# Management Strategy: Sediment Management

Intertidal marshes require a consistent supply of sediments to sustain their elevation relative to sea level.[1] Due to the increased rate of sea level rise, marshes will need even more sediments to maintain their vertical elevation. Therefore, this management strategy focuses on techniques that either directly increase the elevation of a marsh (i.e., sediment relocation) or indirectly increase marsh elevation by increasing the supply of sediments to marsh (i.e. dam removal).

### Sediment relocation

Sediment relocation refers to the transfer of sediments from an area of non-use to a marsh.[2] One of the greatest threats to marshes is sea level rise which prolongs marsh flooding beyond the limits that marsh vegetation can withstand. To counteract the effects of sea level rise on a wetland, land managers can place a thin layer of sediments on their marsh, ranging from 1cm – 50cm in depth, to raise its elevation. Along with countering marsh subsistence, the raised marsh elevation encourages vegetation growth that will further stabilize the marsh, prevents marsh edge erosion, and maintains marsh habitat.[3] The sediment relocation technique is best suited for a wetland that is subsiding due to low surface elevation.

*Figure 1. Dredged materials being sprayed onto the marsh in Ring Island, New Jersey.*[6]

Sediments to be used for restoration can be sourced from various locations, but one of the most cost effective and convenient sources is local dredged materials.[2] Dredged materials are sediments that must be regularly removed from the bottoms of navigable waterways to maintain passage for boats and ships.[4] Rather than disposing of dredged material disposal outside of the estuary, clean sediments can be pumped and sprayed on a nearby marsh platform. Regardless of the source, all sediment relocation projects will require sediment testing, an engineering feasibility assessment, stakeholder input, the development of a design, and the acquisition of proper permits before construction can begin.[3] Dredged material projects require close coordination with dredging entities because timing is everything. Restoration project permits require identification of sediment source and dredging permits require identification of the sediment destination. Following Hurricane Sandy, the New Jersey Department of Environmental Protection Division of Fish and Wildlife, along with the Army Corps of Engineers and the New Jersey Department of Transportation initiated the first of three pilot projects at Ring Island in the Cape May Wetlands Wildlife Management Area in 2014.[5] The project involved taking 1,000 cubic yards of sediment from built up channels in Cumberland County and spraying a thin of layer of it onto the stressed marsh. The project restored about an acre of marsh habitat. The three pilot projects collectively cost $8 million.

### Soil remediation

Studies have shown that there tends to be lower amounts of available nitrogen and soil organic matter in constructed wetlands than in natural wetlands. The lack of nitrogen can limit marsh vegetation growth and therefore reduce the health and resiliency of a marsh. To remediate this issue, a land manager can amend the soil of their marsh with fertilizers or soil organic matter to increase the amount of available nitrogen.

### Remove dams to improve sediment supply

This technique involves the removal an obsolete, old, and/or harmful dam to restore the natural hydrology, nutrient, and sediment flow of a river.[7] The removal of a dam, including dams upstream in a marsh's watershed, will enable the transportation and deposition of sediment into the marsh.[8] A consistent sediment supply is essential for the development and maintenance of a healthy marsh.[1] A dam removal project will require a pre-removal feasibility study, a planning and design phase, permit acquisition, fundraising, monitoring, and construction time.[7] Dam removal projects may also require addressing community concerns such as impacts to property values or water supply that the removal of the dam may cause. Additionally, these projects will require the expertise of an engineering firm with experience in dam removal. The length of the project can vary from one year to multiple years, depending on the size, type, and conditions of the dam. It is important to note that dam removal projects tend to expensive and generally require multiple funding partners. Dam removal projects can range between $50,000 to $500,000 in total costs.

In 2018, the Columbia Lake Dam in Paulins Kill, New Jersey was removed.[9] The dam was originally built for hydropower and ice harvesting but became obsolete in recent years. The removal of the dam provided passage for migratory fish, restored sediment transportation, and improved water quality.

*Figure 2. The Columbia Lake Dam before (top image) and after (bottom image) dam removal.*[9]

References:


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