



Cape Cod Freshwater Initiative

ERIN PERRY, DEPUTY DIRECTOR, CAPE COD COMMISSION

FRIENDS OF CHATHAM WATERWAYS
AUGUST 16, 2023



CAPE COD
COMMISSION



CAPE COD
COMMISSION

The Cape Cod Commission

...is the regional land use planning,
economic development, and
regulatory agency created in 1990
to serve the citizens and 15 towns of
Barnstable County, Massachusetts



ESSENTIAL TO OUR ENVIRONMENT & ECONOMY





Properly Functioning Ponds and Lakes Play an Important Role in Preserving and Restoring Coastal Water Quality

Ponds are credited with reducing up to 50% of the nitrogen that passes through them on its way to coastal embayments.

.....

Lack of Consistent and Consecutive Data Collection

less than **10%**

of Cape Cod's ponds and lakes are monitored

890

FRESHWATER
PONDS & LAKES

10,500
ACRES

A map of Cape Cod, Massachusetts, with a light green background. Numerous small, dark blue dots are scattered across the landmass, representing the locations of freshwater ponds and lakes. The dots are more densely clustered in the central and western parts of the peninsula and along the northern coast.

Cape Cod Freshwater Initiative

A science-based, information-driven planning process that will engage stakeholders and enable action to protect and restore Cape Cod's freshwater ponds

.....

ESTABLISHING THE BASELINE



Ponds And Lakes
Atlas Update



Physical
Characteristics



Data Management
And Analysis



Remote Sensing

STRATEGY DEVELOPMENT



Engagement
and Outreach



Strategies
Database



Economic
Analysis



Legal Analysis

ONGOING MONITORING AND ANALYSIS



Monitoring
Program



Ongoing Data
Management
and Analysis



Ongoing
Remote Sensing

Cape Cod Pond and Lake Atlas

The updated Pond and Lake Atlas provides a current assessment of the importance of ponds on Cape Cod, the threats they face, and what is needed to improve and properly manage these valued and unique resources.



2021 Cape Cod Pond and Lake Atlas



Cape Cod Ponds by the Numbers



CAPE COD PONDS AND LAKES

890
POND S

171
10+ Acre Ponds

395
Named Ponds

LARGEST PONDS *by area*

1. Long Pond
Brewster and Harwich
2. Mashpee-Wakeby Pond
Mashpee and Sandwich
3. Wequaquet Lake
Barnstable

DEEPEST PONDS *with data available*

1. Cliff Pond
Brewster
2. Hamblin Pond
Barnstable
3. White Pond
Chatham

27



Fish Stocked
Ponds

107



Ponds Adjacent to
Cranberry Bogs

22



Ponds that Cross
Town Boundaries

96



Ponds with
Public Access*

30%



Protected Open Space
within pond 300ft buffer

14%



Impervious Surfaces
within pond 300ft buffer

*Includes public beaches, boat ramps, and launches

Chatham

10,913 acres



POND AREA
280 acres

37
PONDS


7
10 Acre+
Ponds

24
Named
Ponds

White Pond (43 acres)
LARGEST POND *by area*

White Pond (59 feet deep)
DEEPEST POND *with data available*

2 
Fish Stocked
Ponds

7 
Ponds Adjacent to
Cranberry Bogs

1 
Ponds that Cross
Town Boundaries

12 
Ponds with
Public Access*

24% 
Protected Open Space
within pond 300ft buffer

13% 
Impervious Surfaces
within pond 300ft buffer

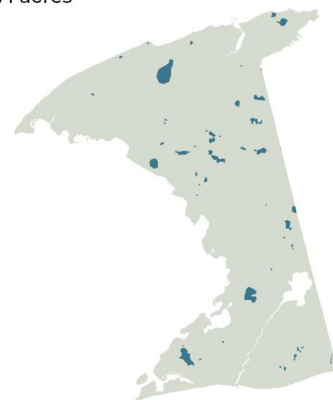
Barnstable

40,141 acres



Dennis

13,671 acres



POND AREA
269 acres

52
PONDS

11
10 Acre+
Ponds

24
Named
Ponds

Scargo Lake (61 acres)
LARGEST POND *by area*

Scargo Lake (45 feet deep)
DEEPEST POND *with data available*

1 
Fish Stocked
Ponds

2 
Ponds Adjacent to
Cranberry Bogs

3 
Ponds that Cross
Town Boundaries

10 
Ponds with
Public Access*


38% 
Protected Open Space
within pond 300ft buffer

13% 
Impervious Surfaces
within pond 300ft buffer

*Includes public beaches, boat ramps, and launches

The Pond Viewer serves as a companion to the Atlas and can be used to explore Cape Cod's ponds, ecology, and the challenges they face.

MAP LAYERS



The screenshot shows the 'Classify Value Table' dialog box in ArcGIS Desktop. The 'Natural Breaks (Jenks)' classification method is selected. The 'Classify Value Table' shows a distribution of values from 1 to 100. The 'Summary Statistics' table shows the distribution of values across the 5 classes. The 'Classify Value Table' is also displayed as a pie chart.

Select a pond and open the Info Panel to view related characteristics including acreage, depth, and more. Users can also explore surrounding land cover and land use summaries within a 300 ft. pond buffer area.

