

# RESTORATION OF DEGRADED DELTAIC WETLANDS OF THE MISSISSIPPI DELTA



## METHODOLOGY OVERVIEW

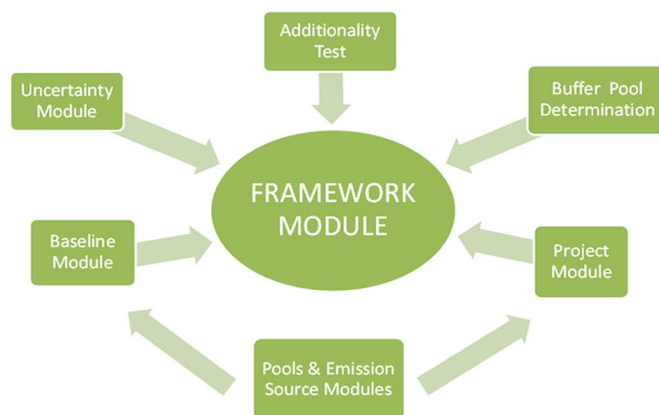
The American Carbon Registry, an enterprise of Winrock International, has approved the first wetland carbon offset methodology, developed by Dr. Sarah K. Mack of New Orleans-based Tierra Resources LLC, with contributions from Drs. Robert R. Lane and John W. Day from Louisiana State University, and funded by Entergy Corporation through their Environmental Initiatives Fund. The methodology, Restoration of Degraded Deltaic Wetlands of the Mississippi Delta, underwent the rigorous ACR approval process that included an internal review by Winrock & ACR scientists and technical staff, a 30-day public comment period, and a blind scientific peer review by a panel of experts. This methodology is the first carbon offset methodology that is specifically focused on U.S. wetlands, and is the first wetland offset methodology in the world that is applicable at a large scale to broadly address wetland restoration through numerous eligible restoration techniques.

The methodology introduces a new offset sector for companies to invest in to offset their emissions. The new methodology is considered a game changer as it will for the first time provide a means to generate carbon offsets for wetland restoration, as well as for activities that prevent the continued loss of wetlands in the Mississippi River Delta. Carbon finance can be an important revenue stream to expedite large scale wetland restoration to slow and reverse the trend of rapid wetland loss while providing multiple other environmental and economic benefits to the region.

## METHODOLOGY STRUCTURE

The methodology is innovative in that it utilizes a modular approach to provide flexibility to meet a variety of local conditions and restoration techniques. Issues that cause wetland loss are different in different regions and may require different restoration techniques. The modular methodology addresses each aspect of the project from establishing a baseline, monitoring of eligible carbon pools, and estimating project emission reductions, as a discrete and independent module. The individual modules that are applicable to a specific wetland restoration project can then be selected and applied under the framework module that result in a streamlined project-specific methodology. These modules, when used together will ensure the environmental integrity and robustness of restoration projects, and prevent certification of poorly designed wetland restoration activities.

The methodology addresses each aspect of the project including eligibility criteria, baseline establishment, eligible carbon pool monitoring, QA/QC methods, risk accounting, and estimation of project emission reductions that are eligible as carbon offsets. Furthermore, this methodology becomes the foundation for third-party validation and verification in accordance with standardized and transparent market practices. Overall, this methodology helps to shape the development of national market infrastructure for wetlands and water management.



*For more information,  
please contact [info@tierraresourcesllc.com](mailto:info@tierraresourcesllc.com)  
or visit [tierraresourcesllc.com](http://tierraresourcesllc.com)*





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## ELIGIBLE ACTIVITIES

This methodology broadly addresses wetland restoration by aiming to give offset credits for a wide range of restoration and wetland preservation activities, including wetland management, implemented on degraded forested and nonforested wetlands in the Mississippi Delta ranging from fresh to saline conditions. Restoration activities to increase carbon stocks include: 1) assisted natural regeneration, seeding, or tree planting; 2) hydrologic management to provide suitable conditions for wetland vegetative productivity and carbon sequestration; or 3) a combination of both activities. Examples of eligible hydrologic management project activities include: Diversion of river water (e.g., Mississippi River or other) into wetlands, introduction of nonpoint source runoff (e.g., agricultural, stormwater) into wetlands, discharge of treated municipal effluent into wetlands (e.g., wetland assimilation), and outfall management to maximize sheet flow and minimize impounded or stagnant conditions. In addition, projected wetland loss may be included in the baseline scenario, and the prevented loss due to restoration activities counted towards carbon offsets.

## SCALE OF OPPORTUNITY

Approximately 4 million acres in the Mississippi River Delta are eligible for restoration under this methodology. Most of the acres are in Louisiana, but also eligible are coastal wetlands in the Mississippi River Delta that extend into Mississippi and Texas. The amount of funding that will become available to restore these acres depends on many factors, however, a conservative estimate of what could be raised through carbon finance based on restoration of only one quarter of the eligible 4 million acre Mississippi River Delta coastal zone is between \$5 billion and \$15 billion over 40 years. Of course, those numbers could increase dramatically if more area is restored. Wetland sequestration ranges from less than 1 ton CO<sub>2</sub>-e/ac/yr in degraded marshes to more than 15 tons CO<sub>2</sub>-e/ac/yr in restored thriving wetlands. For example, a 1000 acre project could generate between 200,000 and 500,000 tons of CO<sub>2</sub>-e emissions reductions over its 40-year life, which depending on the price of carbon, could generate between \$5 million and \$15 million. If we include the prevented loss of wetlands, revenue may be much higher.



## BENEFITS

Louisiana and other states will be able to expand their coastal restoration programs by using carbon offsets to finance restoration. These public/private partnerships that leverage carbon finance will allow more projects to go forward. A carbon market that facilitates financial investment into wetland restoration can potentially create low-cost offsets that provide a wealth of co-benefits such as storm surge reduction, fish and wildlife habitat, recreation, job creation, and economic development that are vital to the sustainability of coastal Louisiana. Furthermore, wetland restoration in the Mississippi River Delta has broad impacts on the entire U.S. economy. The Mississippi River Delta's wetlands and waterways contribute tens of billions of dollars to the national economy every year and support millions of jobs.

## POTENTIAL FOR EXPANSION

Tierra made the decision to limit the focus of the initial methodology to the Mississippi Delta in order to start proving the science on the ground through development of wetland restoration projects. However, the modular format of the methodology facilitates expansion: new modules can be added that will broaden eligibility to other regions by addressing the causes of wetland loss and restoration techniques in other areas. Tierra Resources aims to expand the methodology to include further quantification of prevented loss and to be more broadly applicable to coastal wetlands in general including California's Sacramento-San Joaquin Delta and other wetlands such as Florida's Everglades and wetlands in Virginia, Maryland and the Carolinas. This methodology could eventually be expanded to other critical deltas around the world such as the Amazon, Congo, Mekong, Niger, Yangtze, and Ganges, as well as many other smaller wetland areas.

