

Maine Corporate Wetland Restoration Program

Mill Cove on Spruce Creek, Kittery, ME

Findings of Preliminary Site Visit

December 21, 2007

Normandeau Associates visited the site on December 21, 2007 to perform a preliminary assessment of the level of habitat degradation and the potential for site restoration. We met Mr. John Viele for a briefing on the history of the site, and the concerns and issues presented by the potential restoration. The historical significance of the mill dam and state and local interest in its preservation were of similar importance as restoration of degrading habitats.

Existing Conditions

We arrived at the west side of the pond site with Mr. Viele at approximately 0830, using a recently constructed public dock. The tide was above average (10.7' NGVD in Portland), and just past high when we arrived, having dropped about 4 inches below the high water mark on the dock. The temperature was about 15 degrees F, with a light breeze and partly cloudy. Spruce Creek was generally open, with ice floes rafted along the shore and coves, including Mill Pond. Mill Pond above the dam was frozen with about 4 inches of ice, breaking up in large pieces. The ice prevented installation of a data logger so we periodically collected qualitative water level measurements at the dock and in the pond.

Based on our qualitative measurements, the following statements can be made. The top of the dam became visible approximately 3 feet below high tide, although flow did not appear to be restricted. The dam began impounding water at approximately 6 feet below high tide (1030). Five hours after estimated high tide, the water level in Spruce Creek was approximately 4 feet below the water level behind the dam. A reduced flow of water continued to drain out the breach in the dam throughout the time the tide was below the level of the dam. We left the site at 1300.

The dam was mostly obscured by ice and snow, but the top portion was visible as rock and rubble. Infilling behind the dam has raised substrates to approximately the level of the breach. Much of the bottom of the impoundment was exposed when the dam began impounding water.

We walked the west side of Mill Pond Cove with John. Three small but well established stands of Phragmites (*Phragmites australis*) occurred along the east shore: two in close proximity to development in the upper cove, and one further downstream near Eagle Point. Other invasive species included Japanese knotweed (*Polygonum cuspidatum*) and multiflora rose (*Rosa multiflora*) on the upland edges of the marsh. Multiflora rose, barberry (*Berberis* sp) and buckthorn (*Rhamnus* sp) were present in a young forest/old field under conservation easement.

A small pond has formed immediately behind the dam. The pond narrowed to a tidal channel in the mid-marsh, with smaller tidal creeks draining the eastern and southern lobes of the cove. Fresh water flowed into the marsh from a small perennial stream in the south and an intermittent drainage from the east. Shallow pipes suggesting storm drains emptied into the stream at the southern end. Several stands of cattail and the Phragmites implied brackish conditions along the edges of the marsh from surface and/or groundwater.

The salt marsh was well developed in the upper half of the marsh, predominantly low marsh with some high marsh in patches and near the upland. Much of the marsh was obscured with ice and snow. A narrower shelf of low marsh fringed the mill pond. In the mid-marsh section, where the tidal channel is still relatively wide, the marsh appears to be unstable and collapsing both along the edges of the channel and in several pools on the marsh surface. The pools appeared to be in various stages of development, with some deep, well incised and with open channels to the creek, while others were shallow with poorly defined edges and channels.

Recommendations

Based on our preliminary findings, the potential to restore salt marsh on Mill Pond Cove appears sufficient to merit further assessment. The visible impounding at low tide, infilling of sediment behind the dam, unstable marsh conditions, and presence of invasive vegetation all imply a stressed system. Identifying the sources of stress and the constraints on restoration will be important for restoration planning. The following information will help form a better assessment of the status of the marsh and potential restoration options.

- Identify the impounding elevation and material (natural ledge or man-made dam)
 - If it is natural ledge the entire length of the dam, then dam removal will not increase drainage in the cove or improve fish passage at low tide
- If a man-made structure is impounding water, determine to what depth it extends relative to tidal range
 - Test substrates behind dam for toxic and hazardous content to evaluate the potential for dredge removal or flushing into Spruce Creek
 - Explore with SHPO and Town the possibility of removing a portion of the dam to allow tidal flow, while preserving the remainder
- Examine historic aerial photos and maps to determine
 - The development of salt marsh
 - The status and trend of pool/panne development, and the mid-marsh instability
 - The status and trends of brackish vegetation around the edge, focusing on Phragmites and cattail
 - Changes in drainage to the marsh
 - Changes in development in the watershed

The results of these studies will guide future work and the type of restoration or management to pursue. If improved drainage via further dam removal is a viable

alternative then the potential to increase tidal exchange, raise pore water salinities and decrease the groundwater table may reverse the degradation of the salt marsh. If dam removal is not an alternative, control of invasive plants, freshwater flow into the marsh and surrounding land use will be the primary management tools, although the ultimate restoration potential will be less than increased tidal range.



Mill Cove dam near high tide (12/21/07)



Dam on ebbing tide showing breach.



Southern lobe showing tidal creek and Phragmites.



Pool in mid-marsh fully connected to main tidal channel.



Pool in mid-marsh in process of forming and draining to main creek.