EXPLORE: cccom.link/pond-atlas

Pond Profiles

Expanded Pond Profiles provide a snapshot of regional and town-by-town pond information, including physical characteristics, existing monitoring efforts, watersheds, strategies, and more.

Chatham Ponds Profile

A RESOURCE OF THE CAPE COD FRESHWATER INITIATIVE



Water quality is critical to the vitality of the region's pond ecosystems and coastal embayments. Yet pollutants found in stormwater runoff, and in groundwater by which ponds are recharged, threaten the region's freshwater quality. Understanding the broad issues that impact Cape Cod's freshwater ponds, characteristics of the region's ponds, and actions at the local level help set a baseline for understanding and action.

Chatham

TOWN AREA
10,913 acres



POND AREA
280 acres

3% of total town area is comprised of freshwater ponds and lakes

Top 5 Largest Ponds

POND	AREA
1. White Pond	43.0 acres
2. Goose Pond	40.9 acres
3. Lovers Lake	37.6 acres
4. Mill Pond	23.0 acres
5. Schoolhouse Pond	22.5 acres

Top 5 Deepest Ponds

POND	DEPTH
1. White Pond	59 ft.
2. Goose Pond	52 ft.
3. Stillwater Pond	51 ft.
4. Schoolhouse Pond	47 ft.
5. Lovers Lake	36 ft.

37
PONDS

7
10+ Acre
Ponds

24
Named
Ponds

8 ACRES
Average
Pond Size

3
Acre
Ponds

2
Fish Stocked
Ponds

7
Ponds Adjacent to
Cranberry Bogs

1
Ponds that Cross
Town Boundaries

12
Ponds with
Public Access

7
State Listed
Great Ponds

13%
Impervious Surfaces
in Pond 300ft Buffer

5
Ponds with Coastal
Plain Pondshores

19
Ponds with
Shoreline Erosion

Pond Monitoring

Of the town's 37 ponds, 0 have three consecutive years of recent monitoring data and only 43% of all the ponds have available monitoring data. The data record for this monitoring spans 9 years with an average of 0.8 sampling events at each monitored pond per year.

16
Ponds Monitored

0
Ponds with
Years of Rec
(2016-2021)

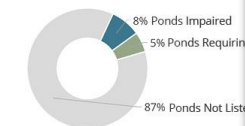
Water Quality Impairments

A lack of consistent and available monitoring data for all ponds means we may be underestimating threats to waterbody health.

0
Harmful Algal Bloom
Advisories Since 2017
(DPH Reported)

5
Ponds listed on MassDEP
2022 Integrated List of Watersheds

0
Freshwater Bathing
Beaches with Sampling
Failures for Fecal Coliform
in 2022



Chatham Ponds Profile

A RESOURCE OF THE CAPE COD FRESHWATER INITIATIVE

Pond Watersheds

The land area that contributes to freshwater ponds and lakes is referred to as a pond watershed. Relatively few pond watersheds have been delineated across the Cape. Land area within pond watersheds is much larger than the water bodies themselves. In Chatham, 6% of the town's total land area is within a delineated pond watershed.

10
Pond Watersheds
Delineated

666
Acres of Pond
Watershed Area

1
Pond Watersheds
that Cross
Town Boundaries



Freshwater
Ponds
Pond
Watershed
Area

Some contributing pond watershed areas also extend beyond town boundaries and include additional acreage in neighboring towns.

Documented Town Reports and Actions

1
Town Specific
Freshwater Reports

3
Pond Specific
Freshwater Reports

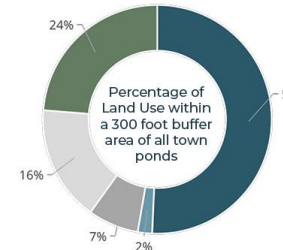
Local Pond Organizations

Independent groups, organizing around a single or multiple ponds, voluntarily conduct educational and advocacy efforts and collect water quality monitoring data, which is not always available or sufficient for regional analysis.

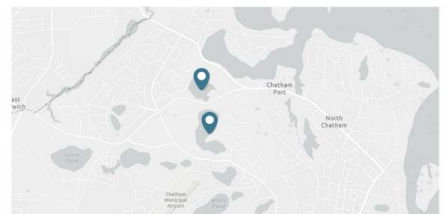
Friends of Chatham Waterways

Land Use in Pond Buffer Area

Understanding the way that land is used around our freshwater ponds contributes to a better understanding of potential pond impacts, stressors, and viable strategies to protect or restore pond health. 688 acres (or 6%) of the town's total land area is within 300 feet of a freshwater pond.



