
ENVIRONMENTAL Fact Sheet



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Threats to the Salt Marsh Environment

Thee hundred and fifty years of wetland destruction and pollution have left a lasting legacy on New England salt marshes. Today, some of the challenges facing wetland managers and scientists include the identification or imperiled salt marshes, the prioritization of sites for restoration, and the development of ways to measure the effectiveness of restoration efforts. Current threats to salt marshes are changes to natural hydrology, pollution, coastal development, fill/improper marsh elevations, and non-native/invasive species.

Changes to Natural Hydrology: Tidal and Reduced Tidal Flow

Throughout coastal New England, there are vast areas of wetlands that were productive salt marshes until roads or railroads severed their connection to the sea. Humans built transportation routes on salt marshes because they were open and flat. Horses and carts were the first to use these routes, followed by steam locomotives in the latter half of the 19th century. In the 20th century, humans continued to create and pave roadways on some of our most valuable wetlands to accommodate automobiles. These roadbeds divided salt marshes into two sections – one with direct unlimited tidal connection to the ocean, and one with restricted or in some cases no access to the ocean. Called tidal restrictions, these road and railroad crossings have had enormous impacts on landward salt marshes by reducing or eliminating tidal flooding – the force that drives salt marsh ecosystems. Tidal restrictions led to the disruption of natural flooding regimes, alterations to soil and water chemistry, and changes to natural plant and animal communities. These changes led to the establishment and proliferation of invasive species such as the non-native form of *Phragmites australis* (common reed) or *Lythrum salicaria* (purple loosestrife).

Many local, state, and federal groups are working to restore former healthy salt marshes. The most common solution is to install larger culverts under roads and railways to restore tidal exchange. Mosquito control ditches also changed natural hydrology of salt marshes and efforts are underway to reverse these effects.

Environmental Pollution

Humans, their machines, and their animals release enormous amounts of pollution to the air, water, and soil. The list of pollutants is virtually endless, and their effect on natural ecosystems is not well understood. Nutrients, such as nitrogen and phosphorus, from fertilizers, septic systems, and farm waste are common pollutants that in high enough concentrations can change the structure and function of natural ecosystems. Excess nutrients are a particular problem in salt marshes because they lead to eutrophication. Industries and combustible engines release a variety of heavy metals, such as mercury, lead, and aluminum, that pose lethal and chronic health risks to wildlife and humans. Herbicides and pesticides are applied to lawns, gardens, forests, and

ponds to kill nuisance species, but often affect non-target species.

Every time it rains, stormwater picks up sediments, nutrients, chemicals, and heavy metals from the landscape and carries these pollutants into storm drains that may lead to streams, rivers, and salt marshes. Salt marshes are depositional areas and therefore are likely to store these pollutants for long periods. Increased surface runoff is another way that humans continue to alter the natural hydrology of salt marshes. In undisturbed coastal landscapes, rainfall and snowmelt are temporarily stored in wetlands and forests, or taken up by plants. In urban communities, much of the landscape has become rooftops and pavement, and rainfall and snowmelt flow rapidly over these surfaces into nearby streams and wetlands. Salt marshes in urban watersheds may receive enormous volumes of stormwater runoff, which can lead to increased erosion, sedimentation, altered salinity levels, and changes in soil saturation levels.

Coastal Development and Upland Habitat "Buffer Zone" Loss

Coastal New England has witnessed unprecedented population growth and urban development over the past three decades. Real estate value has skyrocketed, increasing the pressure on landowners to sell or develop their land. Waterfront property is particularly valuable because of the great views, serenity, and access to the ocean that it can provide. The net effect of coastal development and land use change on salt marshes is the loss of upland buffers and new exposure to a wide variety of anthropogenic pollutants and disturbances. By 2005, 25 percent of the coastal watershed will be developed.

The upland buffer and marsh border are important nesting, breeding, perching, or feeding areas for a wide variety of wildlife that also utilize the adjacent salt marsh, such as many species of songbirds and mammals. Elimination or alteration of upland buffers will indirectly alter wildlife use of the salt marsh. Noise pollution, from cars, airplanes, lawn mowers, etc, and light pollution, from street lights, vehicle lights, etc, can affect wildlife behavior. As covered above, the introduction of pollutants through stormwater runoff, leaky septic systems, lawn chemicals, and other human activities can affect wetland organisms. Human disturbance of the landscape may encourage potentially damaging native, introduced, or opportunistic species such as common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), starlings, house sparrows, raccoons, and opossums. Domestic cats alter bird populations near residential areas as well.

Fill/Improper Marsh Elevations

Historically, some salt marshes have been filled with dredge materials from adjacent areas. Fill placed on salt marshes alters the marsh elevation, soil type, hydrologic patterns, vegetative communities, and wildlife present. Through increased elevation, and thus less tidal flushing, fill placed on salt marshes smothers native salt marsh plants, and encourages the growth of other vegetation not typically present on the marsh. These plants may be non-native and exotic, such as common reed.

Non-Native/Invasive Species

Exotic plants and animals introduced by humans can change community composition and disrupt food webs and ecological functions. The most prolific non-native invasive-species present in degraded salt marshes are common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*), and narrow-leaf cattail (*Typha angustifolia*).

For more information contact the New Hampshire Coastal Program at (603) 431-9366 or visit www.des.nh.gov/coastal.