Louisiana is facing a land loss crisis. Since 1932, our state has lost more than 1,800 square miles of land, roughly the size of the state of Delaware. This loss continues today at the alarming rate of a football field every hour.

Over time, the natural processes that once built and maintained this vital landscape have been disrupted. The land-building and sustaining role of the Mississippi River was cut off by levees. The important balance between fresh and salt water was altered by the dredging of canals and rising sea levels, killing many freshwater wetlands. Combined, these changes not only destroyed existing wetlands, but also left remaining marshes and communities more vulnerable to the impacts of hurricanes and storms.

Natural and man-made causes of land loss

- Levees
- Oil, Gas & Navigation Canals
- Compaction and Sinking
- Sea Level Rise
- Hurricanes
- BP Oil Spill
- Invasive Species

With so many causes behind the land loss crisis, a variety of coastal restoration strategies are needed for effective restoration — there is no single solution. When restoration projects are strategically planned and operated together, they are more effective. Employing the full suite of restoration tools available allows land to be built and maintained in a way that surpasses the benefits of any single project operating alone. To understand the combined effects of different types of restoration projects, it is important to understand the individual project benefits and their limitations.

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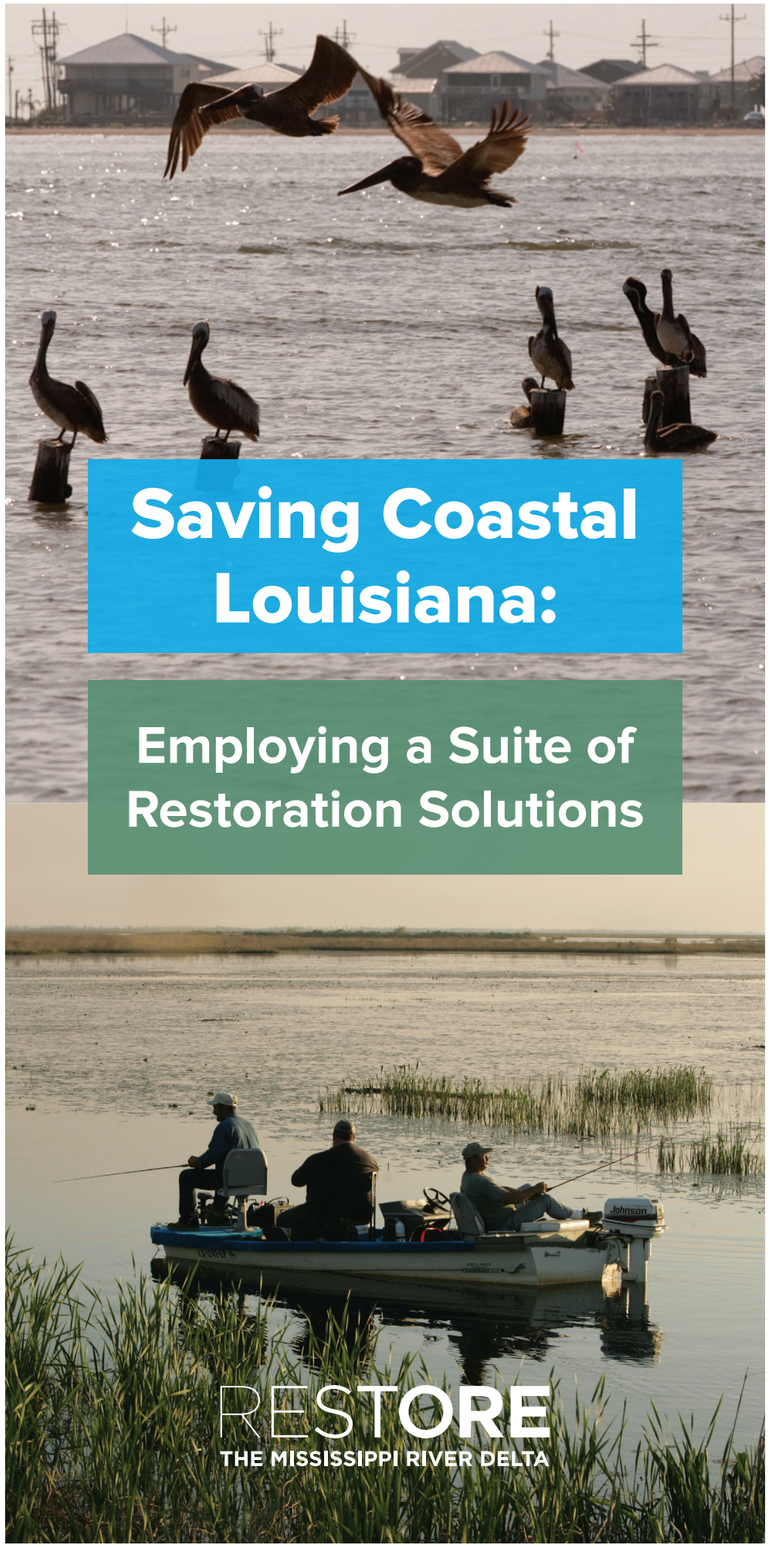

Salinity is the concentration of salt in water and is often reported in parts per thousand (ppt). Salinity levels can span from 0 ppt (fresh water) up to 35 ppt (the Gulf of Mexico).

