

**Cape Cod 208 Area Water Quality Planning
Herring River Watershed Working Group**

**Meeting One
Thursday, September 19, 2013
Harwich Community Center, 100 Oak Street, Harwich, MA 02645**

Meeting Agenda

- 8:30 am Welcome – *Cape Cod Commission*
- 8:35 Introductions, confirm working group membership and participation – *Kate Harvey (Facilitator) and Working Group*
- 9:00 Review 208 goals and process and the goals of today’s meeting – *Cape Cod Commission*
- 9:15 Local Progress to Date: Chronology of what has been done to protect the watersheds in your area – *Cape Cod Commission*
- 9:30 Review and add to chronology of work to date – *Working Group*
- 9:45 Discussion: drawing on past work to move forward – *Kate Harvey (Facilitator) and Working Group*
- 10:00 Baseline Conditions: Understanding Your Watershed and its Water Quality Problem – *Patty Daley (Area Manager)*
- 10:45 Break
- 11:00 Discussion of Baseline Conditions - *Kate Harvey (Facilitator) and Working Group*
- 11:30 Review/Discuss Process Protocols - *Kate Harvey (Facilitator) and Working Group*
- 12:00 Framework for Moving Forward: Preview Meetings 2 and 3 – *Patty Daley (Area Manager)*
- 12:10 Public Comments
- 12:30 Adjourn



Herring River Group

Baseline Conditions & Needs Assessment

What is the 208 Plan?

