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Community Engagement to Understand, Protect and Restore the Bagaduce River Estuary in Hancock County, ME



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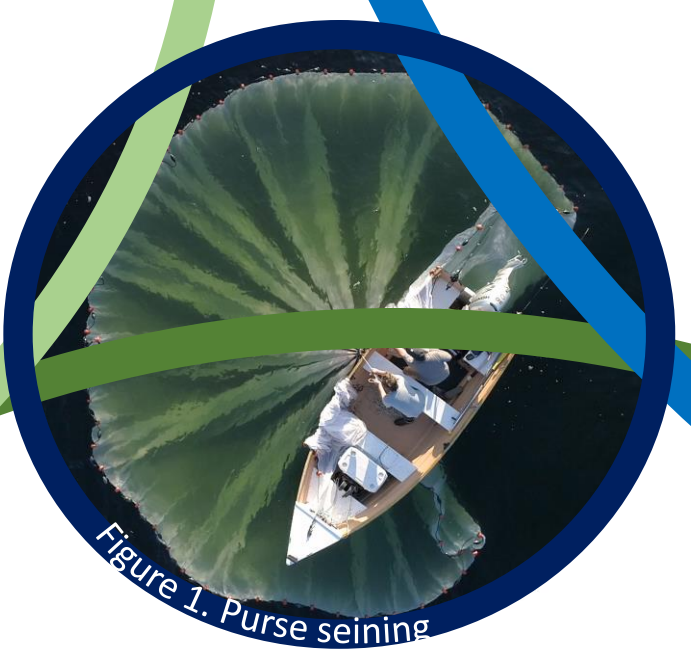
³Maine Coast Heritage Trust;
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History of Bagaduce Community Science

For over a decade, **community-guided monitoring** of the **Bagaduce River and Estuary** in Hancock County, ME has focused on understanding **system ecology**.

Studies conducted to date have examined:

- **Softshell clam** recruitment and predation
- Impacts of **invasive green crabs**
- Identification of **point-sources** of fecal contamination contributing to **closures**;
- Abundance of **juvenile alewife, tomcod** and **harvestable polychaete**; and
- Population counts, scale samples and age analysis of alewife following **fish passage restoration** with the goal of developing **sustainable alewife harvests**



Bagaduce Science Builds Community

As well as contributing to a more robust scientific understanding of the **Bagaduce River ecosystem**, these efforts are contributing socially to **increased community awareness** of the health of the River and Estuary, including via participation at the annual **Alewife Celebration**; as well as increased support for wild **shellfish harvesting** and improved understanding of the role that harvesters play in **ecological conservation**.

Educationally, efforts to study the Bagaduce are also generating opportunities for **local students** from elementary (via alewife field trips) to college (Maine Maritime Academy and College of the Atlantic) levels, as well as **engagement with local & non-profit organizations** (Maine Coast Heritage Trust; Manomet Fisheries; Maine Center for Coastal Fisheries; Penobscot Bay Stewards Program and Downeast Audubon).

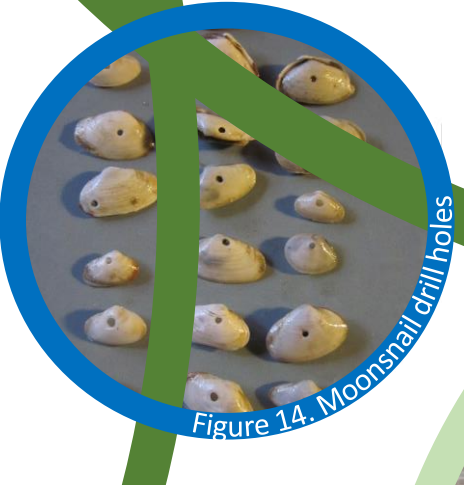
At Maine Maritime Academy, **The Corning School of Ocean Studies** offers three majors (Oceanography, Coastal and Marine Environmental Science [CMES], and Marine Biology) that afford opportunities for **direct student engagement** with the Bagaduce River and Estuary system and **community science partners**.

The Future of the Bagaduce

The Bagaduce has experienced **significant changes** over past decades, including significant declines in abundance of **softshell clams** (and resultant harvester income) due to invasive green crabs, and the return of **historically significant species** (alewife) following **fish passage restoration** in the watershed.

Changes within the **system baseline** are also continuing and include **sea level rise** and **increased storm surge** as well as declines in **ice cover** due to warming winters. These climate-driven changes are likely impacting stability of **mudflats, eelgrass beds** and **fringing marshes**, creating a cascade of impacts on species that feed in and migrate through the ecosystem.

It is vital that we continue building **partners in community science** in the Bagaduce to address challenges of climate change and impacts to **ecological, social, and economic sustainability in the watershed**.



MMA Ocean Studies Engages in Bagaduce Science

Within Ocean Studies, we are continuing to collaborate and engage with community partners in Penobscot, with upcoming projects including **ongoing** CMES collaborative StoryMap focus on the Bagaduce Bioregion; **contributing** to the development of methods for evaluating mudflat health and stability; **determining** water residence times within the system; **eDNA exploring** for presence/absence and abundance of commercially and ecologically important, endangered and invasive species; **monitoring** salt marsh recovery and improved tidal exchange following culvert replacement; **applying molecular techniques** to assess water quality and fecal contaminants; and **examining planktonic** food sources for juvenile alewives.

Through working **collaboratively**, our students gain tremendous opportunities to contribute to the **understanding, protection and restoration** of this unique, local ecosystem.

Figure 11: Clam recruitment boxes

Figure 13: Bagaduce horseshoe crabs