An **estuary** is a body of water where a freshwater river or stream meets and mixes with salty ocean water. They are commonly found along coastlines and are some of the most productive ecosystems on earth. An estuary typically contains a range of salinities - from 0 ppt near the source of fresh water to 35 ppt near the open ocean.

The plants and animals of an estuary each have different tolerances to salinity. Some plants and animals can only survive in parts of the estuary where salinity is very low, some do better at higher salinities, and some need a salinity that falls between freshwater and saltwater.

Sediment Diversion

Description: Sediment diversion projects mimic nature's historic land-building by using the power of the river to move sediment and fresh water into nearby basins.

Benefits: This project type can build new land. In addition, sediment diversions are critical for nourishing and helping sustain the existing wetlands by increasing their resistance to and recovery from storms and sea level rise. These created and sustained wetlands can provide wildlife and fisheries habitat and storm surge protection to communities.

Limitations: Sediment diversion projects immediately begin providing sediment to help sustain existing wetlands, but may take longer to build visible land in open water areas compared to other types of restoration projects.

Working in tandem with other projects: Sediment diversions are long-lived projects that accrue benefits to the environment over time and provide a source of sand and mud to increase and enhance the lifespans, stability and long-term benefits of nearby marsh creation, barrier island restoration and ridge restoration projects.

Hydrologic Restoration

Description: Hydrologic restoration projects restore fresh water flows through man-made channels or use gates, or similar structures, to reduce or prevent saltwater intrusion.

Benefits: This project type decreases salinity, preventing the die-off of freshwater plants and trees that are essential to preserving the structure and function of many marshes and swamps. These projects also maintain lower salinity conditions needed in some parts of the coast to support habitat for a variety of fish and wildlife.

Limitations: This type of project is not expected to build significant amounts of new land, but it is expected to prevent future loss.

Working in tandem with other projects: Hydrologic restoration projects can help maintain optimal salinities needed for the success of oyster barrier reef projects, as well as marsh creation projects dominated by freshwater plants and trees.

Barrier Island Restoration

Description: Barrier island restoration projects use sand to rebuild and restore barrier island beaches and dunes.

Benefits: These projects create or enhance important wildlife and shorebird habitat and serve as the first line of defense against storms for communities. In addition, these islands provide a natural barrier between salty Gulf waters and the salt-sensitive wetland plants behind the islands. They also shelter these wetlands from erosion by waves and storm surge.

Limitations: Due to their constant exposure to waves and storms and the scarcity of nearby sand sources, these projects can have short lifespans and require regular maintenance.

Working in tandem with other projects: By buffering other projects against waves, storms and saltwater intrusion, barrier island restoration projects can increase the lifespan of marsh creation projects and increase the land-building and sustaining benefits of sediment diversions and hydrologic restoration.

Marsh Creation

Description: Marsh creation projects use sediment from the Mississippi River or nearby water bottoms to build land in shallow open water areas, typically where land has recently been lost.

Benefits: Marsh creation projects can build land quickly and address the urgent need to help buffer nearby communities from storms.

Limitations: Marsh creation alone is not a long-term sustainable solution for land loss. These projects are designed and built several feet higher than natural wetlands, because the project is expected to sink with time. In addition, this created marsh will be exposed to the factors that caused the original marsh to be lost, and it will eventually be lost as well.

Working in tandem with other projects: This project type can be built in combination with sediment diversions to help trap sediment from the diversion to build land more quickly. Sediment diversions can in turn benefit marsh creation projects by providing a long-term source of sediment that can help lengthen their lifespans.

Ridge Restoration

Description: Ridge restoration projects use sediment to restore historic ridges. A ridge is a strip of land, usually a remnant of the bank of an abandoned bayou or stream. Ridges are elevated above the marsh surface and typically populated with trees.

Benefits: This project type restores important habitat that is high and dry enough to support native trees and plants. Ridges can provide storm surge protection to nearby communities and help prevent saltwater intrusion into freshwater wetlands. These forests also provide a unique habitat and are important stopover spots for migratory birds.

Limitations: The construction of this project type is limited to the sites of historic ridges.

Working in tandem with other projects: Ridge restoration projects can work with hydrologic restoration projects to re-establish historic salinities within the basin, reduce shoreline erosion of marsh creation projects and trap sediment from sediment diversions to help build more land, more quickly.

Oyster Reef Restoration

Description: Oyster reef restoration projects use natural and man-made materials to encourage the establishment of oysters to create living shorelines.

Benefits: Oyster reef projects can reduce waves on adjacent wetlands, thereby reducing erosion. Additionally, oyster reef projects can help improve water quality, provide habitat for fish and can naturally maintain themselves over time.

Limitations: The balance of fresh and salt water needed for oyster reef restoration limits where these projects can be implemented.

Working in tandem with other projects: Oyster reef restoration projects can benefit from nearby hydrologic restoration projects, creating conditions favorable for oysters to flourish and be sustained over time. Oyster reef restoration can also reduce erosion on marsh creation and barrier island restoration projects.

Shoreline Protection

Description: Shoreline protection projects are narrow "walls" made of rock or similar material placed along shorelines of lakes, bayous and open bays.

Benefits: This project type can significantly reduce the rate of erosion of the wetlands and shorelines they protect.

Limitations: The area benefited by this project type is often limited to the shorelines and wetlands in the immediate area. These projects often require frequent maintenance.

Working in tandem with other projects: Shoreline protection projects can help maintain existing wetlands as new land is built through marsh creation and sediment diversions.