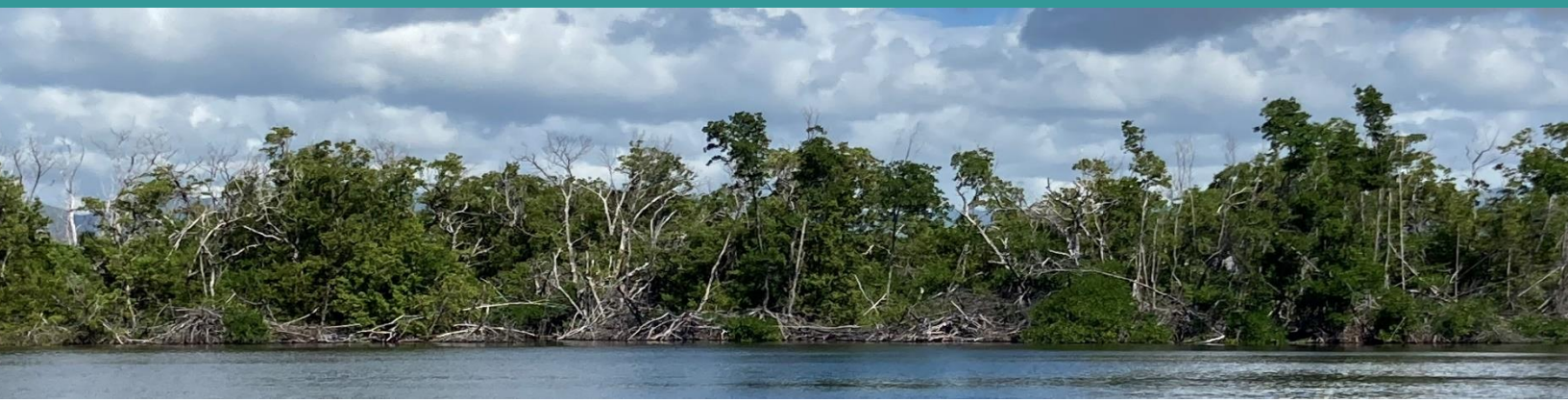
Mangrove Restoration

A DOI Nature-Based Solutions Roadmap Fact Sheet



Mangrove ecosystems are a form of coastal wetlands found in tropical and subtropical regions. These systems support halophytic (salt-loving) trees, shrubs, and other plants and are dominated by mangrove trees. In the continental United States there are three mangrove tree species: Red Mangrove (*Rhizophera mangle*) which grows along the shoreline and is easily recognized by its arching prop roots; Black Mangrove (*Avicennia* sp.), which often grows more inland and at higher elevation than Red Mangrove; and White Mangroves (*Laguncularia racemosa*), which often grow inland and have no outstanding root structures.[1,2]

TECHNICAL APPROACH

Mangrove site restoration typically involves three primary steps:

- Hydrological restoration to restore natural hydrology of the site. This could involve clearing tidal creeks, installing culverts or channels, or diverting excess freshwater flows.[3,4,5]
- Removing disturbance. This will vary based on the site but may include removing invasives and trash, leveling the ground, setting up protections around the site, or amending the soil.[3]
- Revegetation involves reestablishment of mangrove trees. This can either be done using natural regeneration, which relies on naturally dispersed mangrove propagules to restock the site, or artificial regeneration, which relies on planting mangrove seeds or seedlings.[3,5]

BENEFITS

Climate Threat Reduction

- Reduced flooding
- Sea level rise adaptation and resilience
- Carbon storage and sequestration

Social and Economic

- Recreational opportunities
- Food security
- Property and infrastructure protection
- Cultural values

Ecological

- Enhanced biodiversity
- Supports wildlife

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SITE SUITABILITY FACTORS

- ✓ Soil salinity range from 3-27 ppt
- ✓ Tidal connection
- ✓ Relatively low wave energy areas
- ✘ Frost or extended cold periods

KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
Ecological Mangrove Rehabilitation	–	✓	✓	✓
Mangrove Ecological Restoration Guide	–	✓	✓	✓

EXAMPLE PROJECT

The Fruit Farm Creek mangrove restoration at the Rookery Bay National Estuarine Research Reserve took over 13 years from planning to implementation. The 200 acre mangrove site had collapsed due to hydrological changes that prevented natural tidal flows from reaching the habitat. Restoration actions centered on installing culverts and clearing tidal creeks to allow a more natural hydrologic regime. Revegetation occurred through natural regeneration.

Dead mangrove trees and stagnant water at the Fruit Farm Creek site prior to restoration. Photo credit: Sara Mason.

LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on mangrove restoration, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The mangrove restoration summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

Explore the Roadmap

Full Roadmap Document

Mangrove Restoration Section

www.nicholasinstitute.duke.edu/roadmap

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CITATION

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