# Tidal Wetlands Restoration

## Background

Wetland restoration involves returning the natural functions of former or degraded wetlands. The main causes of tidal wetland degradation are activities such as draining, filling, impounding water (e.g., holding or retaining water, often for wildlife or millponds), and placement of undersized culverts, which reduce tidal flow into and out of the wetland.

Restoration activities focus on reconnecting wetlands to estuarine embayments (i.e., restoring tidal flow) through the removal of tide gates, installation of larger culverts, and removal of fill, thus putting them on track to be self-sustaining. Tidal wetlands restoration projects include specific actions to attain complete, successful restoration.

### Restoration Categories

#### Reestablishment

The manipulation of the physical, chemical, or biological characteristics of a former wetland area with the goal of rebuilding and returning its natural/historic functions.

#### Rehabilitation

The manipulation of the physical, chemical, or biological characteristics of a currently degraded wetland with the goal of repairing its natural/historic functions.

### Supplemental Actions

#### Enhancement

Manipulation of wetland characteristics to increase, strengthen, or progress specific function(s) or for a purpose such as improving water quality, flood water retention, or wildlife habitat.

#### Protection/Maintenance

Actions performed within or adjacent to a wetland in order to remove threats and prevent the decline to wetland health. Such actions include purchasing land or easements, expanding culverts, or repairing other natural protection like restoring an adjacent barrier beach. Maintenance and protection also include activities commonly associated with preservation.

## Timeline

In 1969 the passage of Connecticut General Statutes sections 22a-28 – 22a-35a, known as the Tidal Wetlands Act, arrested the indiscriminate loss of tidal wetlands from dredging and filling activities. Passage of Connecticut's Coastal Management Act in 1980 established a legislative policy for the rehabilitation and restoration of degraded tidal wetlands, and established requirements for municipal agencies to minimize adverse impacts to coastal resources, including tidal wetlands, in their decision making. The Tidal Wetlands statutes were further expanded in 1993, allowing the Department of Energy and Environmental Protection (DEEP) to conduct the systematic restoration of degraded tidal wetlands. Finally, passage of the Tidal Wetlands Regulations in 1996 exempted DEEP from permit requirements for performing conservation activities, enabling for more expedient tidal wetland restoration.

## Integrated Marsh Management

Integrated Marsh Management (IMM) is a holistic approach to wetlands management utilizing a variety of techniques to achieve site-specific goals. IMM takes into consideration the many aspects of tidal wetland management, including salt marsh mosquito control, vegetation management, wildlife habitat enhancement, hydrologic modification, and education. Projects can be simple or complex and usually involve input from several disciplines and partners to exchange ideas and resources.

