100 YEARS OF MISMANAGEMENT LEADING TO COLLAPSE

Causes of Wetland Collapse

Oil and gas infrastructure
Louisiana is America's Energy Coast. There are thousands of offshore oil rigs and onshore wells in coastal Louisiana, significant refinery capacity and thousands of miles of pipelines connecting it all. Over many decades, these activities have directly impacted thousands of acres of coastal wetlands and modified the coastal hydrology, speeding up erosion.

Navigation Channels
The Mississippi River Gulf Outlet, the Houma Navigational Canal, and Freshwater Bayou are all straight waterways that have been dredged across the wetland landscape,creating extreme hydrological and salinity changes. The disastrous results include failure of banks, marsh die-outs, flooding of marshes, and rapid wetland degradation.

River Levees
Following the Great Flood of 1927, a national program to "control" the Mississippi River resulted in levees that straitjacketed the river from Missouri down to its mouth. Cut off upstream from its watershed and sediment-laden runoff, the river can no longer deposit land-building sediments in its delta to support the fragile wetlands.

Dams upriver
Valuable land-building sediments are trapped behind locks and dams on the Missouri, Mississippi and Ohio Rivers. Since 1850, the amount of sediment in the Lower Mississippi River has decreased by more than 70 percent.

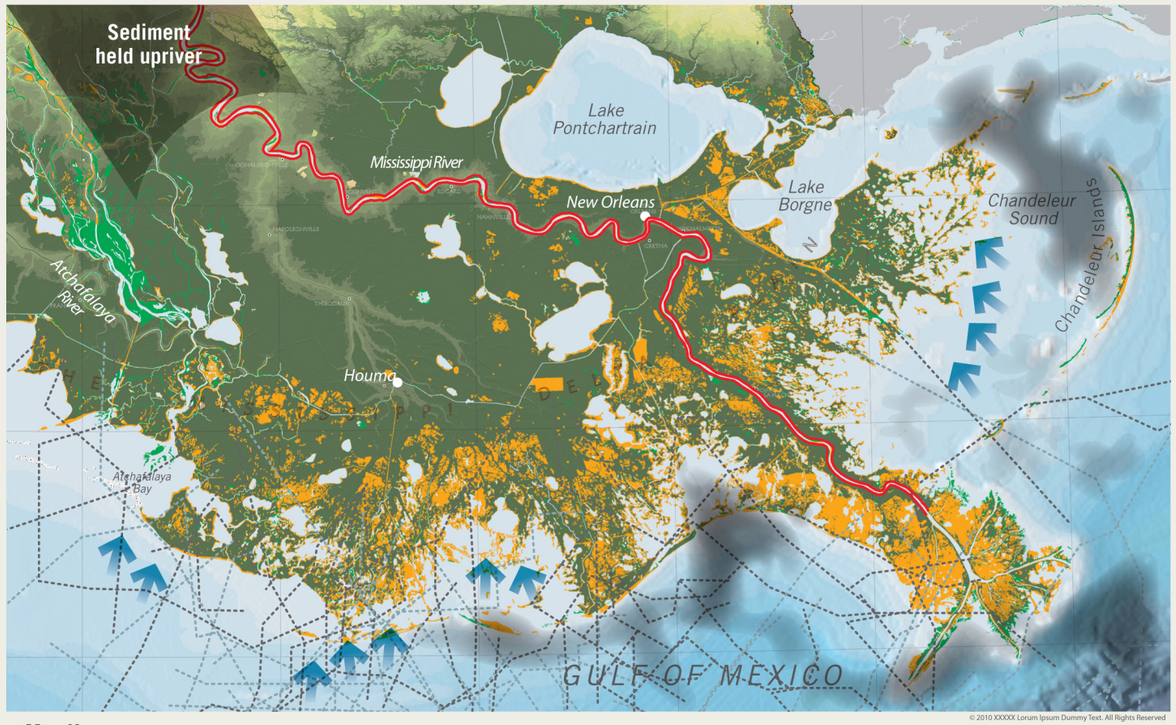
Subsidence
River sediment deposits naturally subside and sink over time. Historically, sediment deposition and accretion by plant growth outpaced the natural subsidence resulting in coastal land gain. Without land-building deposits from the river, subsidence is not counterbalanced and massive areas of land are sinking below sea level and disappearing.

Sea level rise
Scientists say that the level of the world's oceans will rise from one to three feet over the next century. Rising seas combined with subsiding land (called "relative sea level rise") makes the threat of submergence even greater for the Mississippi Delta. When delta wetlands receive sufficient sediment from the river, they can stay above the rising seas.

Nutria
Nutria were introduced into Louisiana for the fur-trade, but their impact on coastal wetlands was an unrecognized future disaster. As they burrow into the ground ,eat the roots of marsh plants, and devour cypress seedlings, acres of marsh can be destroyed by these fast breeding, voracious rodents.

Hurricanes
Storm surge from H Katrina and Rita destroyed hundreds of square miles of unprotected coastal wetlands, emphasizing the importance of barrier islands and healthy wetlands for reducing storm surge. Hurricanes are not a new phenomenon but continued wetland loss makes coastal communities increasingly more vulnerable to their effects.

Oil spill
The BP Macondo well gushed 206 million gallons of oil into the Gulf, affecting hundreds of miles of delicate shoreline, thousands of acres of coastal marsh, and disrupting the communities, economy and wildlife of the coast. The spill will continue to impact the coast and its inhabitants for decades to come.

