

SCC-PG Connecting communities with continuous data collection and downscaled climate risk models to improve water quality and sustain salt marshes in the Buzzards Bay Watershed

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The Problem

Nutrient runoff leads to low oxygen and problems like fish kills in coastal waters. EPA and state regulations specify oxygen thresholds. Traditional water monitoring by grab sampling fails to detect many periods of low oxygen. Climate change will make the problem worse.



Figure 1. Striped bass killed by low dissolved oxygen on Cape Cod in Falmouth, MA.

The Potential of New Technology

Water quality sensors are now inexpensive enough to allow widespread and dispersed deployment. They can capture dynamic patterns and exceedance of thresholds. They are accurate enough to be used for regulatory compliance.

Our SCC Planning Grant

We conducted three workshops with stakeholders who manage and care about coastal waters, fresh waters, and cranberry agriculture, and engineers who design water quality sensors.

Workshops identified dissolved oxygen as a critical parameter that (1) has disproportionate ecological consequences, (2) is subject to regulatory thresholds, and (3) has sensor technology that now allows widespread use.

Our team is working on a project to pilot widespread citizen deployment of distributed oxygen sensors using traditional (anchored) and novel (glider) deployments.

The project will:

- Develop methods to quality check data that are collected;
- Connect continuous data to community of town and state regulators, watershed advocates, scientists, and citizens with data platforms;
- Quantify how the new continuous data connect stakeholders and are used in new ways compared with former discrete data.

This project has potential to inspire citizen-initiated water quality monitoring in other places. It will enable new water quality thresholds that better protect water quality now and in a changing climate.