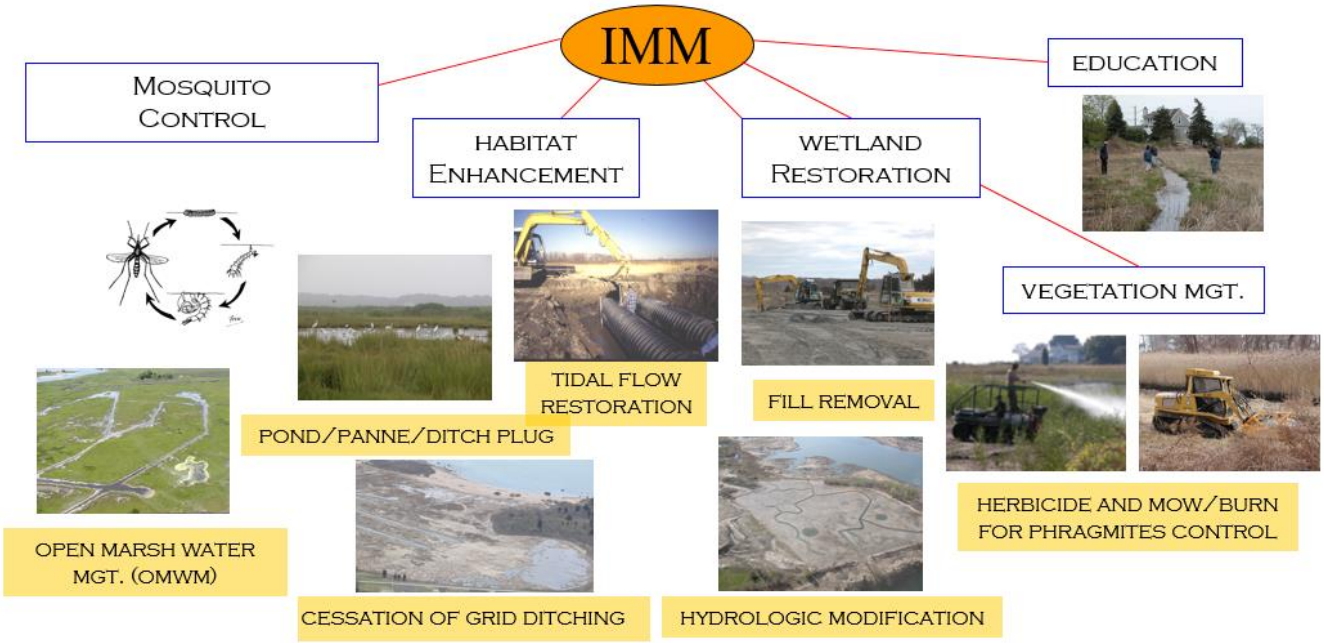


Figure 1. IMM Functions

## Mosquito Control

Most of the coastal wetlands in Connecticut have been altered by a variety of mosquito control activities. Historically, wetlands of all types were filled or drained to prevent malaria transmission by mosquitoes. Networks of mosquito ditches were dug to drain marsh surface waters from the salt marsh pannes, where mosquitos would breed in intermittent pools. By the 1940's nearly all of Connecticut's salt marshes were ditched. While ditching did not destroy the salt marshes, it did alter their innate ecosystems.

In 1985, DEEP's Wetlands Habitat and Mosquito Management (WHAMM) program discontinued maintenance ditching and took more ecologically sound approach with a lower impact, known as open marsh water management (OMWM). Using OMWM to reestablish steady tidal flow allows biological controls - small fish – to manage the removal of practically all mosquito larvae within their reach. These efforts, instead of constantly degrading Connecticut's wetland resources, are reestablishing valuable lost habitat.

## Phragmites Control

*Phragmites*, or Common reed, is a genus of tall perennial grasses occurring within freshwater and brackish wetlands. Two forms of the species *Phragmites australis* occur in Connecticut – a native subspecies called *Phragmites australis americanus* and a nonnative subspecies called *Phragmites australis australis*. The nonnative form of *Phragmites* is an invasive, aggressive species that has taken over thousands of acres of marsh in Connecticut, displacing native wetland pants and forming monocultures, which adversely impact natural wetland ecosystems.

Since 1997, the WHAMM Program has been conducting invasive Phragmites control at over sixty-six sites across the state. Eradication of invasive Phragmites at the landscape level is very difficult, and actually, limited presence of the invasive form within coastal wetlands may contribute to their habitat diversity. Thus, the objective of WHAMM's Phragmites control program is to reduce the extent of the monotypic stands impacting the health of brackish and freshwater wetlands.

To learn more about Phragmites Control, see the information provided in Controlling Invasive Phragmites in Connecticut's Wetlands.

## Accomplishments

DEEP is a national leader in efforts to restore degraded tidal wetlands to healthy and productive ecosystems. Connecticut is the first state in the nation to establish a unit dedicated to restoration and mosquito management of the state's tidal wetlands. Additionally, the U.S. Environmental Protection Agency (EPA) Long Island Sound Office funds a full-time coastal habitat restoration coordinator in the Land & Water Management Division of DEEP. This coordinator pursues funding for projects, and coordinates with other state, federal, and municipal agencies and nongovernmental organizations on the restoration of tidal wetlands, as well as other critical coastal habitats such as dunes, grasslands, and riverine migratory corridors for fish.

Since 1997, through the efforts of DEEP's Land & Water Resources and Wildlife divisions, many of the state's tidal wetlands have been restored for the benefit of waterfowl, shorebirds and other wetland-dependent plants and animals. DEEP, in conjunction with many project partners, has completed more than 70 tidal flow restoration projects (over 1700 acres).

To learn more about tidal wetlands and wetland restoration, see the Tidal Wetlands Primer and Guidance pages and information on EPA's Coastal Wetland Initiative. The bulletin Tidal Marshes of Long Island Sound: Ecology, History and Restoration is also recommended for additional reading.

Figure 2. Duck Pond Restoration, Old Lyme

Figure 3. Restoration stages (top to bottom) at Burritt Cove, Westport