

February 9, 2023

REPORT

Tidewater Mucket Surveys in Cold Stream Pond, Cold Stream, Androscoggin River, Kennebec River, and Merrymeeting Bay

Introduction: Biodrawversity (Ethan Nedeau) conducted freshwater mussel surveys in five waterbodies in Maine to update historic records of the state-threatened tidewater mucket (*Atlanticoncha ochracea*). Waterbodies included Cold Stream Pond and Cold Stream (Enfield; Penobscot County), the lower Androscoggin River and Merrymeeting Bay (Brunswick, Topsham, and Bowdoinham; Sagadahoc County), and the lower Kennebec River (Richmond; Sagadahoc County). Tidewater mucket were last observed in Cold Stream Pond in 1947, despite several surveys in the last 25 years. Tidewater mucket shells were observed at one site in the lower Androscoggin River/Merrymeeting Bay in 1995 but otherwise no live animals had been previously reported in Merrymeeting Bay. Tidewater muckets were known to occur throughout the lower Kennebec River.

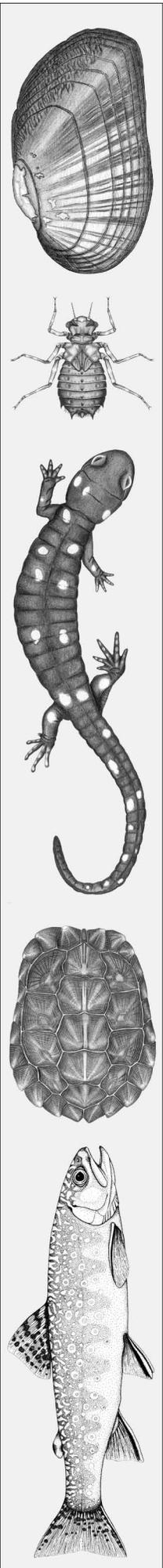
Survey Dates and Conditions: Cold Stream Pond and Cold Stream were surveyed on August 5, 2022. Weather was warm, sunny, and with little to no breeze. Water clarity was excellent in both the pond and stream, and water temperature was in the low 70s. The Androscoggin River, Merrymeeting Bay, and Kennebec River were surveyed in August 8-9, 2022. Weather was sunny on the first day, cloudy (foggy) on the second day, and warm on both days. Water clarity was excellent in the Androscoggin River and Kennebec River, slightly turbid in Merrymeeting Bay, and more turbid in the lower Muddy River (along which we gained access to a portion of the Bay). Water temperature was in the mid to upper 70s.

Methods: One site was surveyed in Cold Stream Pond and Cold Stream (Figure 1). Thirteen sites were surveyed in tidal areas of the Merrymeeting Bay ecosystem including the lower Androscoggin as far upstream as downtown Brunswick (to within 0.5 miles of the first hydroelectric dam) and the Kennebec River upstream from Swan Island in Richmond (Figure 2). Surveys were conducted by snorkeling. Although some deep water existed at each of the survey sites, it was not necessary to survey deeper areas to find tidewater muckets. Survey duration varied among sites, but in general, the survey ceased once tidewater muckets were found. There was no effort to spend extra time searching for other uncommon species, or to fully characterize tidewater mucket demographics (density, length distribution, shell condition) or habitat. Photographs of mussels and habitat were recorded.

Results and Conclusions: In Cold Stream Pond, tidewater muckets were observed at the first (and only) survey site, near a small island just offshore from the public boat ramp on the west side of the lake. It took approximately 45 minutes to detect them, as they were in an expansive patch of sand and gravel in fairly deep water (9 ft) at the base of a large shoal of boulders south



Tidewater muckets from Cold Stream Pond.





Mussel survey site in Cold Stream Pond.

of the island. Four were found near each other; these ranged in length from 52.0 to 74.0 mm and exhibited moderate to heavy shell erosion. Other species observed nearby included eastern elliptio, eastern floater, and triangle floater.

A ~200 meter section of Cold Stream downstream from Caribou Road was surveyed for approximately one hour. No tidewater muckets were observed. Four species were found: eastern elliptio, eastern pearlshell, creeper, and triangle floater. Habitat consisted primarily of shallow to deep runs and pools; flow velocity was moderate; water depths ranged from 0.5 to 4.0 ft; and substrate was comprised of sand, gravel, and cobble. There was a moderate to high density of submerged and emergent aquatic vegetation. Based on the presence of tidewater muckets in Cold Stream Pond and the Passadumkeag River, Cold Stream (which connects the two) probably supports tidewater muckets. It's a challenging waterbody to survey due to limited access and expansive wetlands on both sides of the stream.

Live tidewater muckets were found at all 13 survey sites in the lower Androscoggin River, Merrymeeting Bay, and lower Kennebec River. Technically one site (Site 8) was in the Muddy River, so that tributary to Merrymeeting Bay should also be mapped habitat for tidewater muckets. Numerous tidewater muckets were found at each site, even with fairly short-duration surveys (less than 20 minutes), including both juveniles and large adults. These data suggest that a very large tidewater mucket population exists in the freshwater tidal portions of the Androscoggin River, Merrymeeting Bay, and Kennebec River. Other species observed included eastern lampmussel, eastern elliptio,



Figure 1. Mussel survey sites in Cold Stream Pond and Cold Stream (Enfield).



Tidewater mucket from Merrymeeting Bay (Site 6).

