Diadromous Fish

Frenchman Bay Partners

The Frenchman Bay Watershed serves as a habitat for important migratory fish species that are dependent on both freshwater and marine habitats for completing their life cycles.

Of particular interest to the Frenchman Bay Partners are alewives, which migrate from the sea to spawn in ponds and lakes and are an important food source for many organisms. Also of interest are American eels, which migrate to the sea to spawn. The returning juvenile elvers are harvested and are of high economic value.

Taking steps to enhance anadromous fish runs in the Frenchman Bay watershed is important both because these fish play important ecological and cultural roles in this area, and because the features that aid anadromous fish populations, rivers with good water quality and free passage from headwaters to the sea, are beneficial to a variety of organisms in these habitats. A decline in their numbers is a warning that local habitats are not working in the ways that historically supported these species.

Factsheet

The Frenchman Bay Partners are guided by a conservation plan, the *Frenchman Bay Action Plan*, which identifies four conservation priorities:

1) Eelgrass
2) Benthic Habitats
3) Mudflats
4) **Diadromous Fish**


Alewife


Alewife


Blueback Herring


Brook trout


Elver

Diadromous fish in Frenchman Bay

According to the Frenchman Bay Atlas, eight of the 12 diadromous species in Maine are present in historical or current records from Frenchman Bay, including two species of sturgeon, both river and blue back herring, tom cod (frost fish), rainbow smelt, and American eels. Eels, alewives, and smelt are all currently harvested, either recreationally or commercially, within the bay. Anglers are known to catch brook trout that they suspect are sea-run in several streams in the area.

Most of these species spend the majority of their lives in saltwater, then come into rivers to reproduce in the spring (or the fall for brook trout). Both rainbow smelt and alewives come into local rivers to spawn, with smelt only coming up a short distance into streams to spawn and alewives migrating up to ponds to release eggs. Sea-run brook trout, known to occur in several streams, appear to be less predictable in their movements, possibly moving between freshwater and saltwater habitat multiple times in a year.

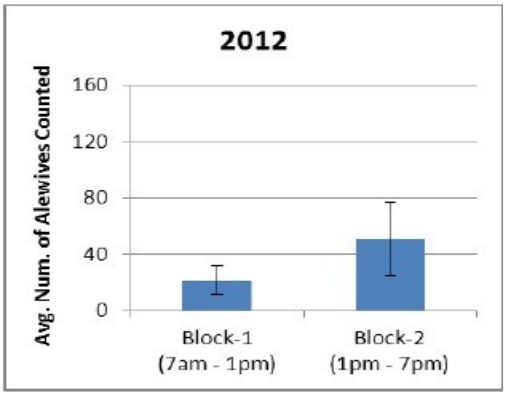
American eels reproduce in the Atlantic Ocean, and young eels (elvers) migrate up rivers in the spring. This migration has become a lucrative live-capture fishery where the eels are shipped to Asia to be grown out and sold. Adult eels spend most of their lives in freshwater before migrating back to the sea to reproduce and die.

Restoration and monitoring projects

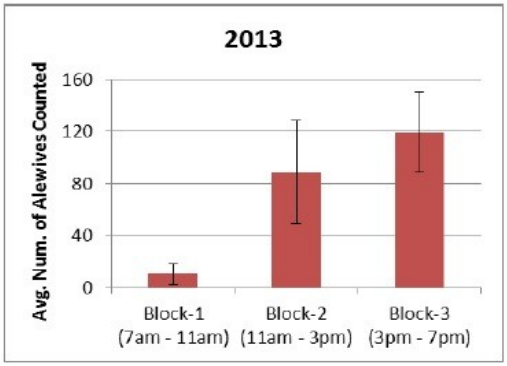
In late 2012, the Frenchman Bay Partners interviewed local alewife harvesters in Hancock County, including the individuals that oversaw and harvested runs in Frenchman Bay. These runs include Grist Mill and Card Mill Stream (Franklin) and Flanders Stream (Sullivan); Flanders and Grist Mill are currently harvested. Determining the possibility of restoring the remaining two runs, Jones Stream (Gouldsboro) and Morancy Stream (Sullivan), which appear to have the potential for alewives, became a goal of the Partners. Enhancing, restoring, and maintaining these runs along with nearby runs in Somesville, has also been identified as a goal. The most important component of alewife restoration is providing fish access from the bay upstream to ponds for spawning.