Clean Water Act Section 208



The Commission was directed to update the 1978 Plan

The Commonwealth provided \$3 million to fund the project

Focus on 21st Century Problems



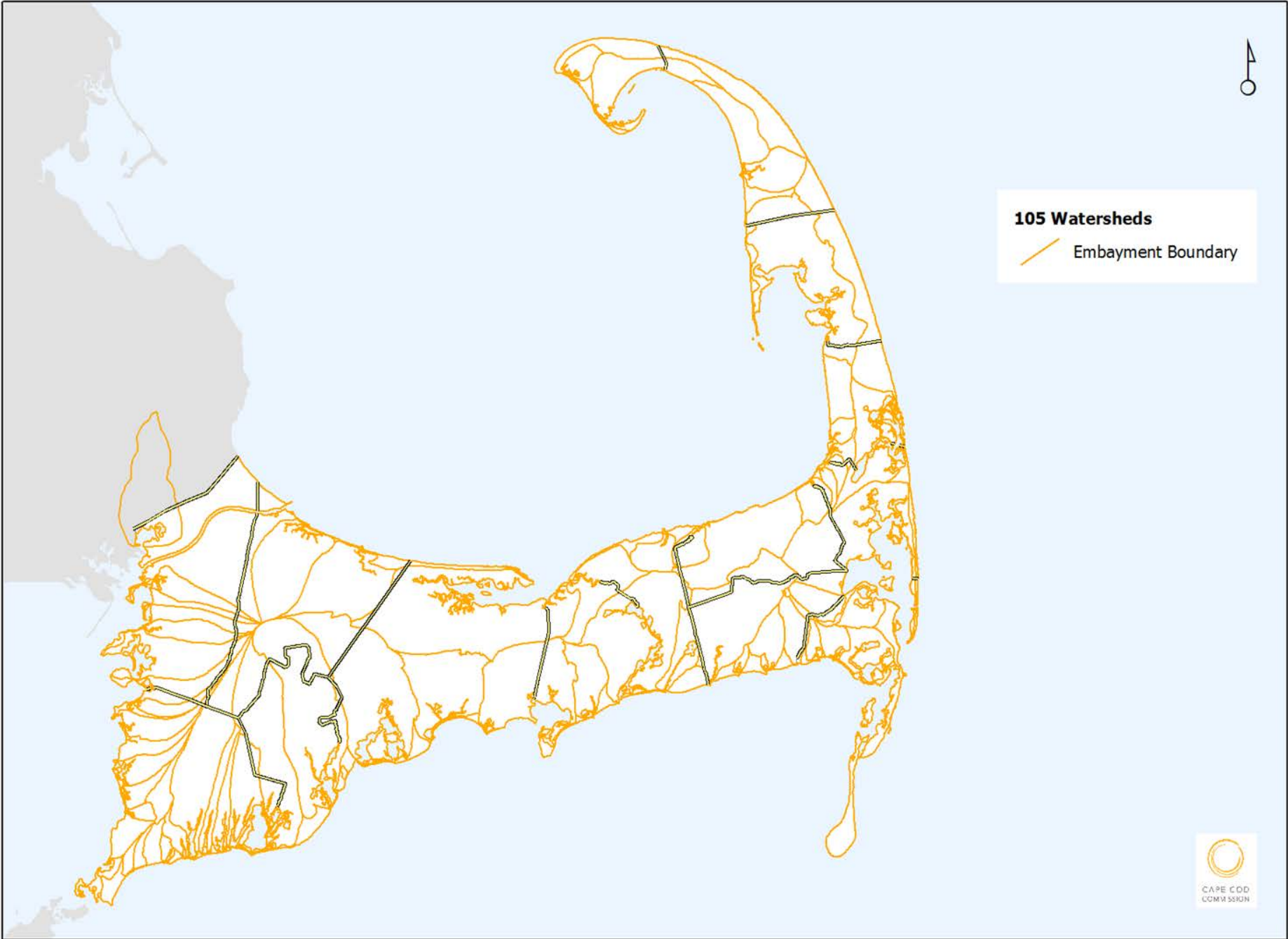
**Nitrogen:
Saline Waters**

**Phosphorus:
Fresh Waters**

**Growth &
Title 5
Limitations**