Residential Land Use
Commercial & Industrial
Land Use
Right of Way Land Use
Other Land Use
Protected Open Space



Pond Strategies Implemented

Updates and additional projects will be added as information becomes available. Review project details at: ccom.link/pond-restoration-projects

Lovers Lake, Alum Treatment
Stillwater Pond, Alum Treatment



CAPE COD FRESHWATER INITIATIVE

ENGAGEMENT AND OUTREACH



Pond Network

Coalition of pond groups and associations or pond water quality monitors to invite connection, collaboration, and shared resources



Municipal Meetings

Meetings with representatives from the 15 towns to better understand local priorities, challenges, and opportunities



Technical Advisory Group

Technical experts will advise components of the Initiative such as the freshwater quality strategies database



Stakeholder Engagement

Engagement that incorporates broad stakeholder representation to understand priorities, the range of potential solutions, and build consensus on a framework for action

REGIONAL MONITORING

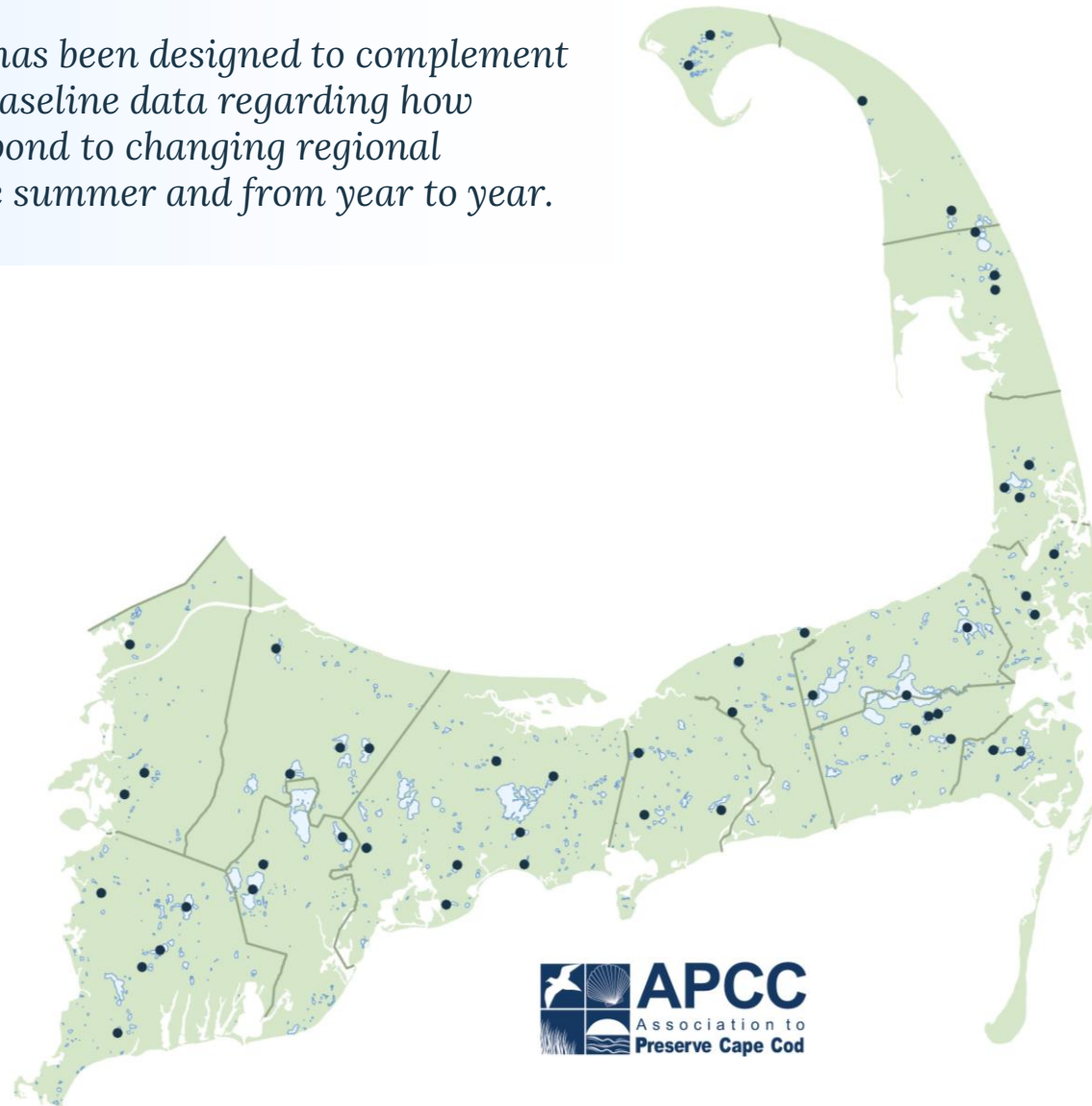


**REGIONAL POND MONITORING PROGRAM**

The Regional Pond Monitoring Program has been designed to complement existing monitoring efforts and provide baseline data regarding how different types of ponds on Cape Cod respond to changing regional environmental conditions throughout the summer and from year to year.

