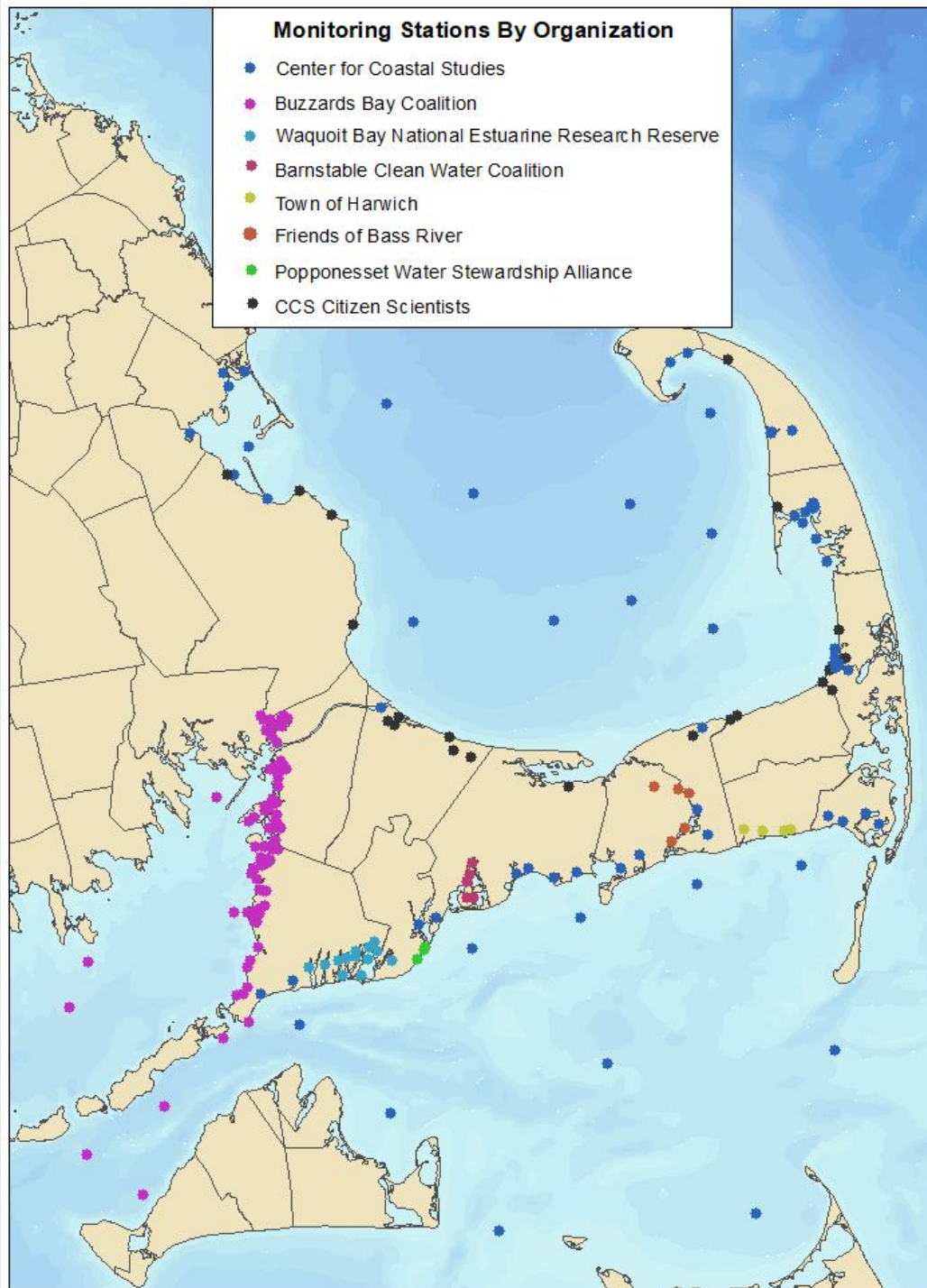
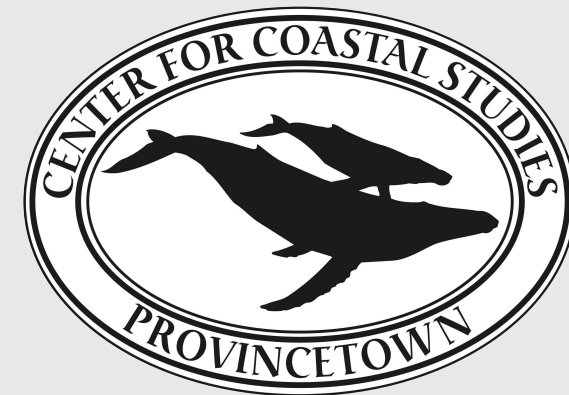
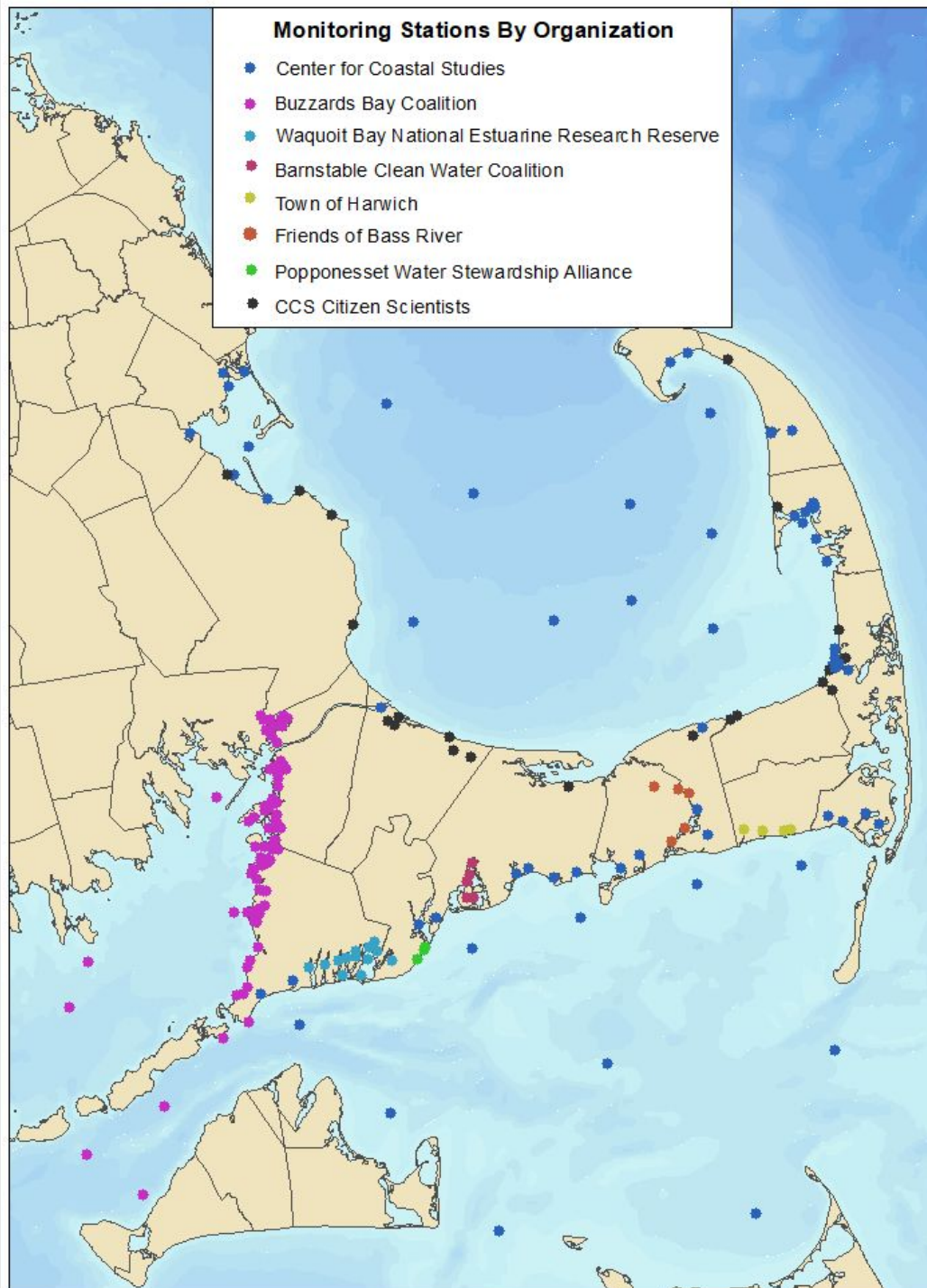