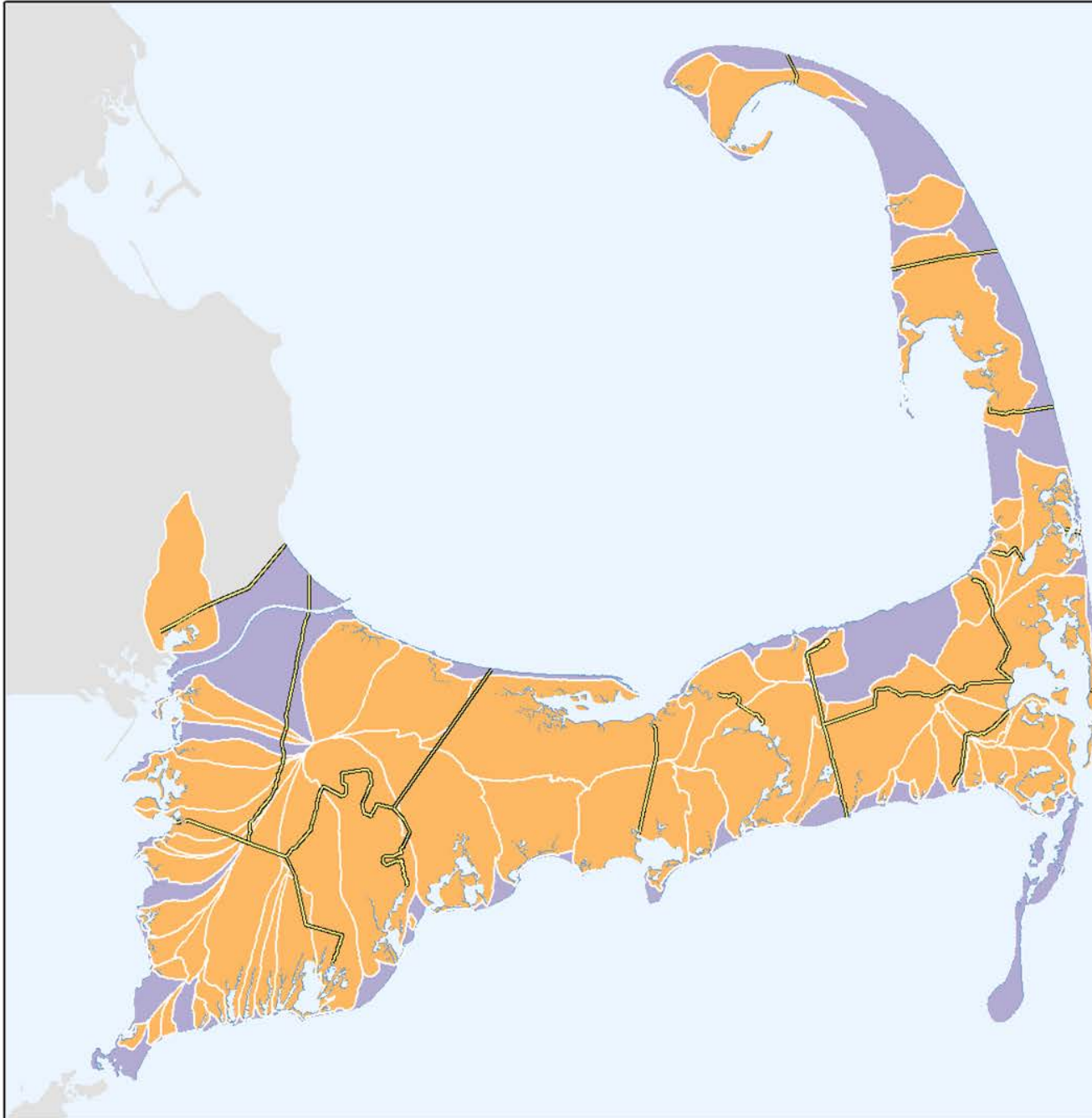
105 Watersheds
— Embayment Boundary





57 Embayments

- ◆ Embayment Watershed
- ◆ Direct Discharge Watershed

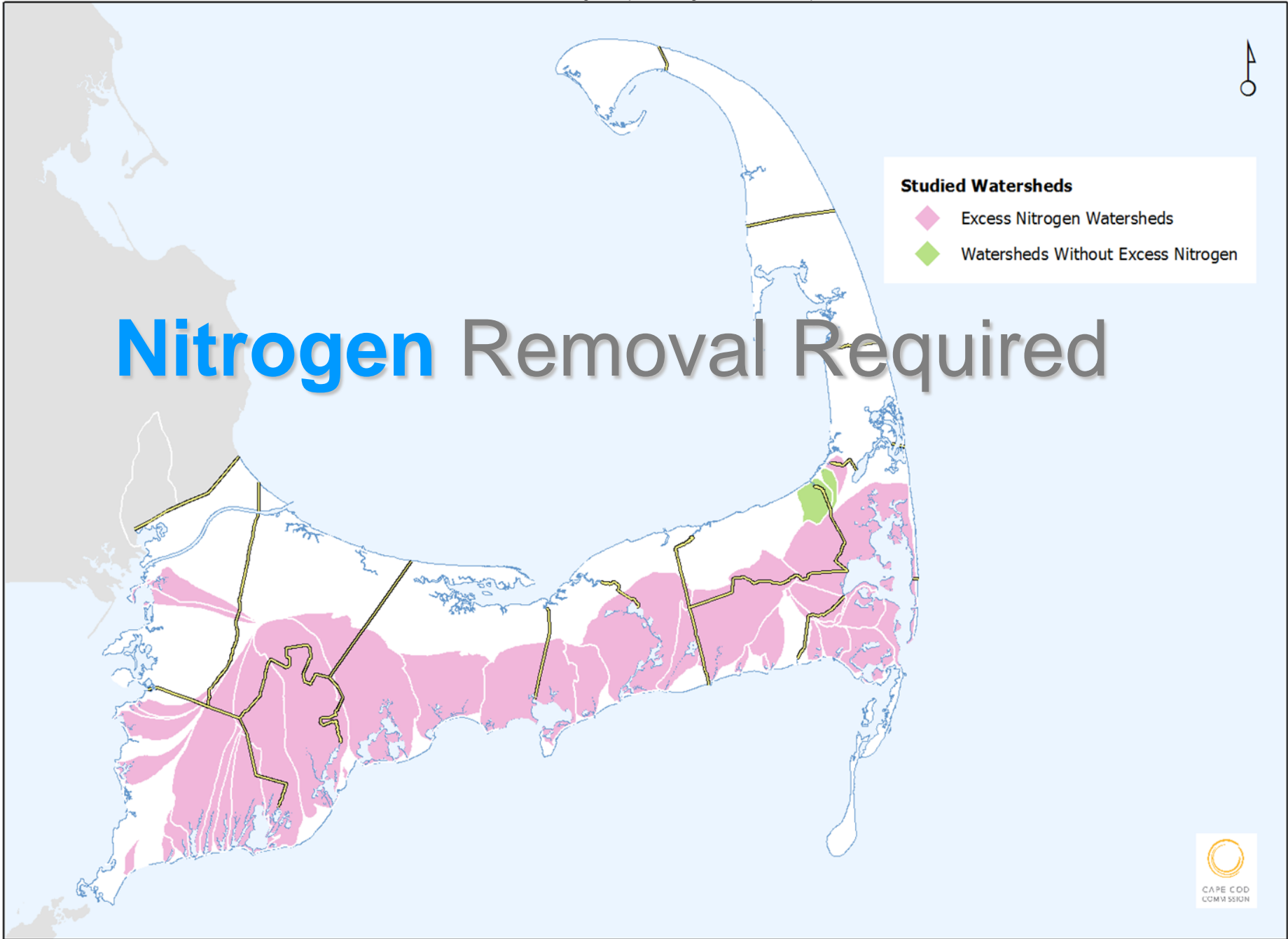




Studied Watersheds

- ◆ Excess Nitrogen Watersheds
- ◆ Watersheds Without Excess Nitrogen

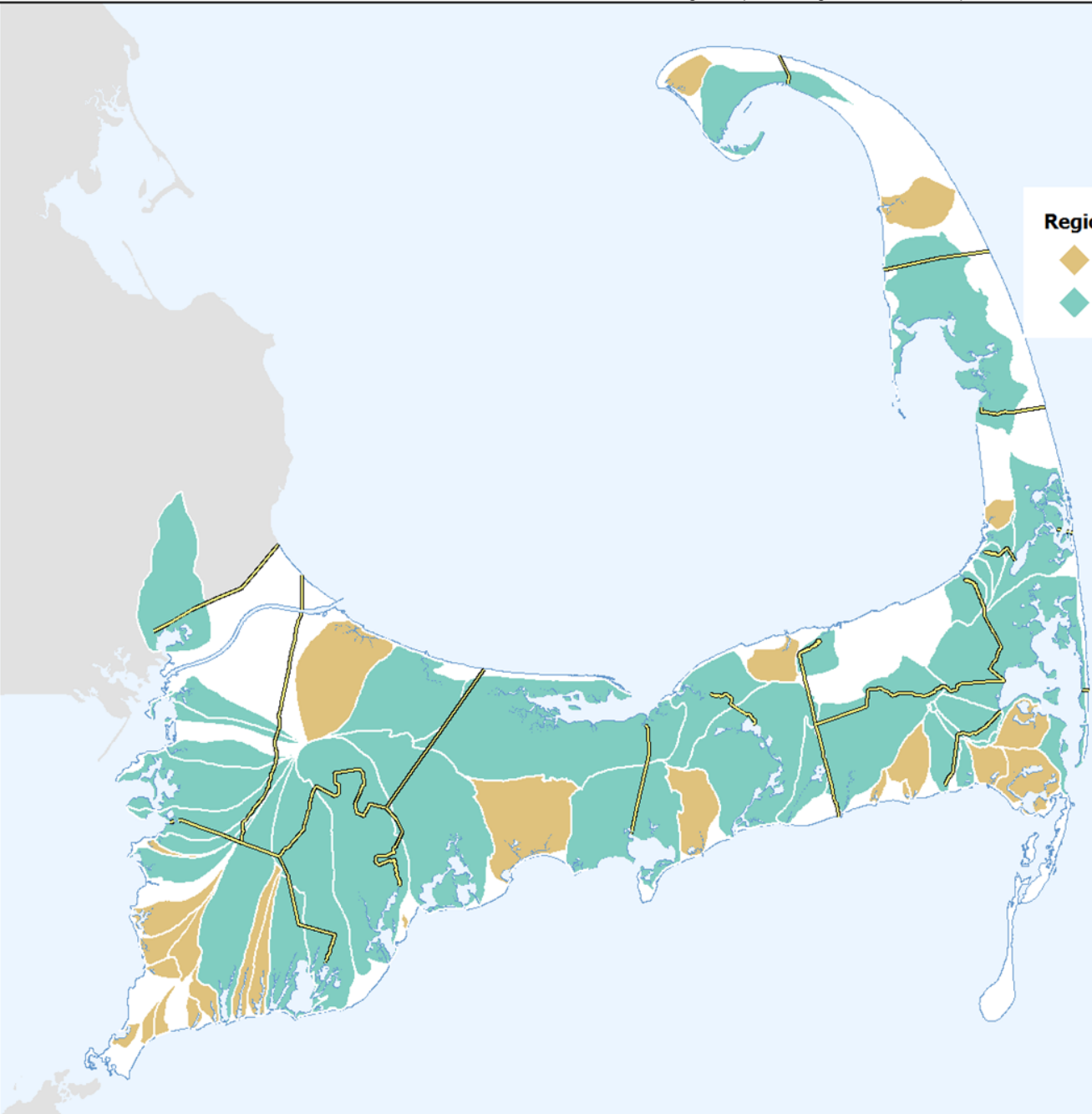
Nitrogen Removal Required