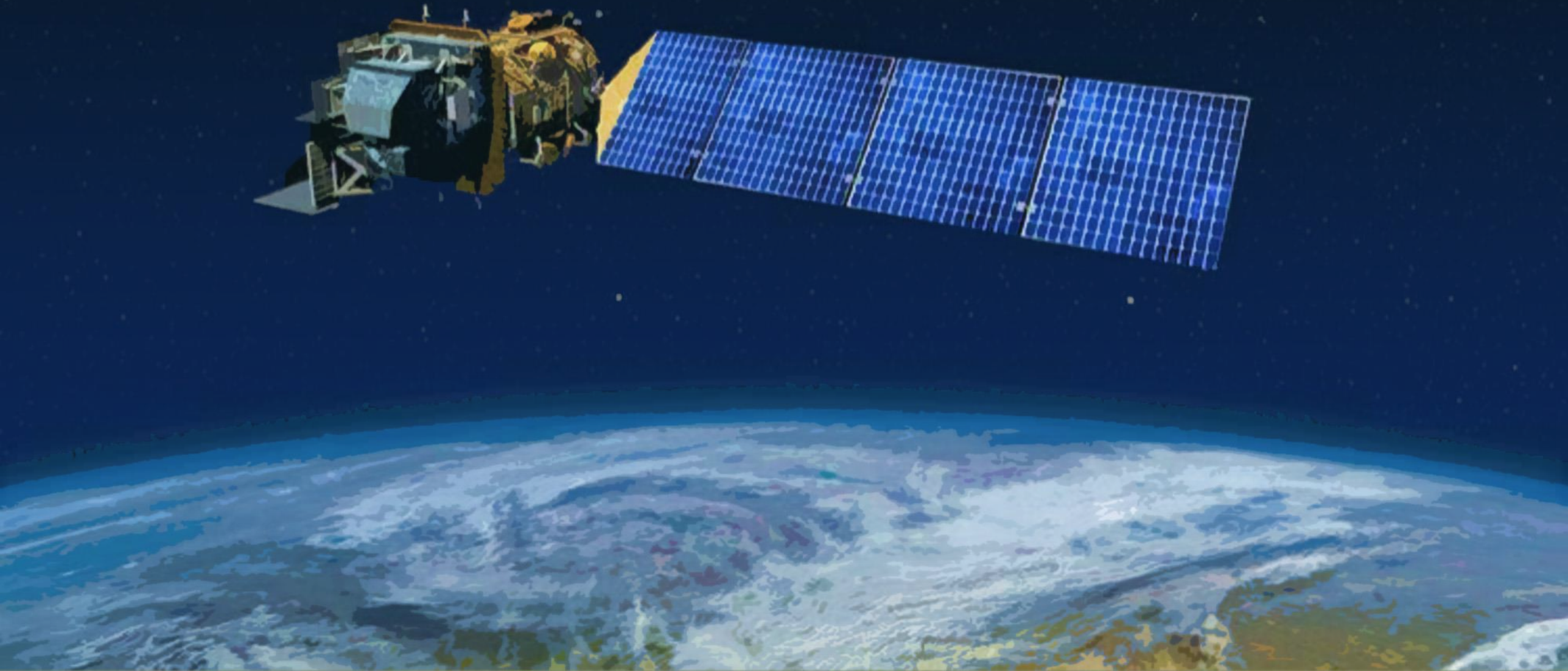
Pond selection criteria:

- Spatial coverage across all towns and aquifer lenses
- Range of physical characteristics e.g., pond size, depth, level of watershed development
- Stream/herring run connections, implementation projects, and Coastal Plains Pondshores
- Water quality status
- Public uses of ponds
- Located in or adjacent to environmental justice area

**Ponds by Town**

Barnstable	7
Bourne	3
Brewster	3
Chatham	2
Dennis	3
Eastham	3
Falmouth	5
Harwich	4
Mashpee	3
Orleans	3
Provincetown	2
Sandwich	4
Truro	2
Wellfleet	3
Yarmouth	3

