

CARBON MARKET OPPORTUNITIES

for **LOUISIANA'S COASTAL WETLANDS**



Coastal wetland restoration in Louisiana has the potential to produce over 1.8 million offsets per year—almost 92 million offsets over 50 years.

Restoration of the Mississippi River Delta is of national significance. The economic health of much of the United States depends on sustaining the navigation, flood control, energy production, and seafood production functions of this valuable river system. Each of those functions is currently at severe risk due to a coastal wetland loss rate of approximately one football field an hour.

Wetland restoration techniques provide a wealth of benefits such as storm surge reduction, fish and wildlife habitat, carbon sequestration, recreation, job creation, and economic development that are vital to Louisiana's sustainability.

CARBON MARKETS

Emissions trading is a market-based approach that provides economic incentives for reducing pollution. Carbon markets are designed to work by assigning a price to greenhouse gas emissions. Environmental offset markets, especially carbon markets, provide an important and innovative approach to finance environmental restoration and conservation.

BLUE CARBON STUDY

A study was executed by Tierra Resources to evaluate the commercial potential of blue carbon in Louisiana and to identify areas for future scientific investigation to support carbon offset programs. Blue carbon is the carbon stored in mangroves, seagrass, and coastal wetlands including tidally influenced cypress forests and freshwater marshes. Wetlands naturally sequester this carbon in plants and soils through photosynthesis as they grow.

ABOUT THE PARTNERS

- 1** **Tierra Resources** | Based in New Orleans, LA, *Tierra Resources* was founded in 2007 with a mission to conserve, protect, and restore coastal wetland ecosystems by creating innovative solutions that support investment into wetland restoration activities. Tierra Resources' services enable landowners, corporations, nonprofits, and government clients to understand the regulatory, financial, and scientific landscape to preserve and restore wetlands and monetize wetland offsets.
- 2** **Entergy Corporation** | This research was supported by *Entergy Corporation* through its Environmental Initiatives Fund (EIF). The EIF was established by shareholders to implement environmentally beneficial projects such as working with companies like Tierra Resources to develop leading-edge technologies and other environmentally beneficial projects that align with Entergy's environmental strategy. Entergy Corporation is an integrated energy company recognized for its leadership in environmental and social responsibility.
- 3** **The Climate Trust** | Based in Portland, Ore., *The Climate Trust* is a nonprofit organization providing advisory services on environmental markets. The Trust has more than 15 years of carbon financing experience, with a mission of transforming the economy to value our climate. In order to avoid the most dangerous impacts of climate change, The Trust works to accelerate project implementation, develop financing solutions, and establish a supportive policy environment in the agriculture, forestry and biogas sectors.



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As part of this study, existing wetland restoration techniques were examined to identify methods that show commercialization potential as wetland offset projects. The restoration techniques identified include: river diversions, hydrologic restoration, wetland assimilation, and mangrove plantings. The predicted carbon offset yield for the various restoration techniques was based upon current peer reviewed data on carbon sequestration and refined in line with carbon market rules.

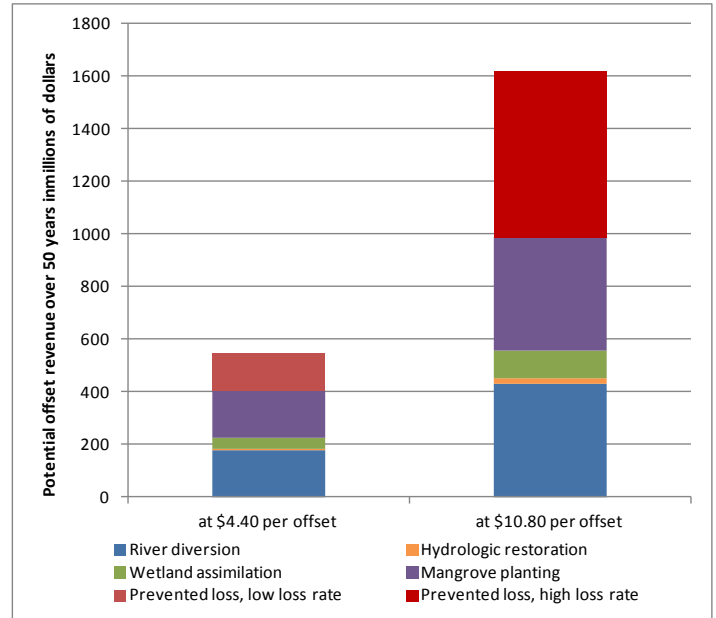
Predicted Carbon Offset Yield (mtCO ₂ e/ac) by Restoration Technique per year	Carbon Credit
River diversion—forested	3.8
River diversion—emergent	0.8
Wetland assimilation—forested	7.0
Wetland assimilation—emergent	3.1
Hydrologic restoration	0.8
Mangrove planting	2.0

Of the restoration techniques studied, forested wetlands that receive treated municipal effluent, referred to as wetland assimilation systems, have the highest net offset yield per acre. However, it was concluded that river diversions and mangrove plantings have the potential to generate the largest volume of offsets in Louisiana due to the huge amount of acreage upon which these restoration techniques can be implemented. Additionally, carbon offsets from wetland assimilation systems and river diversions show potential to be stacked with water quality credits should these markets evolve in Louisiana.



PREVENTED WETLAND LOSS

Unfortunately, many wetlands in Louisiana are deteriorating and converting to open water, resulting in the re-release of large amounts of previously stored carbon. Currently carbon accounting does not include the amount of soil carbon that is re-released as greenhouse gases. The creation of a mechanism to fully quantify prevented wetland loss will optimize the amount of offsets that can be achieved from a specific restoration project. Providing wetland offset credits for prevented wetland loss in the Mississippi River Delta may be essential to providing a strong business case for carbon investment into wetland restoration projects around the world.



STUDY RESULTS

The final study results revealed that coastal wetland restoration in Louisiana has the potential to produce 1.8 million offsets per year—over 92 million offsets over 50 years. Wetland restoration techniques identified in this study could potentially generate \$400 million to almost \$1 billion in offset revenue depending on the dollar value of the carbon offset. Including prevented wetland loss in carbon accounting may provide an additional \$140 to almost \$630 million depending on the price of the carbon offset, and rates of wetland loss, subsidence, and sea level rise.

Conservative estimates indicate that carbon finance has the potential to bring a total of \$540 million to almost \$1.6 billion to assist with wetland restoration in the coastal areas of the Mississippi River Delta depending on the carbon offset prices and yields.

The primary barrier to wetland carbon commercialization that was identified through this study is the high cost of wetland restoration. Therefore, carbon finance will need to be leveraged with traditional restoration funding programs, requiring new public-private partnership paradigms to stimulate investment into wetland projects.

The results of this assessment demonstrate that carbon finance has substantial potential to generate important revenue to support wetland restoration. Restoration efforts will likely lead to new public-private paradigms that leverage carbon finance with government restoration dollars. This study points to Louisiana as an innovator of creative financing strategies for wetlands restoration, and as creating new investment opportunities that will yield substantial economic and environmental benefits. Beyond the Gulf Coast this work can be expanded to address other critical wetland areas such as the Sacramento-San Joaquin Delta, Florida's Everglades and wetlands in Virginia, Maryland and the Carolinas.