nation's offshore oil and gas travels through Louisiana's wetlands. -crcl.org

Oil and gas exploration and production is a \$19 billion industry in Louisiana accounting for 45,000 jobs. -nola.com


Wetlands protect pipelines



Over 20,000 miles of pipelines are located in federal offshore lands and thousands more inland. restoreorretreat.org

Energy

- Over 20,000 miles of pipelines exposed to:
- Ship strikes
- Storms
- Corrosion



Ship O'Rourke, AP

Culture




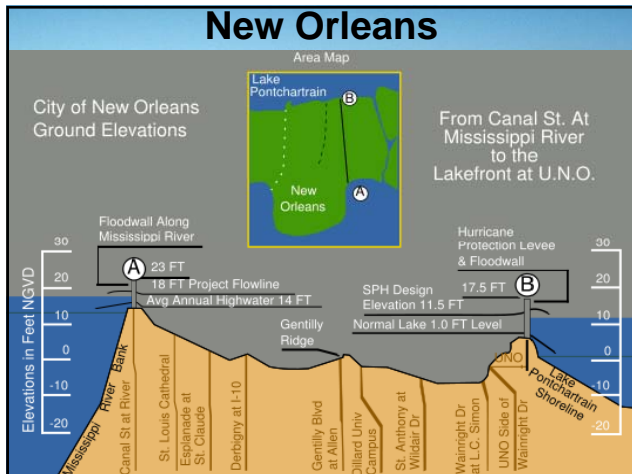
Culture



Hurricane Protection

- Warming oceans
- Predicted increased in frequency, intensity, duration of hurricanes
- Five hurricanes in last seven years:
 - Katrina (2005) category 4
 - Rita (2005) category 3
 - Gustav (2008) category 2
 - Ike (2008) category 2
 - Issac (2012) category 1



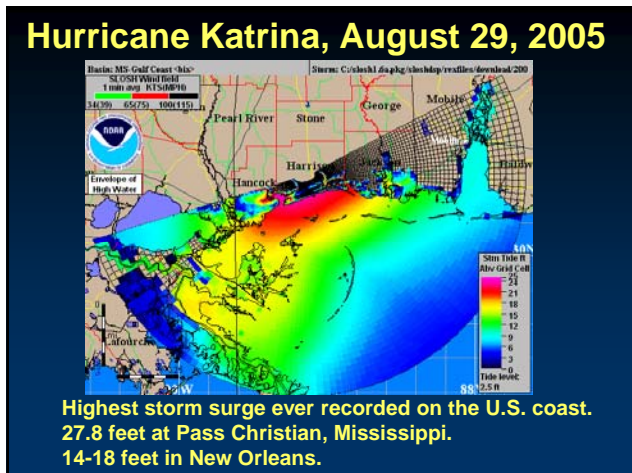


“The storm hit Breton Sound with the fury of a nuclear warhead, pushing a deadly storm surge into Lake Pontchartrain. The water crept to the top of the massive berm that holds back the lake and then spilled over. Nearly 80 percent of New Orleans lies below sea level—more than eight feet below in places—so the water poured in... As it reached 25 feet over parts of the city, people climbed onto roofs to escape it.

Thousands drowned in the murky brew that was soon contaminated by sewage and industrial waste. Thousands more who survived the flood later perished from dehydration and disease as they waited to be rescued. It took two months to pump the city dry, and by then the Big Easy was buried under a blanket of putrid sediment, a million people were homeless, and 50,000 were dead. It was the worst natural disaster in the history of the United States.

When did this calamity happen? It hasn't—yet. But the doomsday scenario is not far-fetched. The Federal Emergency Management Agency lists a hurricane strike on New Orleans as one of the most dire threats to the nation.”

Joel K. Bourne, Jr. National Geographic October 2004



At current land-loss rates...

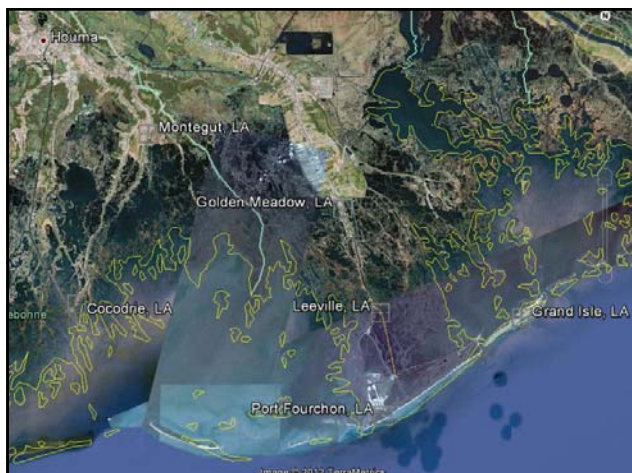
In 10 years:

- Gulf waves that once ended on barrier island beaches far from the city could be crashing on levees behind suburban lawns.
- The state will be forced to begin abandoning outlying communities such as Lafitte, Golden Meadow, Cocodrie, Montegut, Leeville, Grand Isle and Port Fourchon.