A Collaborative Approach to Monitoring the Coastal Waters of Cape Cod





Background

Support for established long-term monitoring programs

Baseline data

- Nutrients
- Chlorophyll
- Turbidity
- Environmental data

Program Goals

- To network with Cape and Islands organizations with similar interests in water quality to promote data sharing and education and outreach
- To conduct a water quality monitoring program that provides baseline data on hydrography, nutrients, and other elements in the waters surrounding Cape Cod (Nantucket Sound, Cape Cod Bay and eastern Buzzards Bay).
- To provide data that will enable scientists and decision makers to track changes, analyze trends, and evaluate the overall condition of the waters surrounding Cape Cod (Nantucket Sound, Cape Cod Bay and eastern Buzzards Bay).

Network with Cape
and Islands
organizations to
promote data sharing
and education and
outreach

Cape-Wide Effort

- Over 200 stations
- 7 organizations
 - Center for Coastal Studies
 - Buzzards Bay Coalition
 - Waquoit Bay National Estuarine Research Reserve
 - Barnstable Clean Water Coalition
 - Town of Harwich
 - Friends of Bass River
 - Popponessett Water Stewardship Alliance
- Over 200 volunteers

Provide baseline data on hydrography, nutrients, and other elements in the waters surrounding Cape Cod

Water Quality Parameters

In

Situ Temperature

- Salinity
- Dissolved Oxygen

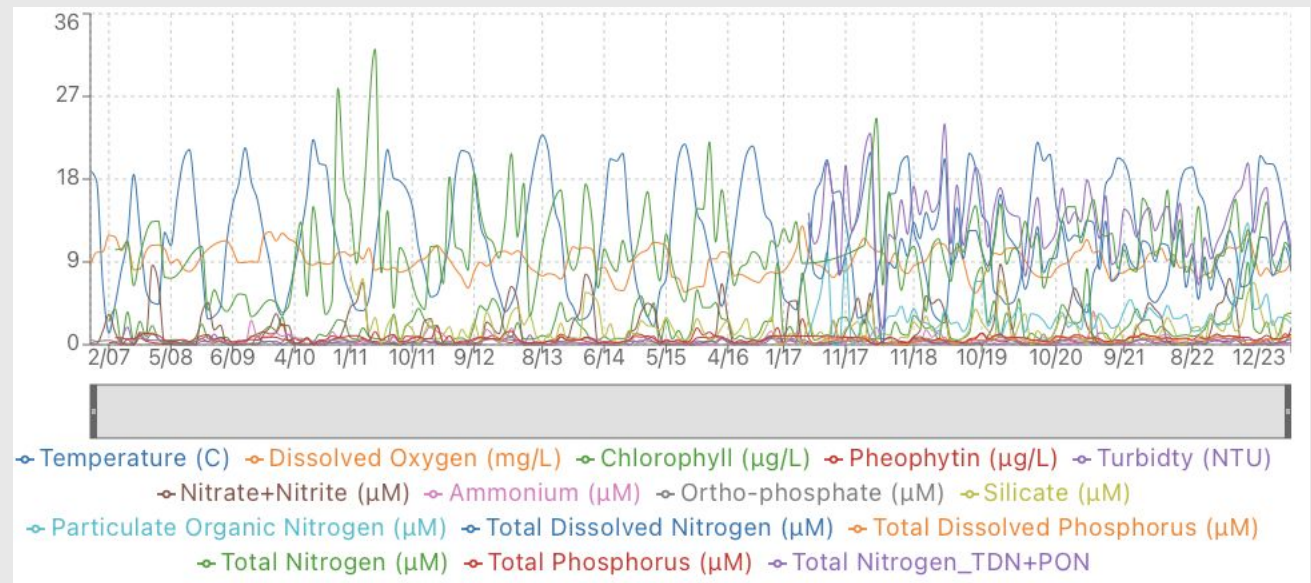
Laborator

- y • Nutrients
 - Nitrate+nitrite
 - Ammonium
 - Ortho-phosphate
 - Silicate
 - Total N
 - Total P
 - Total dissolved N
 - Total dissolved P
 - Particulate organic N
 - Particulate organic C
- Plant Pigments
 - Chlorophyll *a*
 - Pheophytin
- Turbidity