Alewife run monitoring

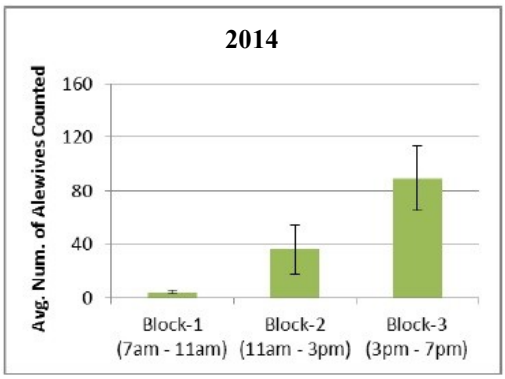
Active monitoring of alewife runs is currently occurring in both Flanders Stream in Sullivan and Somes Stream in Mount Desert. In 2012, the Thorne Road culvert crossing over Flanders Stream was successfully replaced. The project team also replaced a crumbling fish ladder downstream with a series of rock weirs that helps migrating fish gradually reach the elevation of the new culvert. The new design is capable of boosting the productivity of a commercially harvested alewife run on the stream.



In 2012 (before the culvert was replaced), 2013, and 2014, dedicated community volunteers counted the number of alewives passing through a weir upstream of the culvert. In 2012 volunteers saw 13 fish during the spawning period, 26 fish were observed in 2013, and 50 fish were observed in 2014. Monitoring helps evaluate the effectiveness of fish passage and, over time, will provide information on alewife population status.



The graphs to the right show average number of alewives counted per time block in 2012 (blue), 2013 (red), and 2014 (green). Note that time blocks differ between 2012 and 2013/2014. The average alewife count per monitoring session was 35.1 in 2012, 66.7 in 2013, and 37.4 in 2014. Variations in sampling due to weather, count frequency, and time of day make it difficult to compare averages across years.



Year	# of alewives in run
2014	35,756
2013	37,021
2012	32,547
2011	13,502
2010	13,566
2009	12,412
2008	13,756
2007	6,638
2006	4,594
2005	361

The graph above details the increase in the alewife run over time at Somes Pond and Long Pond.

Alewives moving upstream in Somesville.

A similar monitoring program exists for the alewife run for Somes Pond and Long Pond on Mount Desert Island. The Somes-Meynell Sanctuary organizes the restoration and monitoring of this run, and numbers of migrating alewives have increased from 361 in 2005 to over 35,000 in 2013 and 2014.

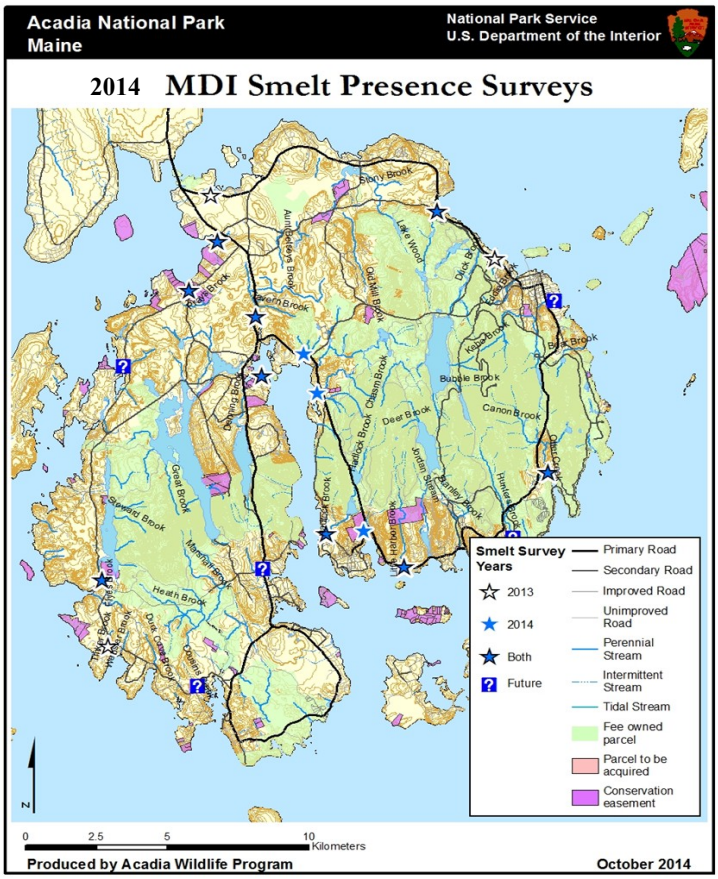
In addition to counting fish at the Mill Pond in Somesville, volunteers collected scale samples for both Long Pond and Mill Pond for analysis by the Maine Department of Marine Resources. From the scales, individuals can be aged (the scales are like tree rings), and the number of times an individual has come upstream to spawn can be determined from details of the growth ring.

