

## How can I get involved and learn more?

AS THE HERRING RIVER RESTORATION PROJECT PROGRESSES, opportunities will arise for a broad spectrum of educational, stewardship, and volunteer activities. For a wealth of background materials and other documentation on the project, visit Wellfleet's Herring River Restoration web page at <http://www.wellfleetma.org/Home/SO07I29EE>. To speak to a staff person working on the project, contact John Portnoy, Senior Ecologist at the Cape Cod National Seashore at 508-487-3262 ext. 107 or the Wellfleet Conservation Commission at 508-349-0308.

For the most up-to-date information on the project, subscribe to the *Herring River News*, a periodic, e-newsletter. To subscribe, send an email with the subject "Herring River News" to [tim.smith@state.ma.us](mailto:tim.smith@state.ma.us).



The Chequessett Neck Road Dike is a popular fishing spot, but only on the Wellfleet Harbor side. Few fish are found upstream.

## Acknowledgements

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The mission of the Wellfleet Conservation Trust is the conservation, preservation and maintenance of open space and areas of wildlife habitat in Wellfleet, for the benefit of current and future generations. The Trust is a 501(c)(3) non-profit organization to which gifts of cash or land are tax-deductible. The Trust is managed by a volunteer board of local citizens. The Trust endorses the Herring River Restoration Project and supports the efforts of the restoration process. The Trust owns many parcels totaling about 56 acres in the Herring River basin. For further information, go to: <http://home.comcast.net/~wellfleet.conservation.trust/>



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The Herring River floodplain, once a thriving salt marsh, is now dominated by shrubby woodlands and the common reed.



The common reed, *Phragmites australis*, now covers large portions of the Herring River floodplain. The very tall and dense plant makes walking difficult and obscures the once expansive vistas.

# Restoring the Herring River



## Introduction

EVERYONE DREAMS OF TURNING BACK TIME. Opportunities to rectify past mistakes are rare and fleeting. Who wouldn't relish the chance to undo an error made long ago? One hundred years ago in Wellfleet, Massachusetts, Town officials decided to build a dike at the mouth of the Herring River. At the time, the river was the lifeblood of one of the largest and most productive coastal wetland systems in New England. But during that era the immense benefits and values of wetlands were ignored and the desire to "...exterminate the mosquito pest..." and "...drain the marshes so they may be brought into valuable land..." led to the construction of a dike at Chequessett Neck Road in order to "...exclude the sea" (report of Whitman and Howard on Proposed Dike at Herring River, 1906).

During the ensuing decades, the vital role of wetlands has been widely recognized. Wetlands are protected by strong laws and many government agencies and non-government organizations are actively involved in efforts to restore and improve the ecological health of wetlands damaged by past human activity. New England's largest and most ambitious project of this kind—the Herring River Restoration Project—presents an exceptional opportunity to turn back the ecological clock.



Prior to diking the Herring River in 1908, fishermen's shacks and weirs dotted the river's shore.

A kayaker enjoys the Herring River just upstream from the Chequessett Neck Road Dike.

## Where is the Herring River?

THE HERRING RIVER IS THE LARGEST ESTUARY ON OUTER CAPE COD. It stretches four miles from its headwater kettle ponds in north Wellfleet to its mouth at Wellfleet Harbor. The River's floodplain encompasses more than 1,100 acres of degraded wetlands occupying a complicated network of five valleys carved out of glacial outwash deposited 10,000 years ago. Each of these valleys is drained by a creek that contributes water to the Herring River before it flows into Wellfleet Harbor and Cape Cod Bay.



*Poor quality and highly acidic conditions have resulted in fish kills, particularly to juvenile herring during their fall migration to the ocean.*

Today, finding the River and its floodplain is difficult. The Chequessett Neck Road Dike, built in 1908, along with smaller dikes and culverts upstream have altered natural tidal patterns. Ditches dug in the early 20<sup>th</sup> century to channelize the river effectively drained the normally saturated soil. The once expansive and thriving salt marshes have been transformed into almost impenetrable stands of non-native, invasive plants, shrubby thickets, and forests.



*The Chequessett Neck Road Dike was built in 1908 in an effort to control mosquitoes. The dike was rebuilt in the 1970s.*

## Why do we care about restoring salt marshes?

SALT MARSHES ARE AMONG THE MOST PRODUCTIVE NATURAL PLANT COMMUNITIES ON EARTH. Salt marsh plants provide nutrients for a huge array of creatures in the marsh and adjacent open waters. Nutrients are also transported offshore by tides and the coastal food web. Even though we don't directly consume salt marsh plants, they nourish the shellfish and finfish that we do eat. According to some estimates, two-thirds of the commercial fish catch along the East Coast depend on salt marshes for at least some part of their life cycle. Salt marshes also protect and improve water quality. Past experience has shown that even partial restoration of tidal flushing can lower harmful bacteria levels and improve estuarine habitat. In coastal areas, communities depend upon healthy, vibrant salt marshes to buffer the effects of coastal storms and lessen damage caused by floods.