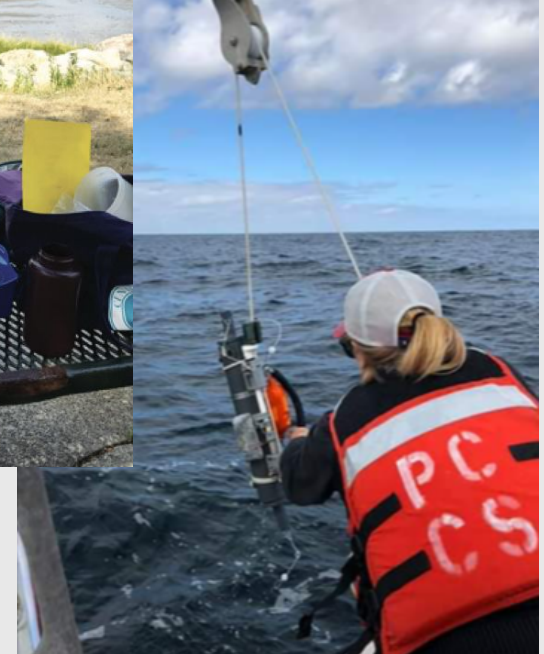
Provide baseline
data on hydrography,
nutrients, and other
elements in the
waters surrounding
Cape Cod

Data (2024)