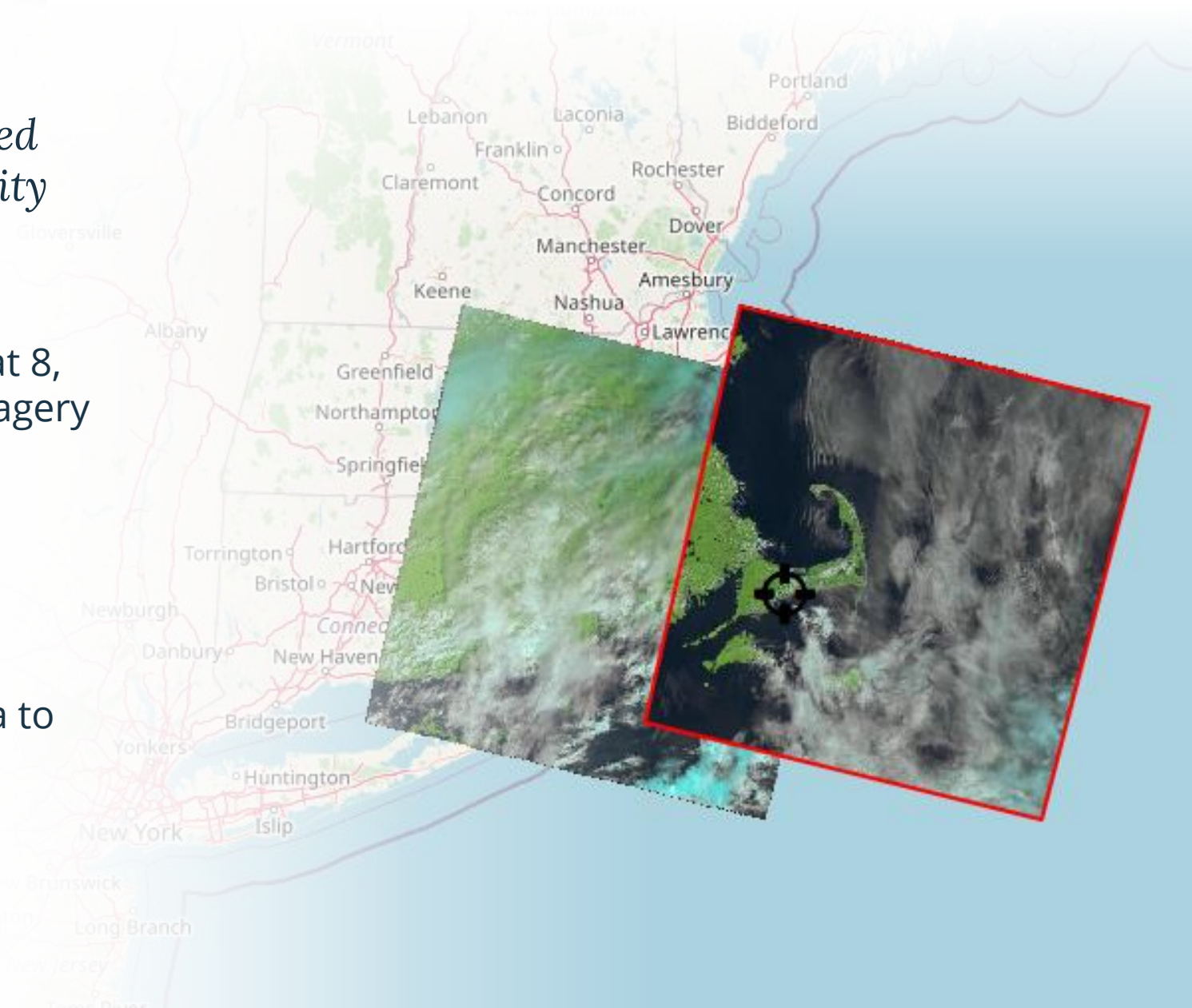
REMOTE SENSING





Investigating the use of satellite-derived imagery and existing pond water quality data to quantify changes in pond characteristics

- Partnership with NOAA, using Landsat 8, Landsat 9, and Sentinel 2 satellite imagery (images every 5-16 days)
- Connecting imagery to water clarity
- Field validation data collected during satellite overpass to calibrate
- Sufficient satellite and validation data to analyze 217 ponds



DATA MANAGEMENT & ANALYSIS





Cape Cod Water
Quality Database



Identify trend analyses and
develop processing scripts



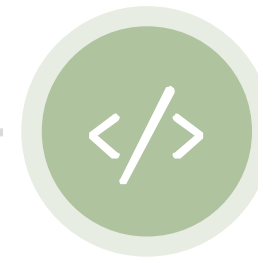
Release freshwater public
data portal / user interface