By age four, the majority of river herring can spawn, and will migrate to do so unless their route is blocked. All alewife runs in Maine are dominated by age-four fish. Runs with a more even age distribution are more stable over time. Alewives were sampled in 2012, 2013, and 2014. The run was dominated each year by age-four fish, but older fish are starting to be found in the run. Last year, a seven-year old was documented going into Long Pond. Copies of these reports are available online at https://chriswpetersen.wordpress.com/research/anadromous-fishes/.

Rainbow smelt surveys

Rainbow smelt populations appear to be declining, especially in southern New England. Smelt have been harvested by individuals along streams since Colonial times, and historically documented in both Frenchman Bay and on Mount Desert Island. In 2014, collaborators at College of the Atlantic, Acadia National Park, Maine Coast Heritage Trust, and the Maine Department of Marine Resources created a survey to document the presence of adult smelt and spawning activity at historic spawning habitats not recently censused on Mount Desert Island.

Methods included egg bed surveys and live trapping at Babson Creek on Mount Desert Island. Both surveys failed to find areas where rainbow smelt had spawned.



These streams on Mount Desert Island have probably lost what appears to be a once prominent species. One smelt was captured late in the season at Babson Creek. In Downeast Maine, the Downeast Salmon Federation did a larger survey of smelt runs and had more success finding smelt. They will be sharing their data with FBP researchers. However, although the official census failed to find smelt spawning, elver harvesters reported that smelt were depositing eggs on their nets in Morancy Stream in Sullivan, suggesting that elver harvesters might be good data collectors for future smelt surveys.

Next Steps

- Aid in monitoring the restored runs in Flanders Stream and Somes Stream. Assist the Department of Marine Resources in collecting data for population characterization.
- Help determine the distribution of other species of anadromous fish, especially rainbow smelt.
- Work with interested partners to develop a feasibility plan for restoring alewives to Morancy Stream and Jones Stream.
- Provide support for efforts to increase connectivity of streams including education, culvert replacement, and stream restoration.
- Investigate the reported alewife run in Northeast Creek.
- Work with partners including College of the Atlantic, the University of Maine, Acadia National Park, and the town of Bar Harbor to improve and monitor the Cromwell Brook Watershed.

Partners

Collaboration is critical to any Frenchman Bay Partners undertaking. Key partners on diadromous fish projects include: Acadia National Park, the College of the Atlantic, Maine Coast Heritage Trust, Maine Department of Fish and Wildlife, and Maine Department of Marine Resources. Special thanks to the Somes-Meynell Sanctuary for work on Somes Pond and Long Pond, Gary Sullivan for his work on Flanders Stream, and Claire Enterline of the Maine Department of Marine Resources for her encouragement and support.

For more information

For more information about our partners, projects, and events, visit our website at www.frenchmanbaypartners.org or call FBP President Jane Disney at 207.288.3605 x 429.

Frenchman Bay Partners

The mission of the Frenchman Bay Partners is to ensure that the Frenchman Bay area is ecologically, economically and socially healthy and resilient in the face of future challenges.