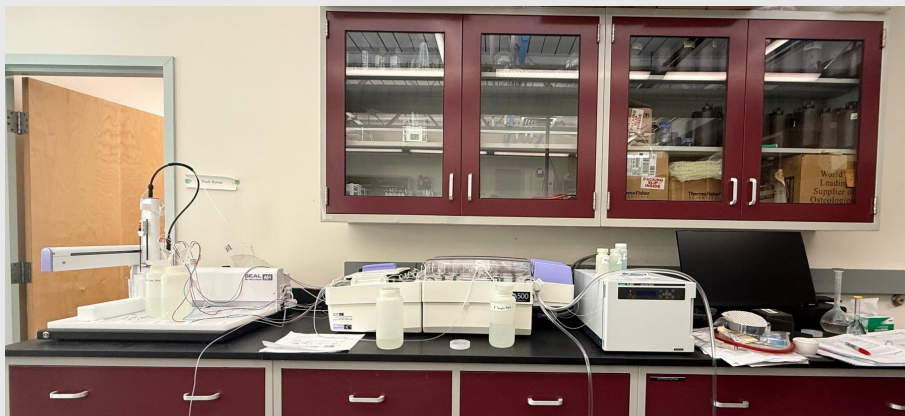
- 2500 samples
- > 40,000 data points



Field Work



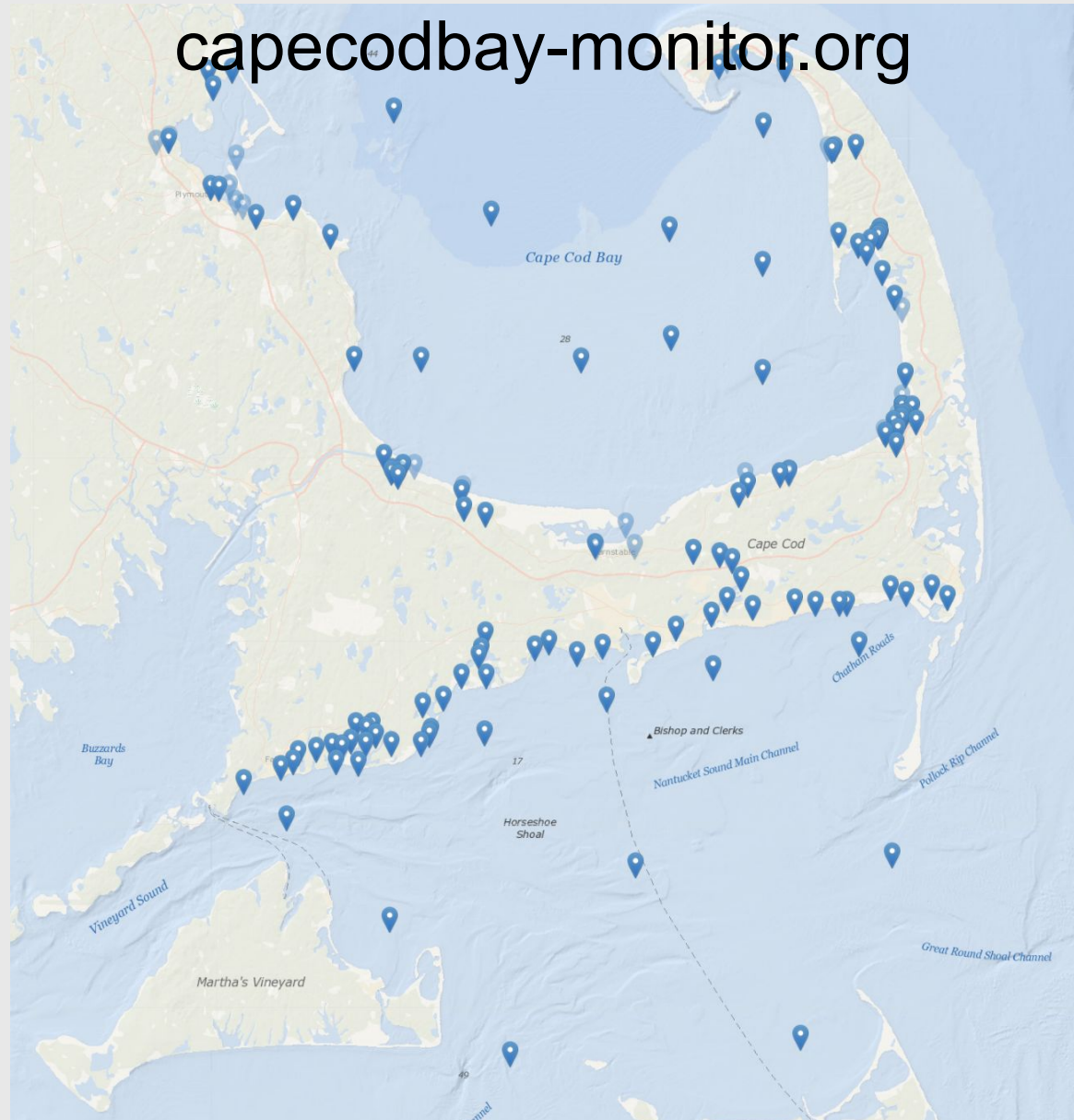
Lab Work



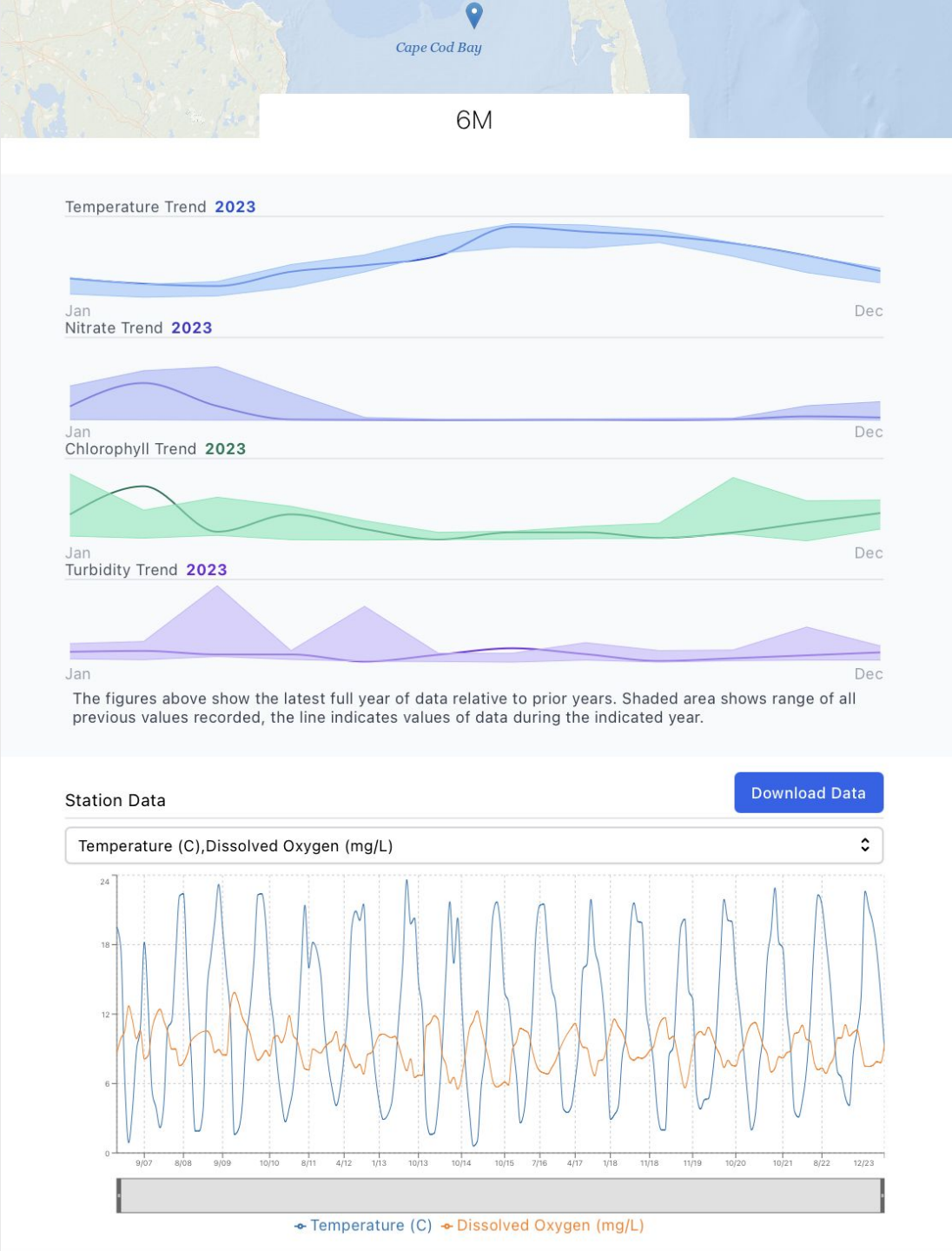
Provide data to help
track changes,
analyze trends, and
evaluate the overall
condition of the
waters surrounding
Cape Cod

Center for Coastal Studies

capecodbay-monitor.org



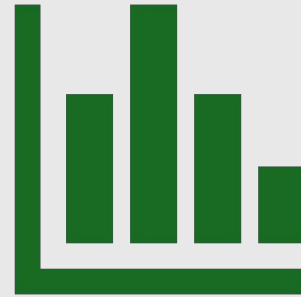
Provide data to help track changes, analyze trends, and evaluate the overall condition of the waters surrounding Cape Cod