ONGOING DATA MANAGEMENT AND ANALYSIS

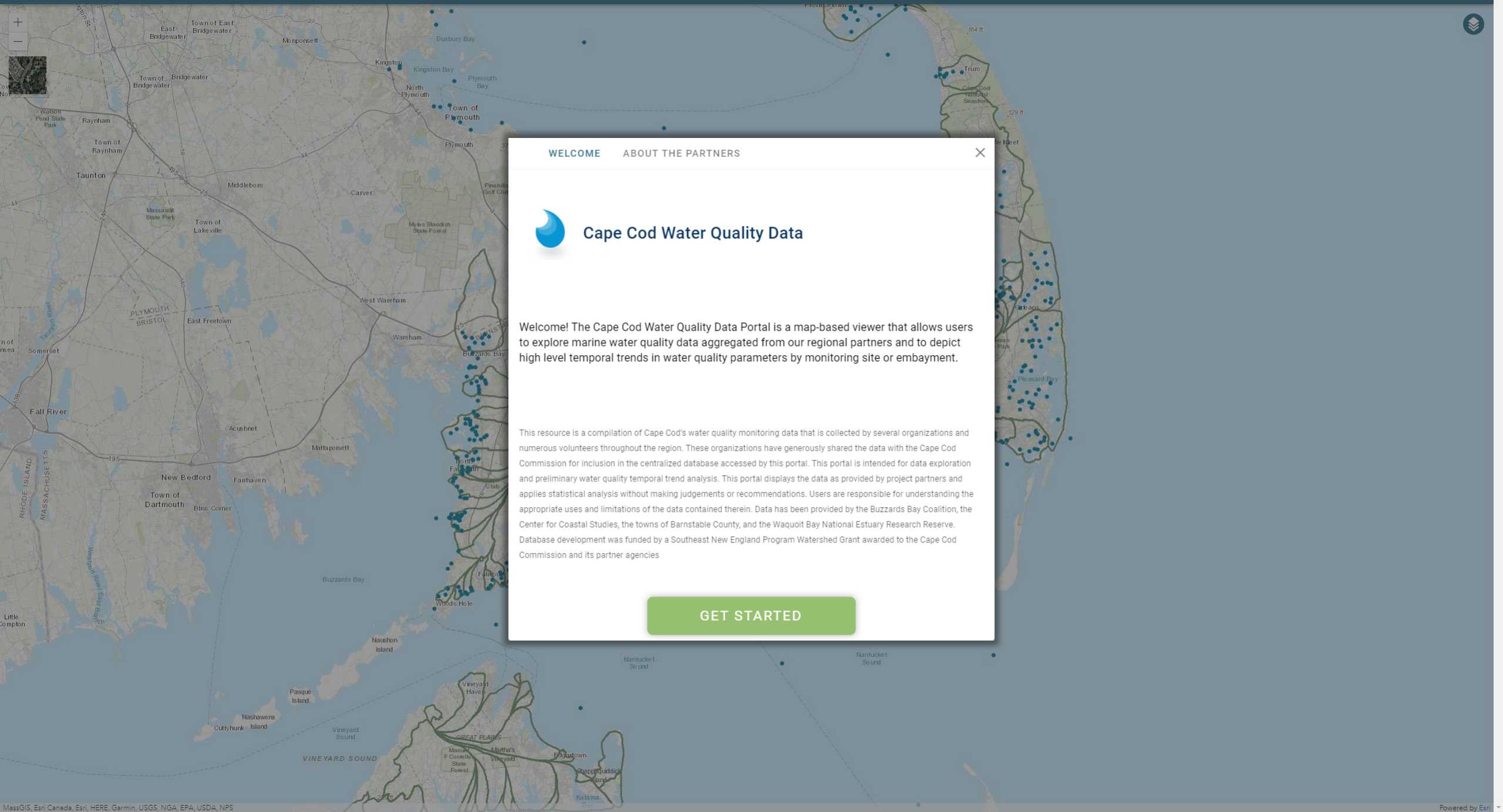


Future
monitoring data



Regional data and
trend analysis





[WELCOME](#) [ABOUT THE PARTNERS](#)

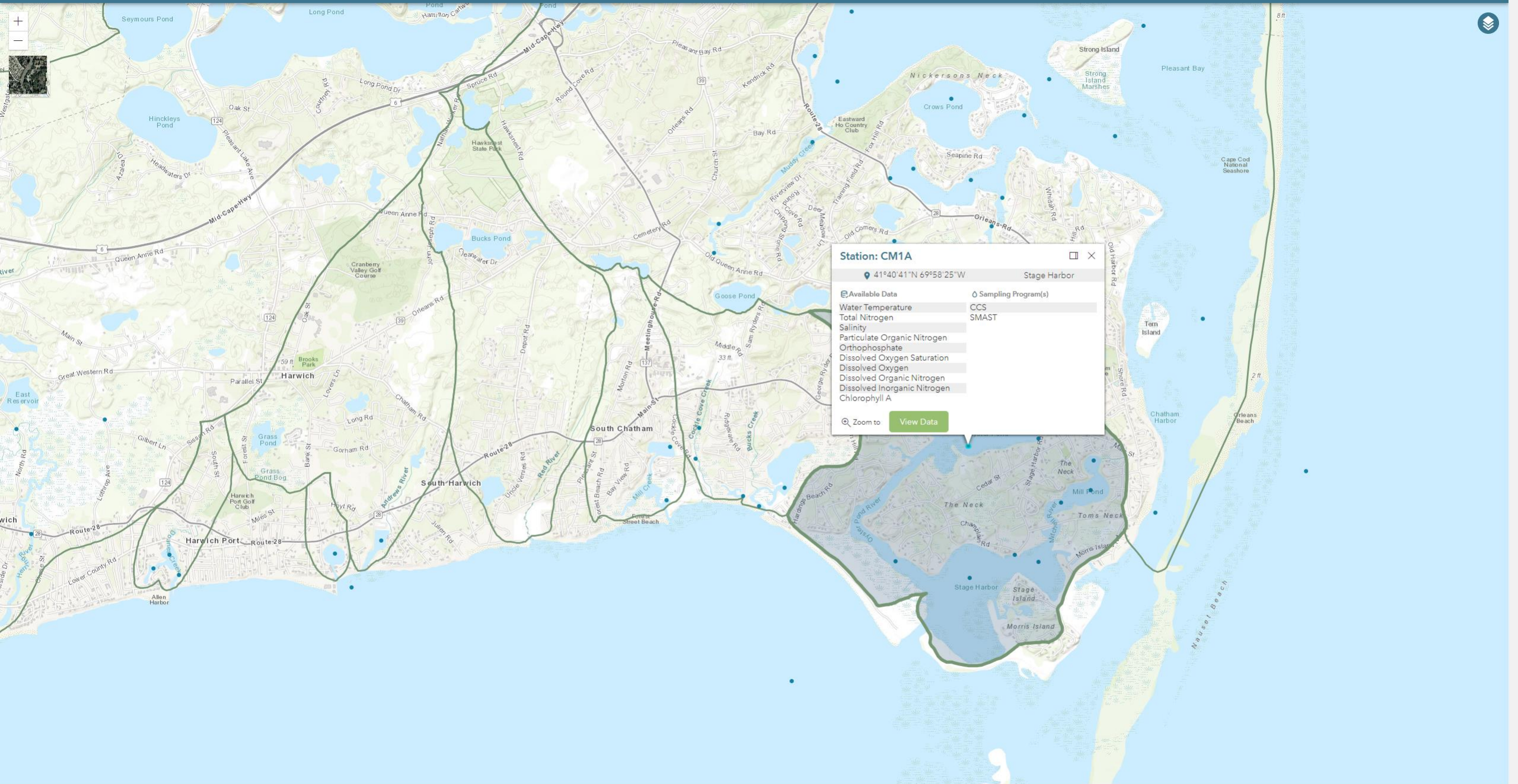


Cape Cod Water Quality Data

Welcome! The Cape Cod Water Quality Data Portal is a map-based viewer that allows users to explore marine water quality data aggregated from our regional partners and to depict high level temporal trends in water quality parameters by monitoring site or embayment.

