2012 Watershed Tour

Tour Guides:

- Rob Desmarais — Director of DPW
- Pete Manor — Town Engineer

Attendees:

- Anne Ferguson — Municipal Counselor
- Bruce Georgian — Lakes & Waterways Commission Chairman
- Ken Aspeslagh — Lakes & Waterways Commission Member
- Alexander Pooler — Lakes & Waterways Commission Member

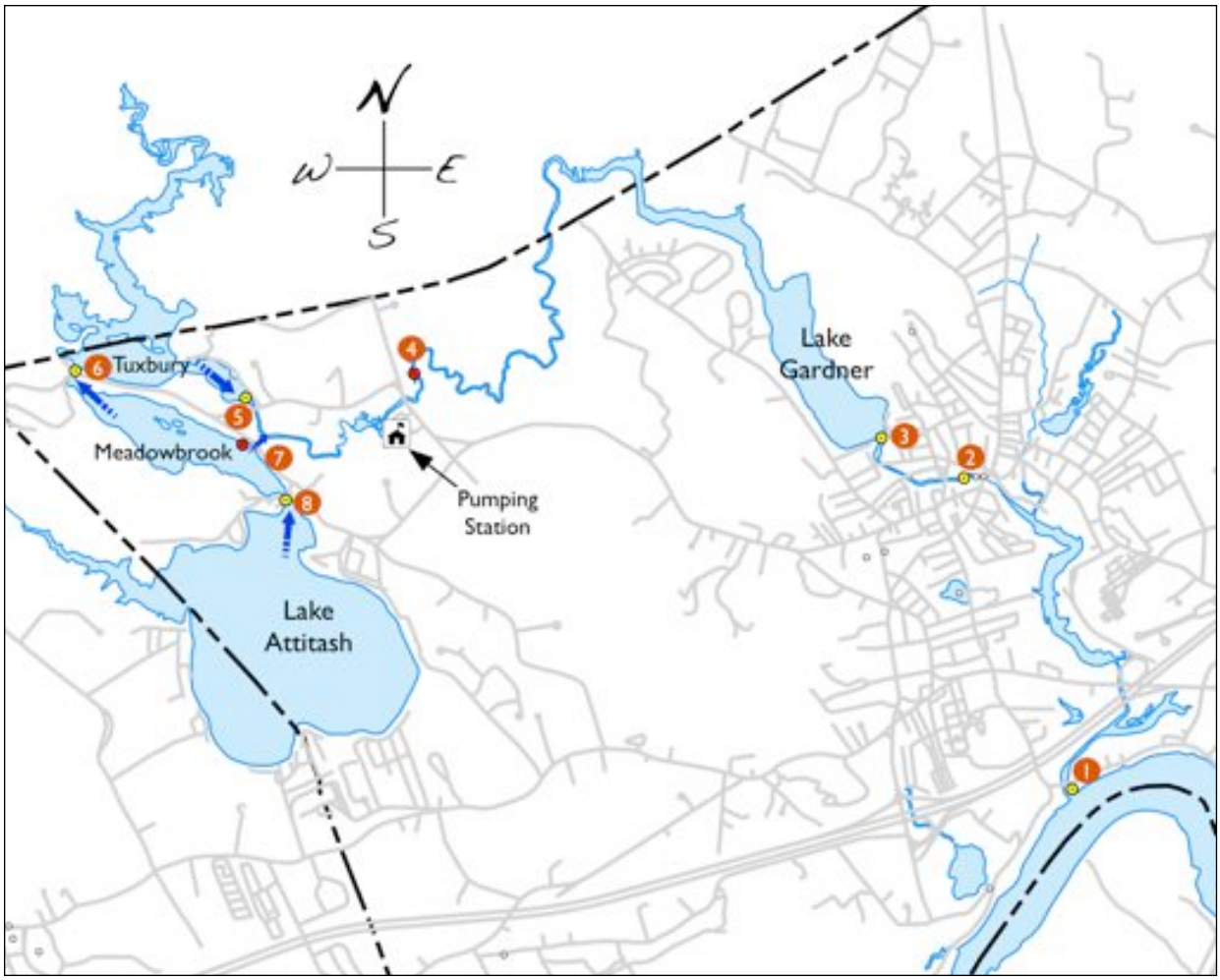
Summary

Members of the Lakes & Waterways commission and invited guests were given a tour of the many important water control structures that make up the Powow River watershed. The tour was led by DPW Director Rob Desmarais and Town Engineer Pete Manor.

The tour began at the mouth of the Powow, and followed the Powow upstream to Tuxbury Pond, Meadowbrook Pond, and Lake Attitash. The eight stops on the tour included:

1. The Mouth of the Powow
2. The Millyard Crib Dam
3. Lake Gardner Dam
4. The Weir
5. Tuxbury Pond Dam
6. Stateline Dam
7. Archbrook Culvert
8. Birches Dam

These locations are numbered on the following map. The blue arrows represent typical water flow direction.



Map Data: MassGIS

Merrimack & Mouth of Powow

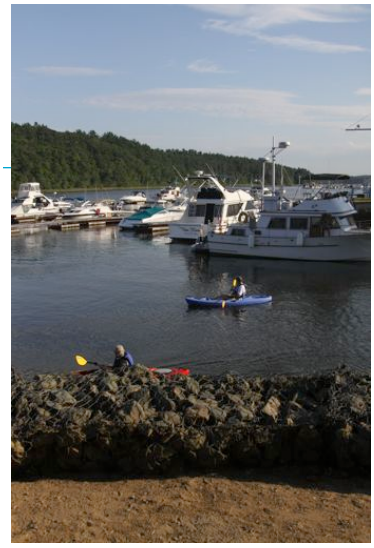
Merrimack River presents erosion problems during floods. Pleasant Valley Rd. land being private makes it hard to repair erosion on the shoreline.