Data Analysis

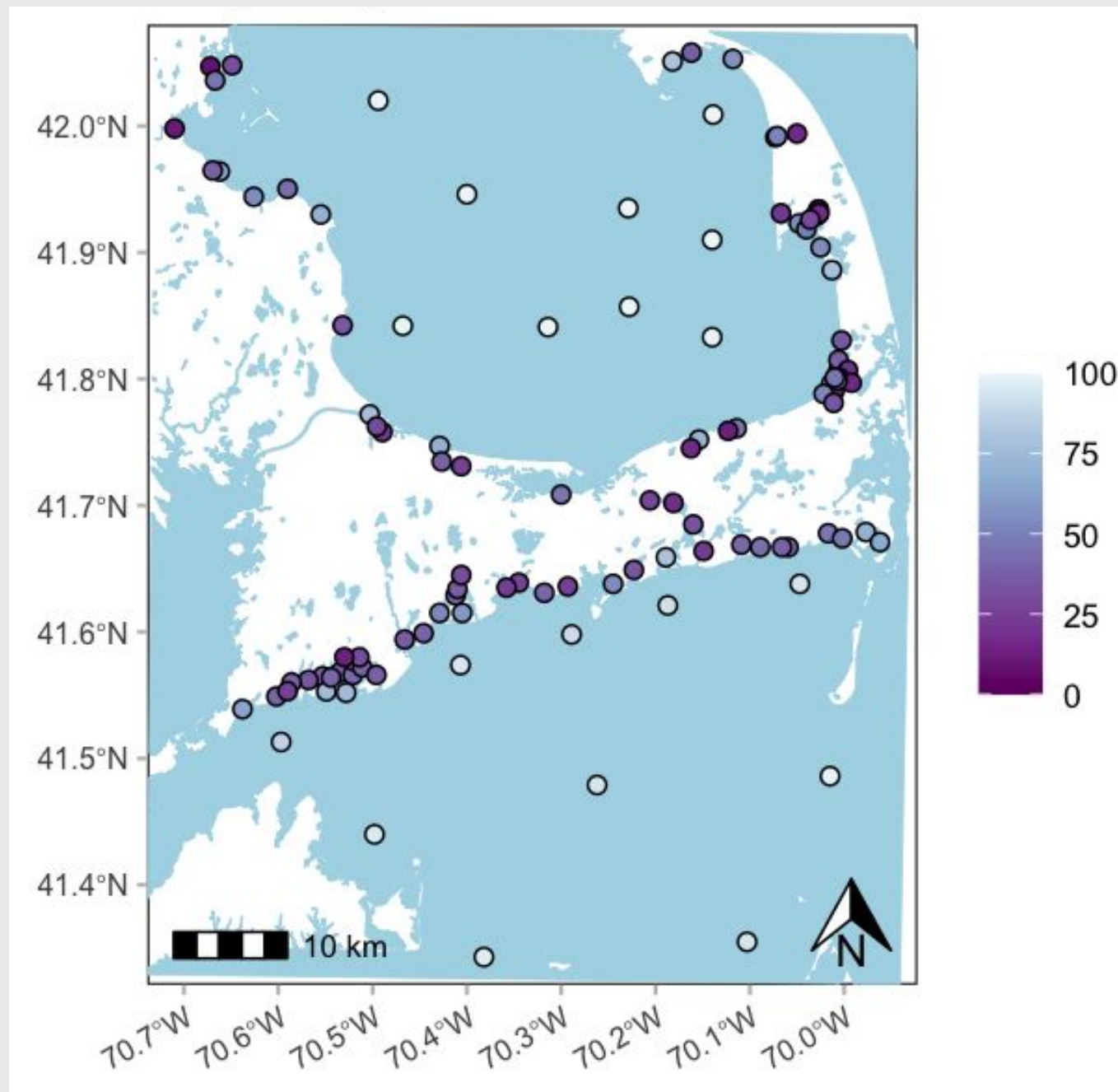


Heath Index



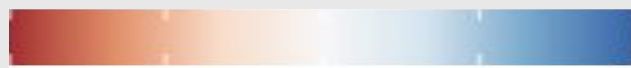
Trend Analysis

Health Index

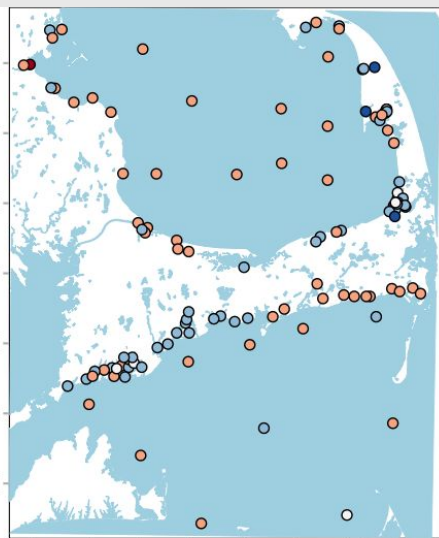


Trend Analysis

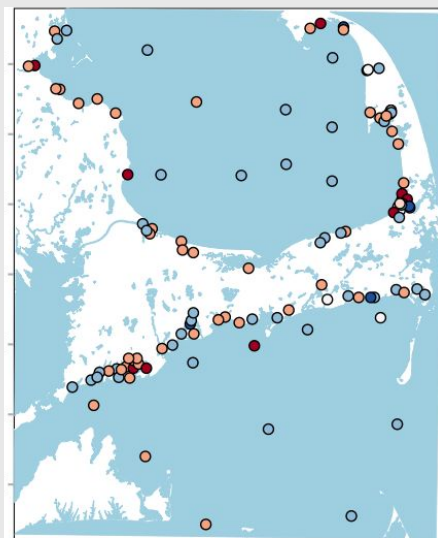
degrading no change improving



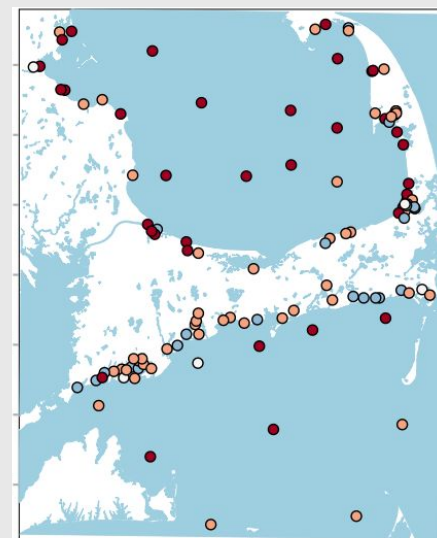
Water Temperature



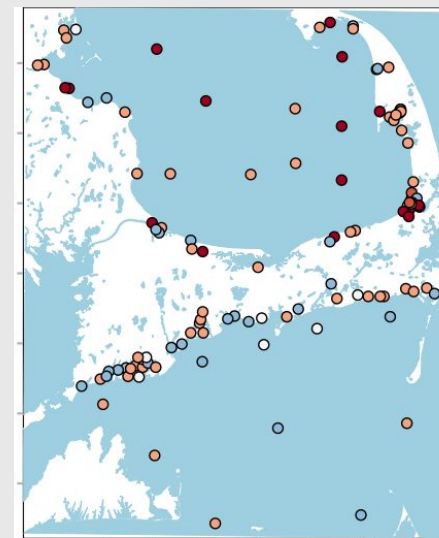
Turbidity



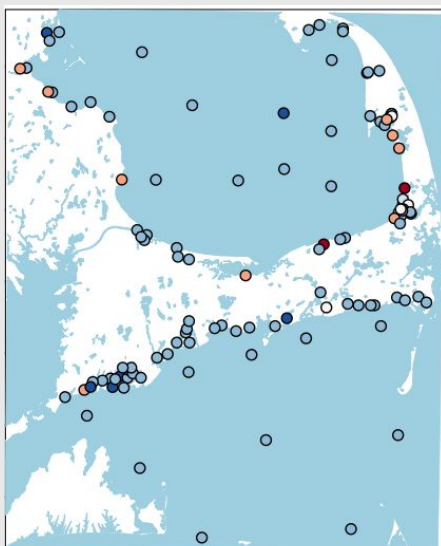
Chlorophyll a



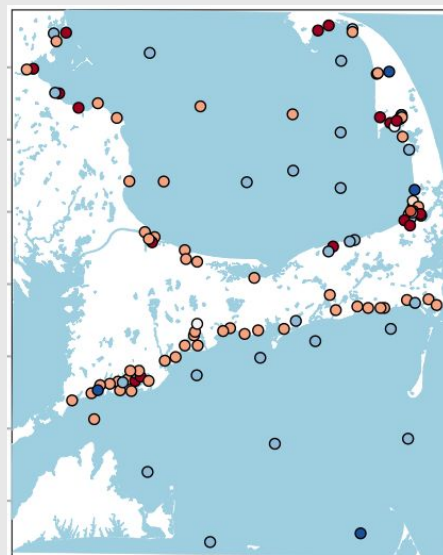
Dissolved Oxygen



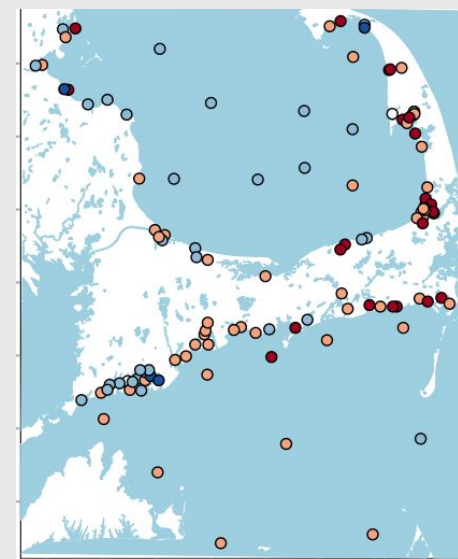
Total Nitrogen



Nitrate+Nitrite

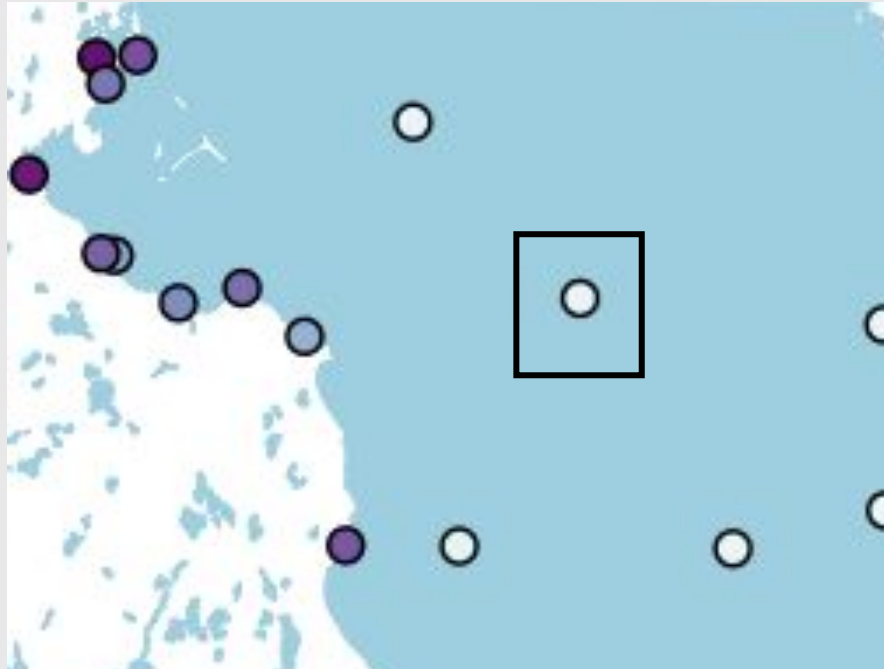


Ammonium

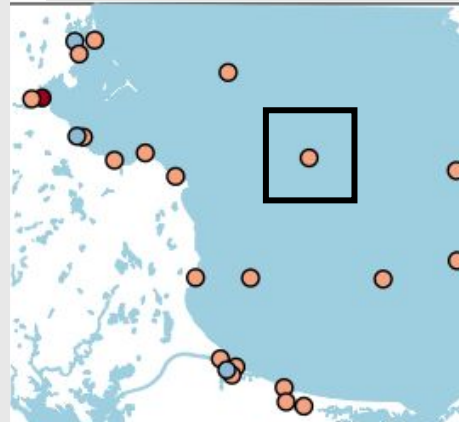


Health Index: Good