This resource is a compilation of Cape Cod's water quality monitoring data that is collected by several organizations and numerous volunteers throughout the region. These organizations have generously shared the data with the Cape Cod Commission for inclusion in the centralized database accessed by this portal. This portal is intended for data exploration and preliminary water quality temporal trend analysis. This portal displays the data as provided by project partners and applies statistical analysis without making judgements or recommendations. Users are responsible for understanding the appropriate uses and limitations of the data contained therein. Data has been provided by the Buzzards Bay Coalition, the Center for Coastal Studies, the towns of Barnstable County, and the Waquoit Bay National Estuary Research Reserve. Database development was funded by a Southeast New England Program Watershed Grant awarded to the Cape Cod Commission and its partner agencies

GET STARTED





by Strategy

by Town

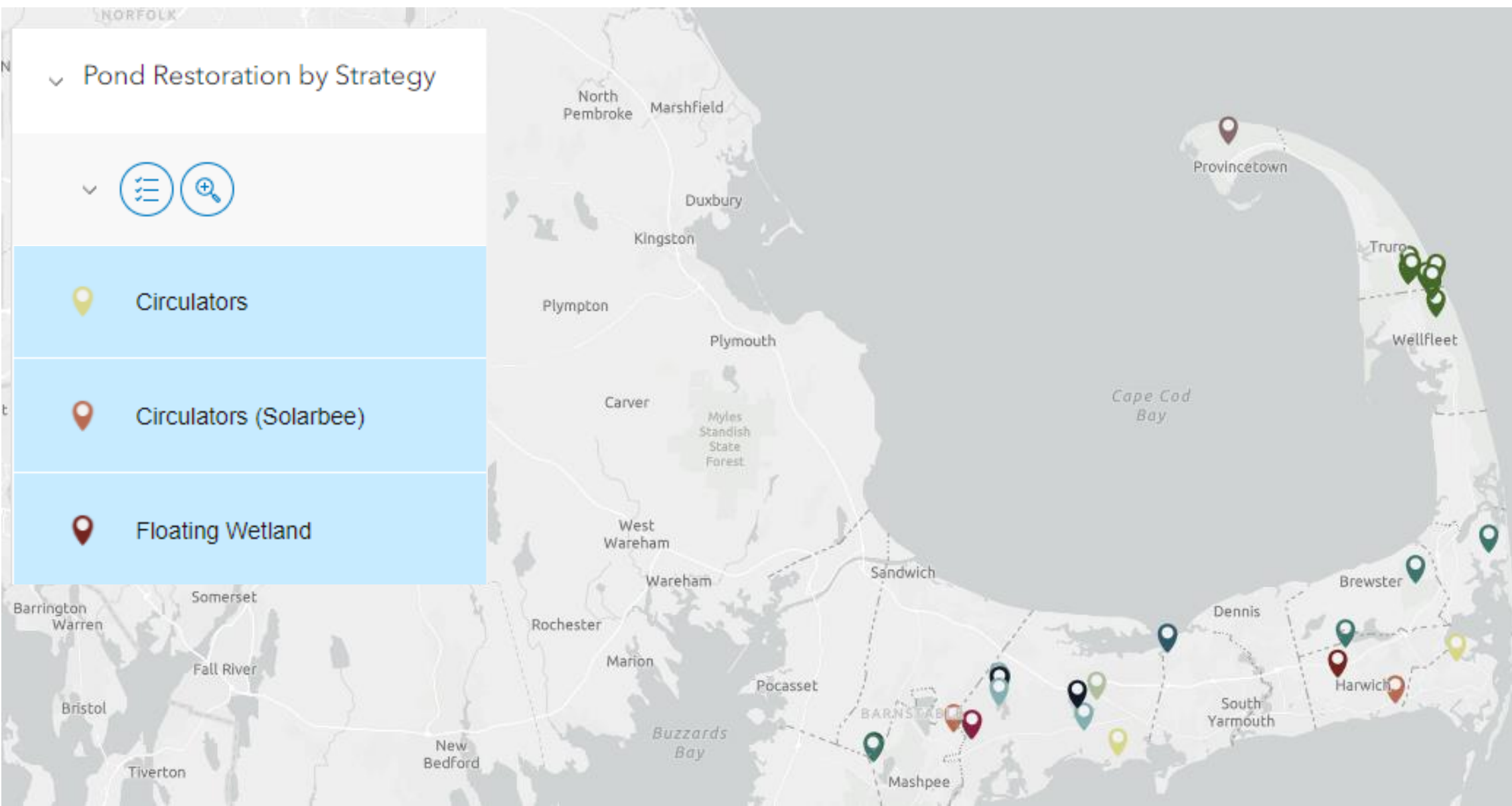
- ✓ Pond Restoration by Strategy



 **Circulators**

 Circulators (Solarbee)

 Floating Wetland





CAPE COD FRESHWATER INITIATIVE
POND STRATEGIES DATABASE

SCALE OF APPROACHES:

WATERSHED



Comprehensive watershed planning, land use regulations, land protection, advanced wastewater treatment