Regional Issue

- ◆ Watersheds within a Town Boundary
- ◆ Watersheds that cross Town Boundaries



Approach to the 208 Plan Update

Watershed
Based

Stakeholder
Engagement

Maximize Benefits
of Local Planning

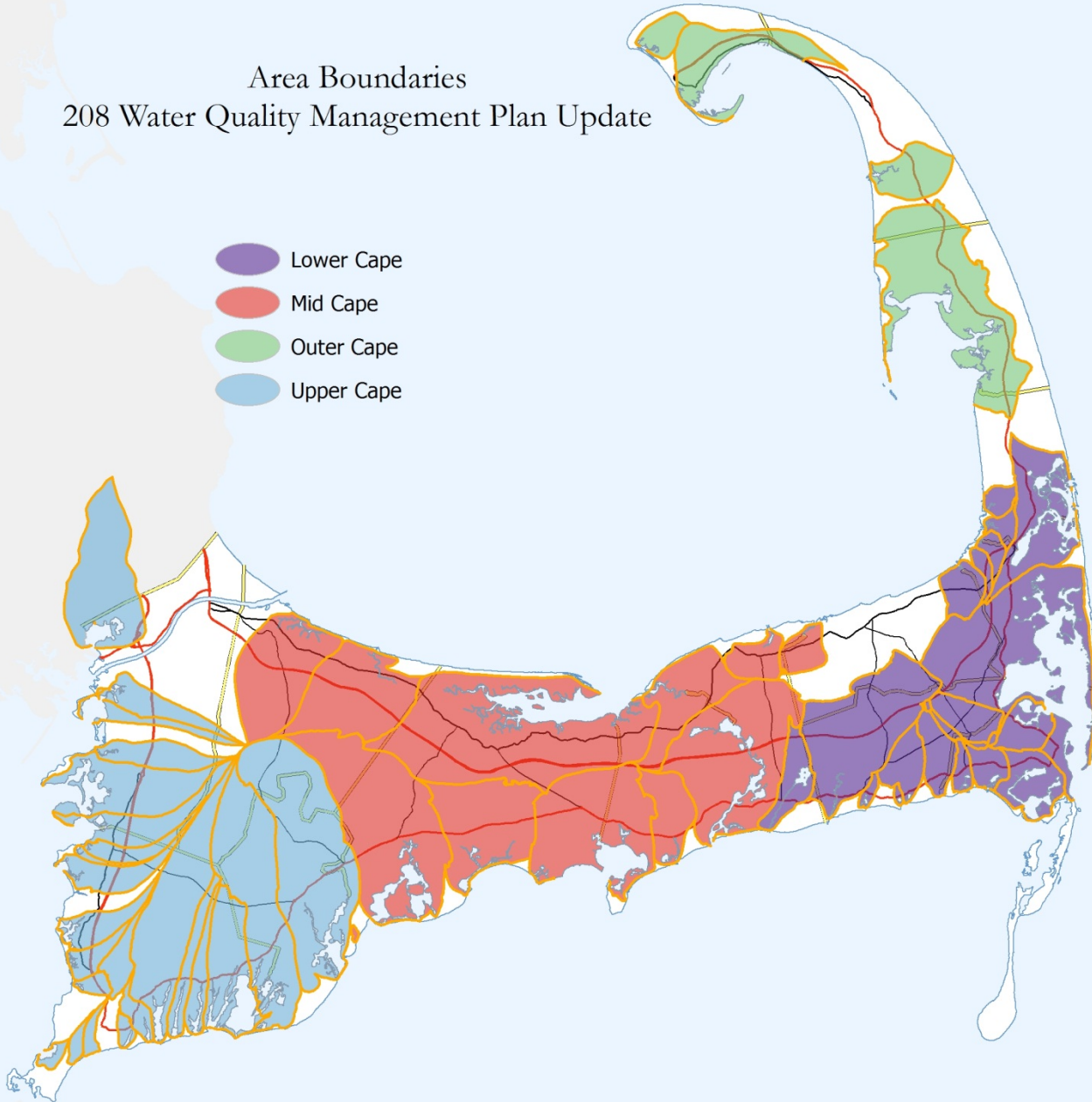
No Optimal
Solutions

Goal:

To generate a series of approaches in each watershed that will meet water quality standards

Area Boundaries 208 Water Quality Management Plan Update

- Lower Cape
- Mid Cape
- Outer Cape
- Upper Cape





Subgroup Boundaries 208 Water Quality Management Plan Update

Lower Cape

- Herring River
- Pleasant Bay
- Stage Harbor Group
- Nauset and Cape Cod Bay Marsh Group