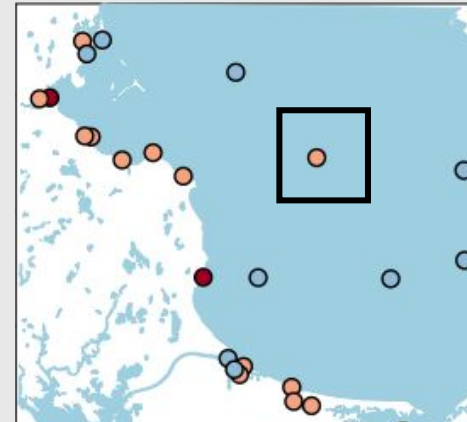
Trends: Degrading



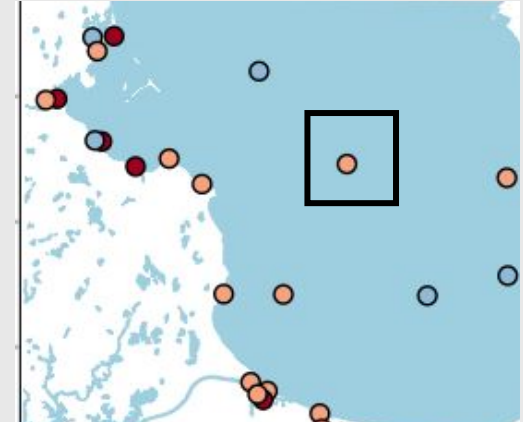
Temperature



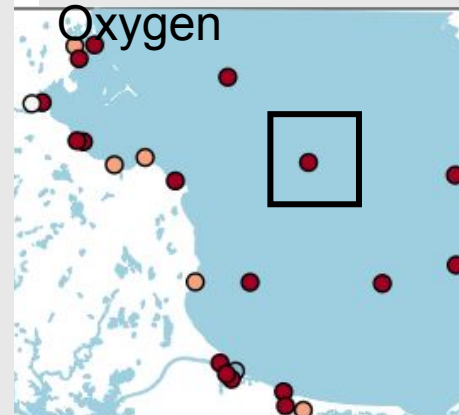
Turbidity



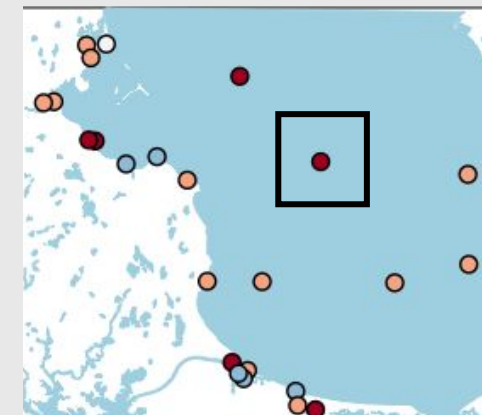
Nitrate+Nitrite



Chlorophyll a

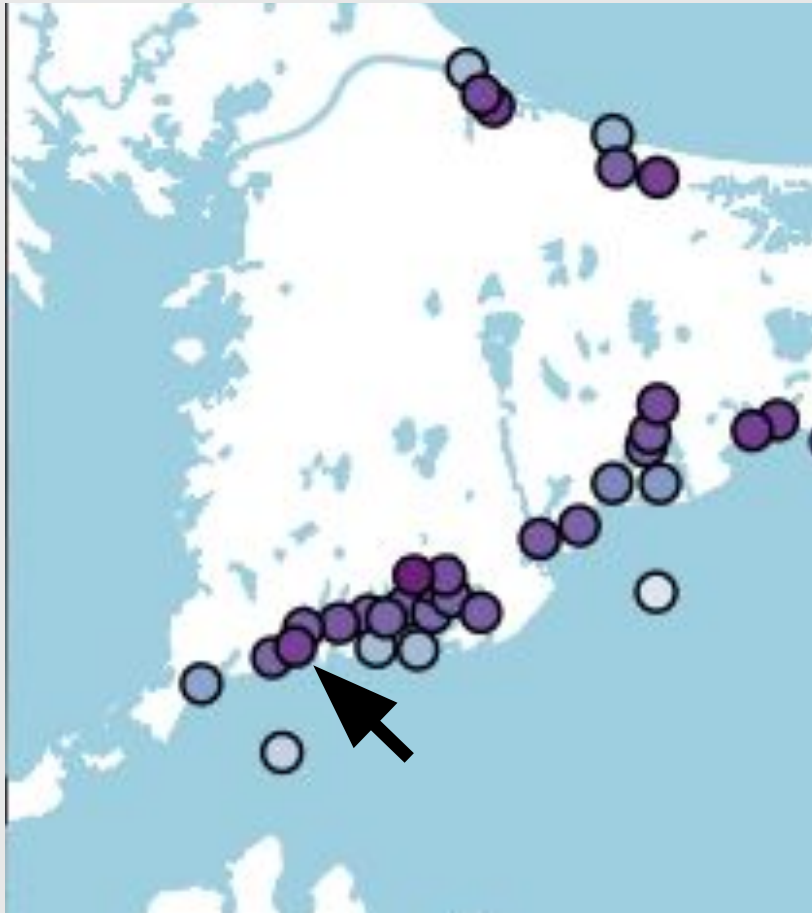


Dissolved

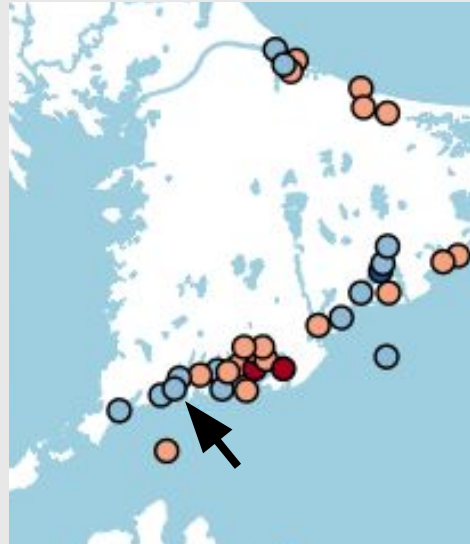


Health Index: Poor

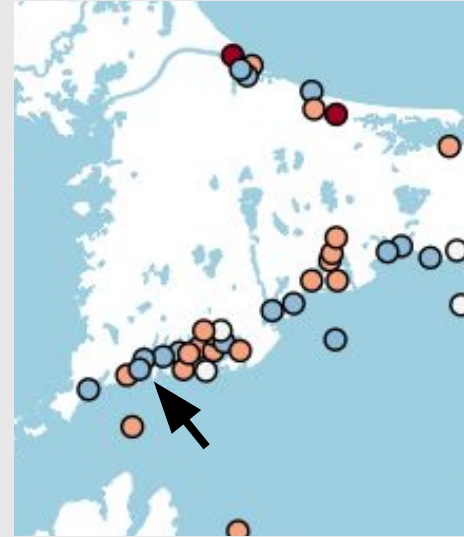
Trends: Improving



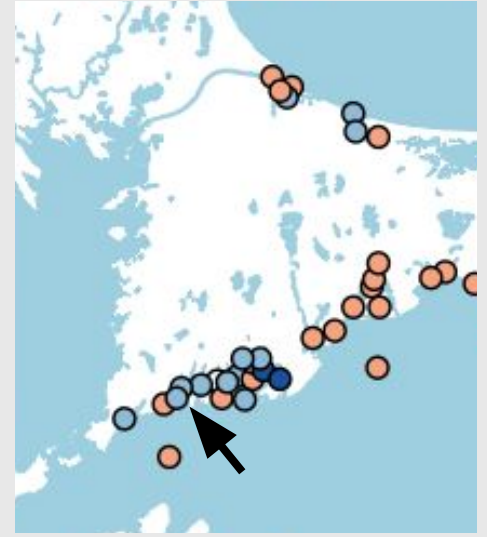
Turbidity



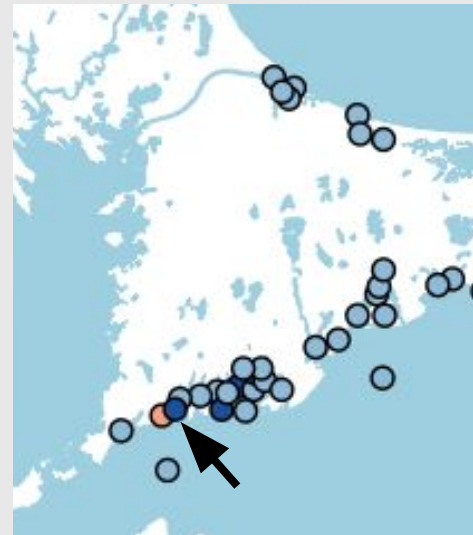
Dissolved Oxygen



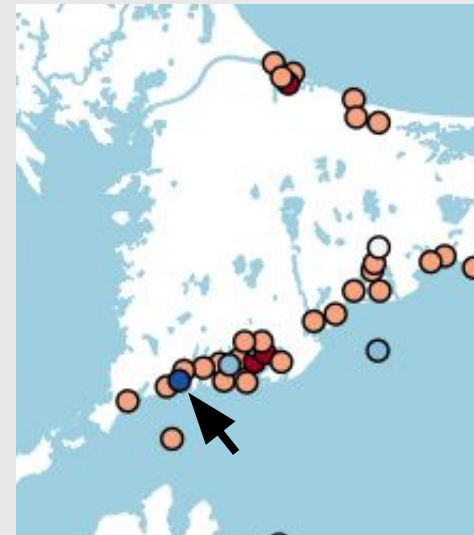
Ammonium



TN

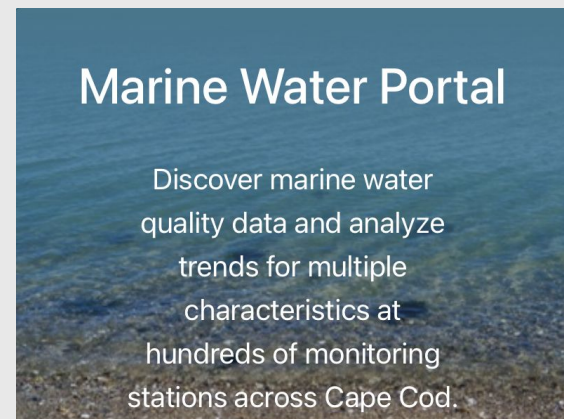


Nitrate+Nitrite



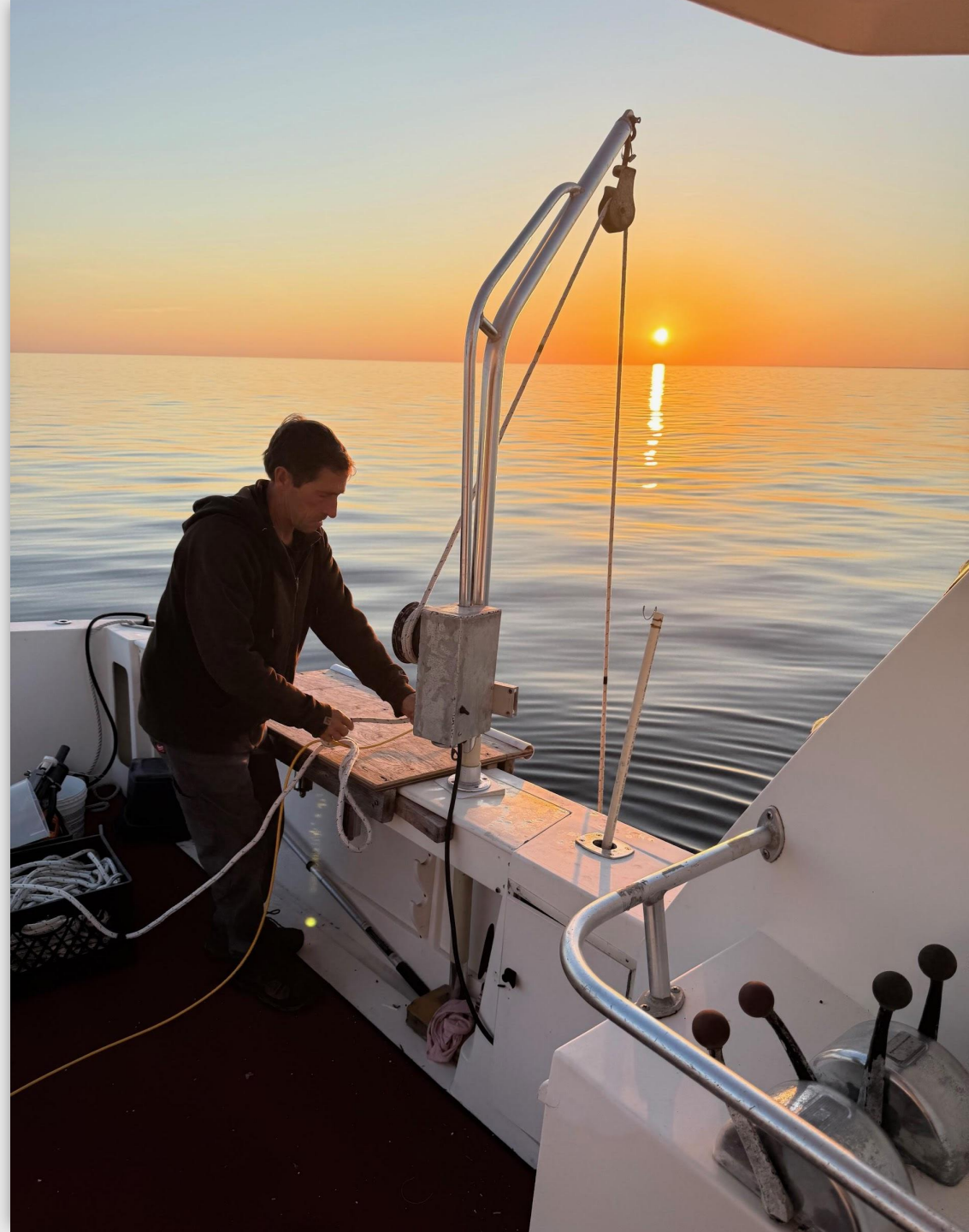
Examples of Use of Data