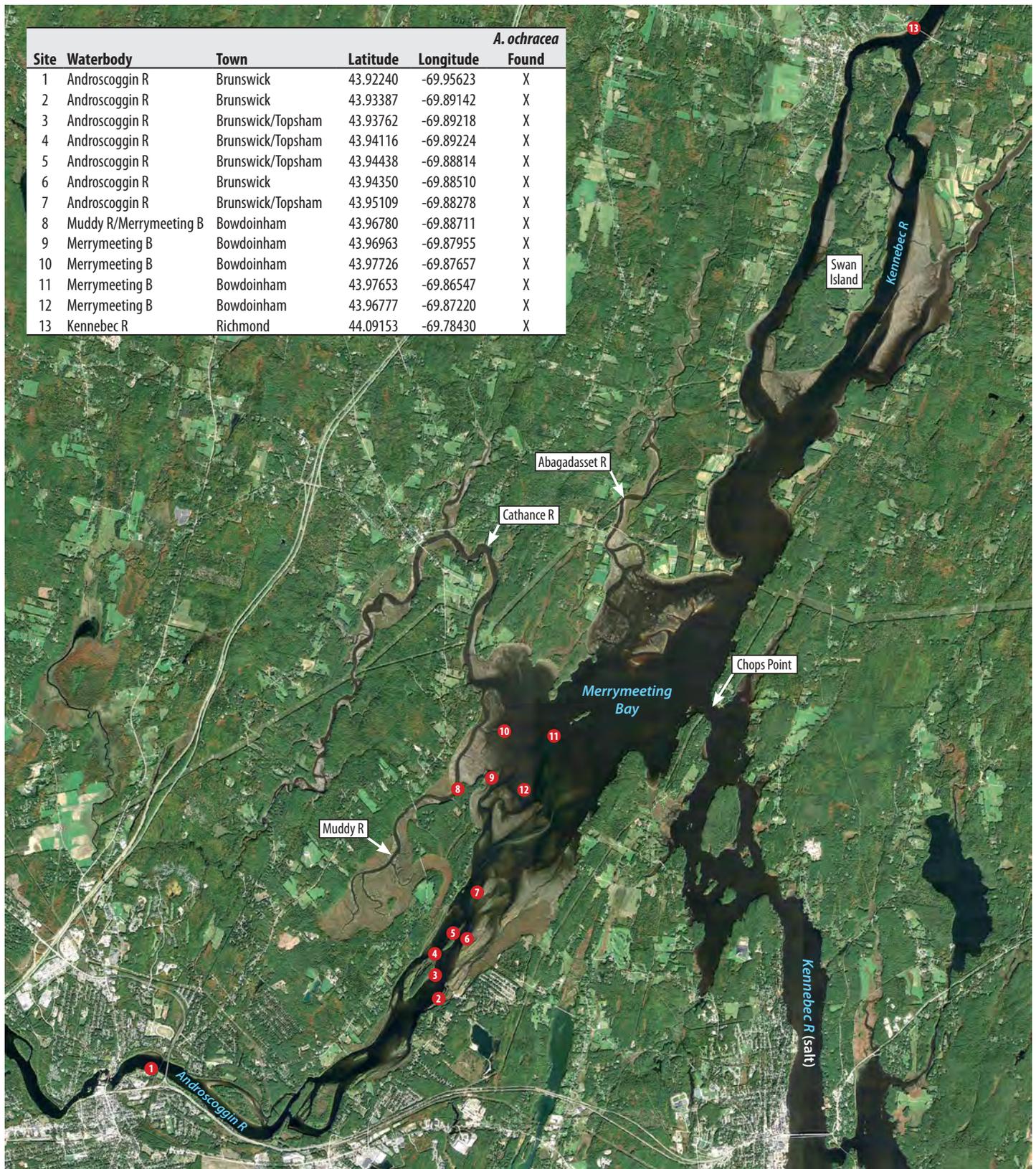


Figure 2. Mussel survey sites in the Androscoggin River, Kennebec River, and Merrymeeting Bay.



Androscoggin River in Brunswick (Site 1).



Kennebec River in Richmond (Site 13).

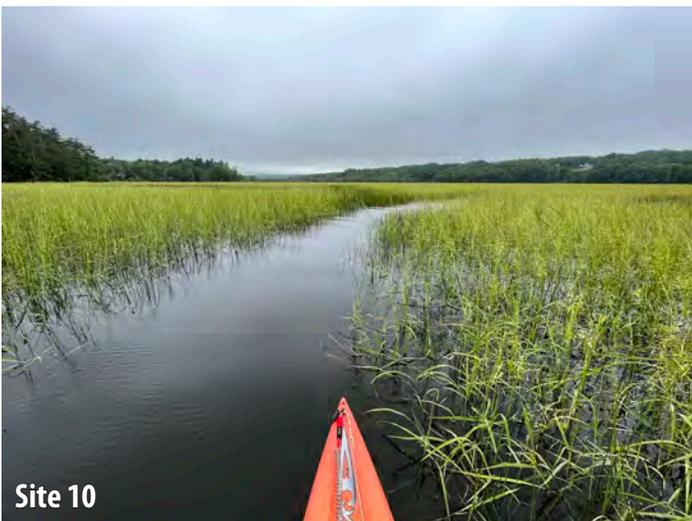


Tidewater mucket from Site 1.



Tidewater mucket from Site 13.

and alewife floater, with the latter two by far the two most common mussel species. Habitat was somewhat unique for Maine, with such a vast shallow freshwater tidal ecosystem, but is similar to the lower Connecticut River in Connecticut where tidewater muckets are also very common. At Site 11, there was some evidence of saltwater influence including some seaweed floating upstream on the incoming tide, and a curious seal within 40 meters of the kayak. I expect that saltwater influence is strong—and freshwater mussels absent—near Chops Point.



Representative habitat photos from Merrymeeting Bay.