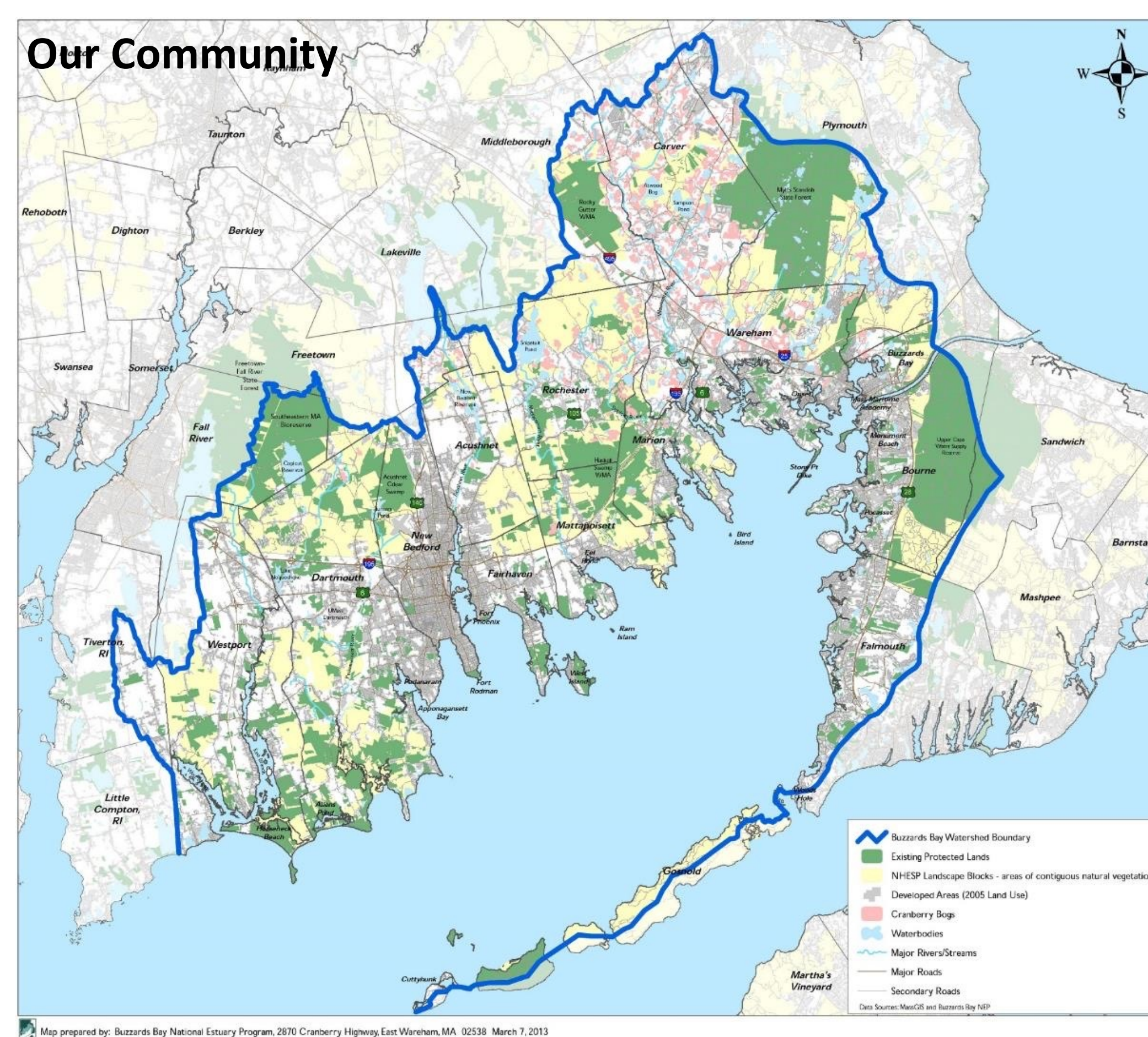


Figure 2. Our community is the citizens, municipalities, government agencies, and non-profit watershed associations that have a stake in the water quality of Buzzards Bay.

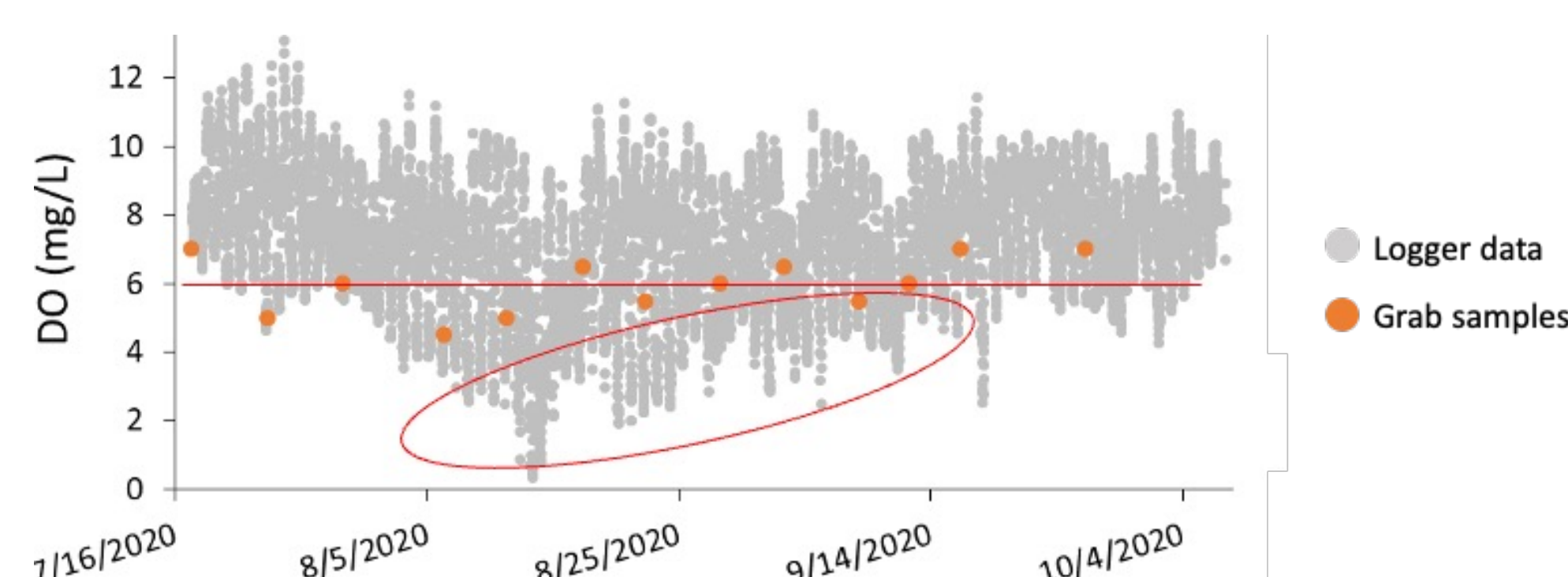


Figure 3. Plot of dissolved oxygen concentrations in a Buzzards Bay estuary measured by grab samples and by continuous logging. Grab samples miss long periods of low dissolved oxygen concentrations that are below the State water quality standard of 6 mg/L.