Mid Cape

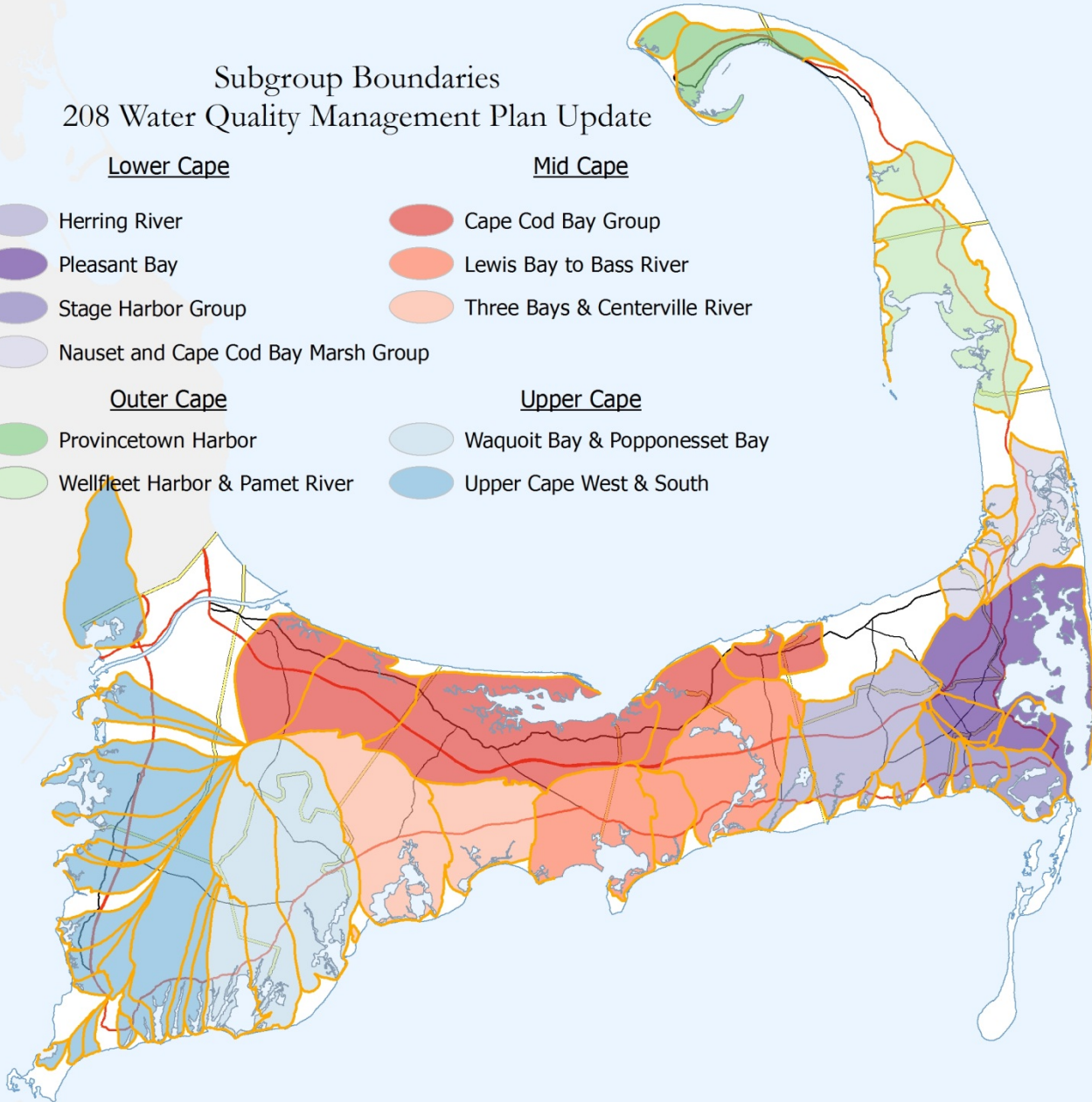
- Cape Cod Bay Group
- Lewis Bay to Bass River
- Three Bays & Centerville River

Outer Cape

- Provincetown Harbor
- Wellfleet Harbor & Pamet River

Upper Cape

- Waquoit Bay & Popponesset Bay
- Upper Cape West & South



What is the stakeholder process?