-Times Picayune

Economics

- Do nothing scenario: \$41 billion in lost capital not including hurricanes
- Restoration projected to produce benefits of \$21 billion, bringing in an annual net benefit of \$62 billion.



Restoring Sustainability to the Mississippi River Delta

- Barrier Shoreline Restoration
- Marsh Restoration with Dredged Material
- Land Building Diversions
- Land Sustaining Diversions
- Hydraulic Restoration
- Shoreline Stabilization
- Closure of the Mississippi River Gulf Outlet

Barrier Shoreline Restoration

- Habitat for birds, threatened, and endangered species
- 1st line of defense against wave energy and storm surge
- Sediment is dredged, pumped, and revegetated with native dune and marsh species.



Barrier Shoreline Restoration



Marsh Restoration with Dredged Material

- Containment dike
- Cutterhead stirs up sediment
- Slurry piped
- Dewatering
- Planting



Land Sustaining Diversions

Outfall management



Land Building Diversions



Land Building Diversions

Some sediment diversions up to 250,000 cfs at high flows (>900,000 cfs)



Hydraulic Restoration



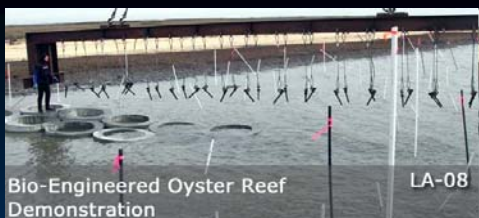
Shoreline Stabilization



Closure of the Mississippi River Gulf Outlet



- Junction with Intracoastal WW
- Shortcut to Gulf
- Funnel effect



Bio-Engineered Oyster Reef Demonstration

LA-08



Little Vermilion Bay Sediment Trapping Project

TV-12

Restoration Legislation

- CWPBRA-1990
- 2012 MASTER PLAN
- RESTORE ACT



CWPPRA 1990

Coastal
Wetlands
Planning
Protection &
Restoration
Act



- AKA the Breaux Act
- 91 feasibility and demonstration projects
- Since 1990, CWPPRA has protected, created, or restored 112,000 acres. 550,000 enhanced.

2012 Master Plan

- 109 projects over 50 years
- More land gained than lost by 2042
- 859 square miles built by 2061
- Net average 2.5 square miles/year
- \$50 Billion
- BP fines, congressional appropriations, offshore oil
- ½ to risk reduction, ½ to restoration
- For comparison:
Everglades restoration, \$7.8B, 30 years
Boston's "Big Dig" \$14.6B, 25 years

RESTORE Act 2011

Resources and
Ecosystems
Sustainability,
Tourist
Opportunity, and
Revived
Economies of the Gulf States



80% of Clean Water Act penalties to Gulf States
Record \$4.5 billion criminal penalty

Questions?

Learn More!

- [Bayou Farewell -Mike Tidwell 2003](#)
- [Nola.com/speced/lastchance/](#)
- [Coastal.louisiana.gov](#)
- [Clear.lsu.edu/needs_in_louisiana/](#)

Additional Citations

- [Lacoast.gov](#)
- [Btnep.org](#)
- [La.audobon.org](#)
- [Lca.gov](#)
- [Dnr.state.la.us/crm](#)
- [Crcl.org](#)
- [Restoreorretreat.org](#)
- [habitat.noaa.gov/coastalbluecarbon.html](#)
- [news.nationalgeographic.com/news/2010/08/100826-katrina-sewage-wetlands-water/](#)
- [Gone with the water, National Geographic October 2004](#)
- [dnr.louisiana.gov/assets/OCM/OCM/webfactsheet_20110727.pdf](#)
- [Mitsch et al. 2001. Reducing Nitrogen Loading to the Gulf of Mexico from the Mississippi River Basin: Strategies to Counter a Persistent Ecological Problem BioScience 51\(5\):373-388.](#)
- [D. Batker et al. 2010. Gaining Ground -Wetlands, Hurricanes, and the Economy: The Value of Restoring the Mississippi River Delta. Earth Economics. Tacoma, WA](#)
- [Barras, John A. 2009. Land Area Change and Overview of Major Hurricane Impacts in Coastal Louisiana, 2004-08. USGS](#)
- [Couvillion, B.R., Barras, J.A., Steyer, G.D., Sleavin, W., Fischer, M., Beck, H., Trahan, N., Griffin, B., and D. Heckman. 2011, Land area change in coastal Louisiana from 1932 to 2010: U.S. Geological Survey Scientific Investigations Map 3164, scale 1:265,000, 12 p. pamphlet.](#)
- [DeMarco, K., Mouton, J., and J. Pahl. 2012. Recommendations for anticipating sea-level rise impacts on Louisiana coastal resources during project planning and design. Summary of the technical report for coastal managers. Coastal protection and restoration authority.](#)