Each storm brings back the shoreline a little bit more.

The town is pursuing a grant with federal highway to try to protect it. A similar problem on River Rd. in Merrimac, MA resulted in the road being abandoned. Amesbury would like to get the money they abandoned.

Amesbury has limited activity on Merrimack. Powow River is the main focus of our efforts.

The Army Core of Engineers added the existing gabions along the eastern side of the mouth of the Powow in the late 1970's or early 1980's as a solution to erosion problems.



Crib Dam in Millyard

The building over the Powow on the east side of Main St. came down in the 1990's, leaving the open area with the steam pipe.

The Crib Dam was restored in 1995. The area was rebuilt in 1985 and again in 2003 or 2004.

The Upper Millyard is the site of many former penstocks. A large pipe went under Amesbury Industrial and another penstock ran under mill where Ovedia is. The tunnels left voids under the road. In the past, a sink hole formed in the Amesbury Industrial parking lot because of caverns where penstock used to come into the mill.

The wall near the upper bridge and near the amphitheater both failed in 2006 and were replaced in 2011 with funding by FEMA. Granite blocks were salvaged from Gloucester.

Other river walls are made of various materials but are at risk for failures due to trees and also high water.

If one of the buildings the river flows under were to collapse, it could block the river. Not much is holding up those buildings.

Lake Gardner Dam

The dam is downstream of a 52-square-mile watershed.

The dam was constructed in 1860 and rebuilt in 1920's. It was rebuilt again in 1987 when two former powerhouse buildings were starting to coming down. In 1993, the powerhouse buildings were taken down and replaced with a retaining wall.

In 1999 or 2000, the lake was drawn down for 4 years for the project to build the stability berm. The current dam is reinforced concrete. The granite blocks are a facade. A "skilling pool?" below the dam is 2 ft. deep and its purpose is to act like buffer, slowing the water to prevent scour on the concrete structure. The structure of the dam is built on 8 anchors that go 65 ft to bedrock.

Historically, stop-locks required taking out boards manually so it

could not be done in winter or once a flood starts. Stop-locks have been replaced with mechanical sluice gates.

The emergency spill-way had release bolts but have since been disabled.

Even when opened a small amount, water shoots out very quickly and very powerfully from the gate.

To manage storms, water can be held in Lake Gardner (which floods Battis Farm) to prevent damage to the Millyard and Downtown.

The lake is sometimes lowered to prepare for incoming storms. Sluice gates allow DPW to wait until storm hits to adjust gates. The lake itself is not even close to large enough to attenuate storms. Lake can fill to end of row of trees before flooding over.

The inundation map for dam failure is most of downtown, from train station to town park. (This is the evacuation area if dam was in danger of failure.) Elevation changes from 86 ft at dam to 10 ft at DPW garage in Lower Millyard.

Any sand that builds up on the dam is released when the gates open. (Channel is 16 ft deep and concrete is angled up.) Weeds in front of dam are not considered problem because a concrete apron tapers down.

The town has a sewer easement from Whitehall Rd to town owned berm. DPW added one load of sand to beach this year.

The Weir on the Powow

A weir is a barrier across a river designed to alter the flow characteristics. With the low river-level, the weir is visible for the tour.

The weir is a 140 ft wall that keeps the river at the correct height for pumping. It is part metal and a timber section extends beyond the main part of the river.

It was originally constructed in 1952 to raise water level for town wells. In 1960's, the town went to surface water intake. The weir keeps water level at a minimum height for the treatment plant.

create a concrete structure.

The current weir was constructed in 1976 as an emergency project. It was re- constructed 14" higher which caused flooding for local residents leading to a long costly lawsuit which the town settled.

The sheet metal on the dry side is starting to deteriorate. Timber also rots. In 2003, rocks were added downstream of the weir for stability; to keep it from falling over. The proposed plan is to build another weir in front of it and fill the void with concrete to

It is still the subject of lawsuits that are unresolved. The weir could be moved, but wetlands would be altered which is difficult legally and puts the town in legal jeopardy.

The weir is low risk, but critical for water supply. Sheeting could be stockpiled and replaced in an emergency.

Tuxbury Pond Dam

Tuxbury Pond Dam, built in 2002, holds back Tuxbury Pond at 100 ft.

The Channel is 10 ft deep. Gates and stop-lock bays can be opened for flood control.

Output from Tuxbury is 95% of the town water supply. Water from Lake Attitash makes up about 5%.

The water below the dam is visibly heavy in iron and manganese. A visible sheen on the water is algae and often mistaken for an oil sheen.

Stateline Dam

Stateline Dam is a dam between Meadowbrook Pond and Tuxbury Pond.

Archbrook Culvert

The main outlet of Lake Attitash and Meadowbrook, Archbrook is a culvert that allows water from Meadowbrook to flow directly into the Powow under Kimball Rd. Water could flow through Tuxbury Pond but that's higher.

The 5' x 2' culvert is 120 ft in length and made of granite lintel beams on field stones.

It was created in 1750 to drain an area for hay harvesting and worked on at various times and in the 1980's.

The capital plan has a cost for replacement.

The existing culvert looks like a metal grate over a hole in the ground with wooden stop-locks which can be adjusted to control the level of Meadowbrook Pond.

There are 6 square miles of watershed from this point up.

Lake Attitash Birches Dam

Birches Dam is the outlet of Lake Attitash. Normal pool is 96.7 ft.

The structure was created in late 1970's and hasn't changed. The water line over the bridge was replaced in 1996.

This dam is also a bridge, so if the dam was to flood, there is no other way out for the Birchmeadow Rd. neighborhood.

To the right is a public boat launch. To the left is Amesbury's public access beach as required to qualify for grant money.