POND SHORES



Vegetated buffers, fertilizer management, septic setbacks, I/A septic systems

IN POND



Nutrient, algae, sediment, and vegetation management approaches

DATABASE INCLUDES:

Policy
Approaches



Physical
Approaches



Chemical
Approaches



Biological
Approaches





ECONOMIC ANALYSIS



ECONOMIC ANALYSIS

Quantifying the costs and benefits of pond management strategies, including the cost of no action and the impacts of degraded freshwater quality on real estate values

**Role of freshwater
ponds on the regional
Cape Cod economy**



**Impacts of degraded
water quality**

**Cost/benefit analysis of water quality
improvement strategies**



Understand the Economic Impact of Cape Cod's Freshwater Ponds

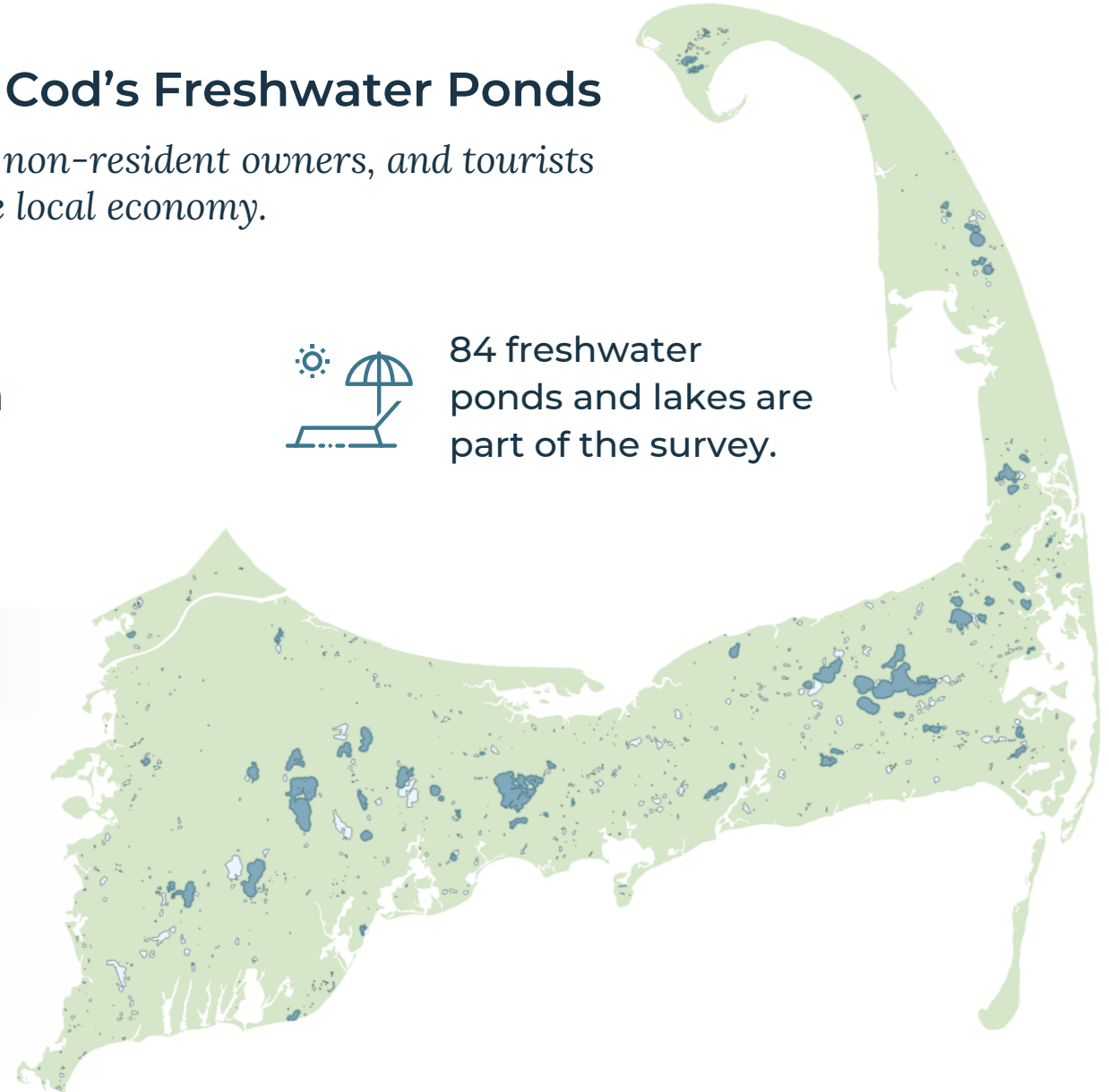
An economic impact study will assess spending by residents, non-resident owners, and tourists related to freshwater activities and their ripple effects on the local economy.



Freshwater Intercept Surveys are being conducted by ERG staff from May through October 2023.



84 freshwater ponds and lakes are part of the survey.





Category	General
Comment	Hathaways Pond has been "our pond" for many years. There's a great trail that circles the pond along with small areas perfect for fishing or launching a kayak.



Last edited on 7/26/2023, 5:08 PM.

 Zoom  Edit





Cape Cod Freshwater Initiative

CALL FOR STAKEHOLDERS



Cape Cod Freshwater Initiative

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FRIENDS OF CHATHAM WATERWAYS
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