- By state and federal officials to determine whether waters should be considered impaired on the State's 303(d) list
- In the development of both Groundwater Discharge and National Pollution Discharge Elimination System permits
- To develop nitrogen Total Maximum Daily Loads (TMDLs)
- By DMF to model oyster habitat suitability
- By town officials making decisions about local initiatives
 - Falmouth – ocean outfall evaluation
 - Truro – watershed management planning project
- State of the Waters Reports for Cape Cod (APCC) and Duxbury (DBMC)
- CCC's Cape Cod Water Quality Data Portal
- EPA to develop N targets to protect and restore marine systems



Acknowledgements

- Funders:
 - MassDEP
 - Barnstable County
 - Cape and Islands Water Protection Fund
- CCS WQ Monitoring Program Staff
 - Marc Costa
 - Jenny Burkhardt
 - Troy Wood
 - Priya Gahir
- Volunteers
- Partnering Organizations
- Data Users



Examples of Projects Levering Funds

- Isotope analysis to identify and quantify the specific sources of nitrogen in the coastal waters (funded through Mass Environmental Trust)
- Monitor for coastal acidification (funded through MassDMF and MassBays)
- Monitor for bacteria at sites that are listed as impaired and/or have insufficient data to be assessed for surface water quality (funded through MassDEP)
- Investigate the cause of low dissolved oxygen events in Cape Cod Bay (funded through SeaGrant)



SKC: 6M, chlorophyll
a