Massachusetts has lost approximately one-third of its pre-colonial era wetlands due to human activity. Many remaining wetlands are degraded and offer diminished value to humans and wildlife. Many salt marshes suffer from altered hydrology caused by tidal restrictions. Tidal restrictions occur where human infrastructure, such as roads and railroads, have been built across coastal wetlands and waterways and disrupt the natural ebb and flow of the tides within upstream habitats.

## Some notes on the Herring River and mosquitoes...

HERRING RIVER WAS ORIGINALLY DIKED TO CONTROL SALT MARSH-BREEDING MOSQUITOES. Today we know that these nuisance insects can be controlled without eliminating any salt marsh habitat. In fact, restoring the natural tidal regime makes mosquito control easier by reducing stagnant-water breeding sites and allowing predatory fish, like mummichogs, to reach the small, isolated pools within the salt marsh where they consume large numbers of mosquito larvae.

## What is wrong with the Herring River, and how did it get that way?

WHERE TO BEGIN! The composition and health of coastal marshes—and their highly productive array of plants and animals—depend on daily flooding with seawater. Cape Cod's salt marshes are subject to tidal fluctuation of about ten feet twice a day. With this in mind, it's easy to see how blockage of tides can profoundly harm salt marshes. Construction of the Chequessett Neck Road Dike eliminated tidal influence to the Herring River, which both dried out the rich salt marsh peat and transformed the marshes into a freshwater environment. Salt marsh plants have been overrun by invasive freshwater and upland vegetation, including many non-native species, like common reed, which have little value to native fish and wildlife. Herring River's original 1,100 acres of salt marsh and estuarine habitats present before diking have shrunk to only seven acres.



*Herring River water is sometimes so acidic that metal fish traps used for sampling become corroded and dissolve in a matter of weeks.*

More severe, but less obvious impacts occur within the original salt marsh peat. Under the full range of normal tides, peat remains salty and waterlogged. In this condition, peat accumulates large amounts of both organic matter and sulfur. The slow build up of peat helps keep marshes above rising sea levels. When tides are eliminated and salt marshes ditched, the peat rots. Decomposed peat becomes compressed and sinks. Today, in some places the elevation of the Herring River floodplain is three feet lower than it was before the Chequessett Neck Road Dike was built. When peat rots, sulfur converts to sulfuric acid, which can leach into the river and kill fish. At times, water in the Herring River is as acidic as vinegar. It's not surprising that fish and other aquatic animals are scarce. In addition to high acidity, low summertime dissolved oxygen—also caused by the lack of tidal flushing—makes survival tough for aquatic life.

## What is being done to restore the Herring River?

THE TOWN OF WELLFLEET OWNS THE CHEQUESSETT NECK ROAD DIKE. Cape Cod National Seashore owns 80% of the Herring River floodplain. In August of 2005, these two parties formally agreed to work together to restore the river. This agreement led to the formation of a Technical Committee, directed by the Town's Board of Selectmen to develop a Restoration Plan outlining the opportunities, challenges, and benefits of restoring the river.

The committee's work is backed by 25 years of research conducted by National Seashore scientists and is also supported by numerous government agencies and academic institutions studying the condition of the river and opportunities for restoration. A computer simulation of the river's hydrology has been developed to predict the physical effects of restoring tidal range at various levels. This work has established a scientifically credible justification for increasing tidal range, beginning with modifications to the Chequessett Neck Road Dike. A new dike would have much wider openings, capable of allowing a greater range of tides to reach upstream, while also allowing sufficient drainage to Wellfleet Harbor. Adjustable sluice gates would be used to reintroduce tides in an incremental and controlled manner over a period of years. Decisions to increase tide range would be based on intensive monitoring and will consider both ecological benefits and any potential social impacts.

Besides the Town and the Seashore, the Committee is aided by representatives from the Town of Truro, Massachusetts Office of Coastal Zone Management, National Oceanic and Atmospheric Administration Restoration Center, Natural Resource Conservation Service, US Fish and Wildlife Service, and local stakeholders who serve as a sounding board for public and private interests.

Other issues for the Restoration Plan include protection of private properties, nuisance mosquito management, protection of groundwater, fish passage, and effects on both wild shellfish and Wellfleet's extensive shellfish aquaculture.