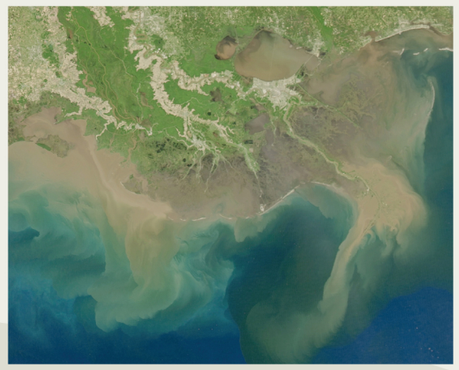


Map Key:
Land lost 1937 - 2000 | Land gained 1937 - 2000 | Oil spill | River levees | Sea level rise | Oil & gas pipelines

Land loss 1937 - 2000: Decades of management of the Mississippi River for national economic development and flood control have brought the Mississippi River Delta, and the coastal ecosystem that depends on it, to the brink of collapse. The Louisiana coast has lost 2,300 square miles since 1930, and current land loss continues at the rate of a football field every half hour. (shown in yellow above)

A Tale of Two Rivers: The Atchafalaya River, unlike the Mississippi, is able to function in a more natural state and shows the restorative capacity that rivers in deltas have. The river water is sediment-rich, some of which settles in the basin and some is forming two deltas in the bay, creating new land and important wildlife habitat (shown in green above).

Unleash the River's Capacity to Build Land: In the satellite photo at right, the rich load of sediment carried by the spring flood is clearly visible. Much of the water and sediment of the Mississippi River falls into the deep water of the Gulf of Mexico, where it cannot build land. The Atchafalaya River, on the other hand, flows out into a shallow bay, where new land is forming.



SOLUTIONS:
Key Principles of Restoration

Reconnect the river to its delta
The Mississippi River created the delta that makes up most of the Louisiana coast – which in turn supports the local, regional, and national economy; industry and infrastructure that is critical to the nation; productive fisheries and vital habitat for birds and other wildlife; and the unique cultures of south Louisiana. Reconnecting the river to the surrounding wetlands through large-scale controlled sediment diversions that mimic the river's natural land-building function will help save the delta from collapse.

Manage and Use Sediment to Build Land
For the coast to survive, every bit of vital sediment must be used effectively. With sediment in the river reduced, instead of treating it as a nuisance that hinders navigation, we must value it as a precious and limited resource. Every year 22 million cubic yards of sand and mud – the life blood of the wetlands – are dredged to make way for shipping and dumped in the deep water off the continental shelf. Instead, appropriately placed sediment diversions and strategic placement of dredged material can capture this valuable resource to sustain and build coastal land.

Use of Old River Control Structure
The Atchafalaya River is the largest distributary of the Mississippi River and feeds the largest river-swamp in the US. To maintain the Mississippi River for navigation, The Old River Control Complex restricts the Atchafalaya River to 30 percent of the combined flow of the two rivers – an arbitrary number. Instead, the ORCS should manage flows based on an ecologically sound plan for sustaining and restoring the wetlands on both Rivers.

Non-structural flood protection
Flood-control projects along the Mississippi River over the last century have created a false sense of security among coastal engineers as well as inhabitants of low-lying coastal communities. Recent flooding from hurricanes has emphasized that levees fail, and that communities are ever more vulnerable as coastal land loss and sea level rise continue. Communities are learning to become more resilient by elevating homes, flood-proofing businesses, and hardening coastal facilities, reducing flood risks for people and property.

Restore hydrology
When canals are dredged through the wetlands for oil and gasexploration and for navigation, the dredged soil is frequently piled along the sides of the canals in small levees called spoil banks. These banks prevent the normal flow of water and nutirients into and across the marsh and allow salt water to flow far inland. The canals allow salt water to flow far inland anad kill fresher marshes. Removing the spoil banks and refilling unused cnanals aare simple and quick steps to restore the smooth flow of water and nutrients, prevent further salt water intrusion and help the marshes to thrive.

Protect shorelines with living reefs
Restoring living oyster reefs in front of beaches and marshes protects the shoreline in many ways. Living reefs absorb wave action and create a buffer against storms; provide high quality habitat for fish and birds; improve water quality; and cast off old shells that naturally armor the beach and prevent erosion. Additionally, the rocks that are frequently used to protect shorelines sink and must be replenished, while living oyster reefs grow and keep up with sea level rise.

Protect and restore barrier islands
Barrier islands define the outer limits of the estuary and help maintain the gradient from fresh water to salt water that makes it so productive. They are the "first line of defense" against storm surge, and dampen wave energy within the estuary.

EDF ENVIRONMENTAL DEFENSE FUND™ Finding the ways that work

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Environmental Defense Fund, National Wildlife Federation and the National Audubon Society are partnered to advance the large-scale restoration of the Mississippi River Delta. Our coalition is working to make restoration a national priority and catalyze the resources necessary to harness the power of the Mississippi River for restoration.

Acknowledgements: Land Loss Map: Louisiana Shoreline Change 1937-2000, John Snead, R. Hampton Peele, and S. Ahmet Binselam. Louisiana State University/Louisiana Geological Survey, 2007
LA Lift House: A project and photo of TRAC. (in Non-structural flood protection section), **Subsidence and Sea level rise photos:** Tim Carruthers/IAN, **Design:** Weirdesign. www.weirdesign.com