

Climate change will be the major driving force affecting Wellfleet Harbor, both for sea level rise and warmer waters. In order to plan ahead we need a solid understanding of life in the harbor today.

Wellfleet is built around its harbor, covering a span of 5 miles north-south and 2 miles east-west. The harbor is a critical to the Town's economy, for shellfishing, fishing, boating and with a shoreline offering a multitude of opportunities.

The last survey of the biological health of the harbor was undertaken in 1972, by the Division of Marine Fisheries (DMF), under the leadership of J.R. Curley :

[https://www.wellfleet-ma.gov/sites/g/files/vyhlif5166/f/uploads/study\\_of\\_the\\_marine\\_resources\\_of\\_wellfleet\\_harbor\\_curley\\_report.pdf](https://www.wellfleet-ma.gov/sites/g/files/vyhlif5166/f/uploads/study_of_the_marine_resources_of_wellfleet_harbor_curley_report.pdf)

More recently, a full benthic study of the harbor has been completed (see Appendix). This is a useful background for planning.

There has also been considerable work on some specific issues – harbor water quality, Diamond-back Terrapin, the count of Sea Herring during Spring migration from the ocean to Gull Ponds. But basic data on shellfish and fin fish populations is missing.

Many changes have happened since 1972: increased population, growth of shellfish aquaculture, and global warming as examples. Two critical projects – the Herring River restoration and waste-water control (for nitrogen reduction) are nearing implementation. Harbor dredging was completed in the winter of 2021-2022.

It is timely to undertake a new harbor survey. We know that the tidal levels and mean harbor water temperatures will increase.

We need also a baseline of current harbor life. Together with the tidal data, this would provide a basis for a long term harbor management plan.

We seek proposals that would update the 1972 DMF project, using modern technology and science.

We believe that this would best be done by recognizing the top predators and their food chain:

> Blue Fish, Striped Bass, Winter Flounder

The main food sources are smaller "bait" fish, such as Mummichog, crustaceans and Worms. The bait fish are of special interest as they spawn and feed in tidal estuaries. They also play a key role in control of mosquito larvae.

> Shellfish including Oysters, Quahogs and Scallops.

The main food source is phytoplankton.

A suggested sampling protocol follows. An alternative plan would be considered, within the broad purpose and scale of this proposal.

## **FISH**

For the larger fish which feed in the harbor, surveys are required over two years, with three tests each year, including one in late Fall.

The surveys should follow the basic plan of the original report, with stations:

- > the Gut,
- > mouth of Loagy Bay.
- > open harbor: north, mid and south harbor. (The south harbor survey could consider the only deep harbor channel as shown in the benthic mapping.)

The late summer survey should also include a drag as part of the shellfish survey (see below), including a characterization of the sediments.

Bait fish surveys are also required over two summers, twice per summer, following the basic site plan of the original report. Survey dates are mid-July and Labor Day. Ebb tides are strongly preferred, as these will include fish carried into the harbor off salt marsh breeding & foraging estuaries.

The sites are all at mouths of key estuaries & marshes:

- > Duck Creek
- > Middle Meadow
- > Herring River/the Gut ... for Herring River restoration.
- > Blackfish Creek
- > Fresh Brook.

It is recommended that all fish sampling should include a water sample, for potential testing of temperature, pH, and phytoplankton content & species.

Also, part of the deep water samples should be frozen for potential future DNA tests. These tests can help confirm harbor populations.

> Harbor vegetation. We have no information about sub-tidal vegetation in Wellfleet harbor. Broad surveys are required, once in late Spring once in the Fall, again concurrent with harbor trawling operations.. Any records of eelgrass would be especially helpful, as these are habitat for scallops.

## **Shellfish.**

There have been many developments in shellfishing since 1975, with the development of aquaculture and an aggressive program of "clutching" to provide growth sites for young oysters. The Wellfleet Shellfish Department has excellent data concerning the harvest of all shellfish, either wild or cultured.

Our concern is rather to survey shellfish habitat, to create a baseline to monitor future harbor changes.

Field survey sites should be chosen to broadly cover the harbor. These include:

- > west side of the harbor south-east of Indian Neck
- > the Gut
- > Chipman's Cove, both west side and east side adjacent to cutched beds
- > south-west of Indian Neck
- > inside Silver Springs Basin.

As with the 1972 survey, quadrat samplers should be used, one square foot for clams one square yard for oysters. Each survey site should include a core of the substrate, for characterization of the basic habitat.

### **Water Quality**

There is considerable historical data on water quality in the harbor, including temperature, nitrogen, and pH. Most of this data is mid-harbor. During high tides, this basic data should be sampled for information at the various testing sites.

Phyto-plankton. These small (plant) organisms are the key food source for shellfish. They are a key marker for basic harbor productivity. Some sampling work has been carried out and reported by the CCS. This data should be up-dates with two surveys at the shellfish sampling sites and one mid-harbor control.

Once in late Summer over two summers should be sufficient. Obviously, the timing should be at full ebb tides.

The key target species are Oysters and Quahogs. Three species whose populations in Wellfleet Harbor may be increasing with climate change are Blood Clams, Blue Claw Crabs and Bay Scallops. Bay Scallops are known to spawn in Eel Grasses, so a search for these two fauna can be carried out conjunctly.

A final report is required after the field and laboratory work is completed:

- > a summary of data
- > an overview of the basic state of Wellfleet harbor, based on the available data
- > suggestions for future work and concerns.

In preparing a final report, the results of other projects should be referenced and made use of. NRAB will work with our partner to help identify useful sources.

We at NRAB are ready to meeting with respondents to discuss both the actual scope of work and cost management.

Appendix:



## Center for Coastal Studies Provincetown

Hiebert Marine Laboratory  
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### Benthic Habitat Mapping in Wellfleet Harbor and Vicinity



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Report prepared by the Coastal Processes and Ecosystems Laboratory  
at the Center for Coastal Studies

Publication: 19-CL08

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## Terms and Conditions

All responses to the RFP are due by yyy. These will be treated as confidential by the Town of Wellfleet as Wellfleet property. RFP will be judged based on technical competence and costs. Partnerships between a lead contractor and second parties will be considered.

Responses will be communicated by xxx , subject to a final approval by the Wellfleet ATM in late April.