Public Meetings

Watershed Working Groups

Goals,
Work Plan
& Roles

Affordability,
Financing

Baseline
Conditions

Technology
Options
Review

Watershed
Scenarios

July

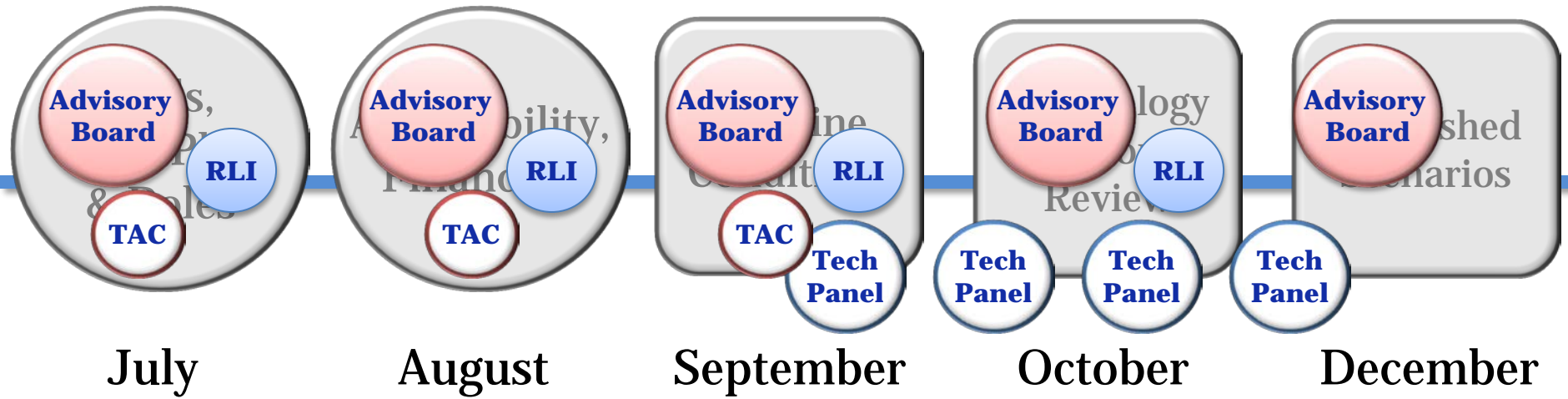
August

September

October

December

208 Planning Process



 Regulatory, Legal & Institutional Work Group

 Technical Advisory Committee of Cape Cod Water Protection Collaborative

208 Planning Process

Goals,
Work Plan
& Roles

Affordability,
Financing

Baseline
Conditions

Technology
Options
Review

Watershed
Scenarios

4 Public
Meetings:
July 15-18

4 Public
Meetings:
Aug 26-29

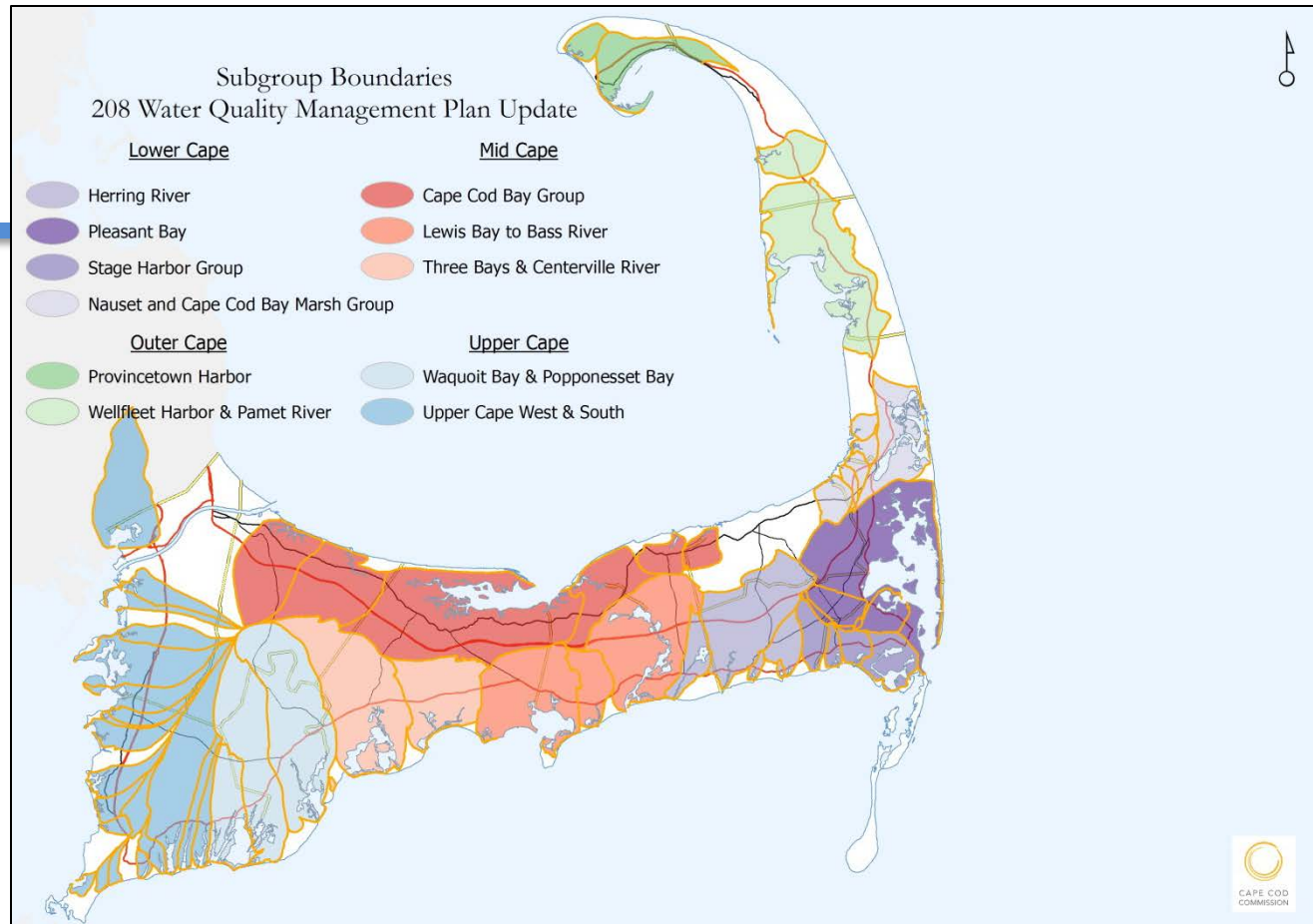
208 Planning Process

Baseline
Conditions

11 Working
Group Meetings:
Sept 18-27

Technology
Options
Review

Watershed
Scenarios



208 Planning Process

Baseline Conditions

11 Working Group Meetings:
Sept 18-27

Technology Options Review

11 Working Group Meetings:
Oct 21-Nov 5

Watershed Scenarios



208 Planning Process

Baseline
Conditions

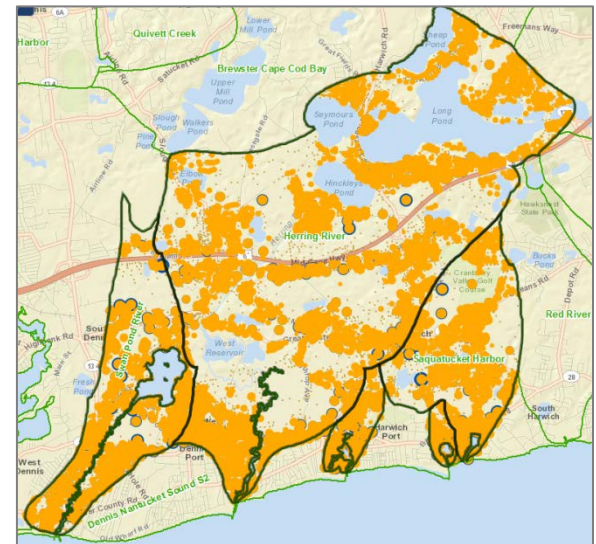
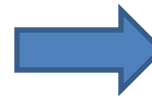
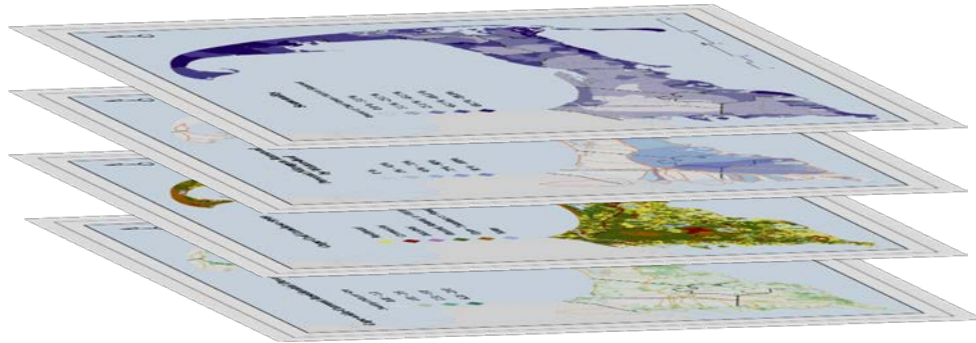
11 Working
Group Meetings:
Sept 18-27

Technology
Options
Review

11 Working
Group Meetings:
Oct 21-Nov 5

Watershed
Scenarios

11 Working
Group Meetings:
Dec 2-11



208 Planning Process

Baseline
Conditions

11 Working
Group Meetings:
Sept 18-27

Technology
Options
Review

11 Working
Group Meetings:
Oct 21-Nov 5

Watershed
Scenarios

11 Working
Group Meetings:
Dec 2-11

**Baseline
Conditions**

**11 Working
Group Meetings:
Sept 18-27**

Goal of Today's Meeting:

To review and develop shared understanding of the characteristics of these watersheds, the work done to date, existing data and information available, and how to apply all of this to planning for water quality improvements for these watersheds moving forward.

208 Planning Process

Local Progress to Date



Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor

Brewster

From 1978 Section 208 Plan

Present and future town well sites should be protected from the non-point sources resulting from New development by creating Watershed Protection Districts.

The town should cooperate in regional water supply planning to determine future water supply needs of neighboring towns and whether it can assist.

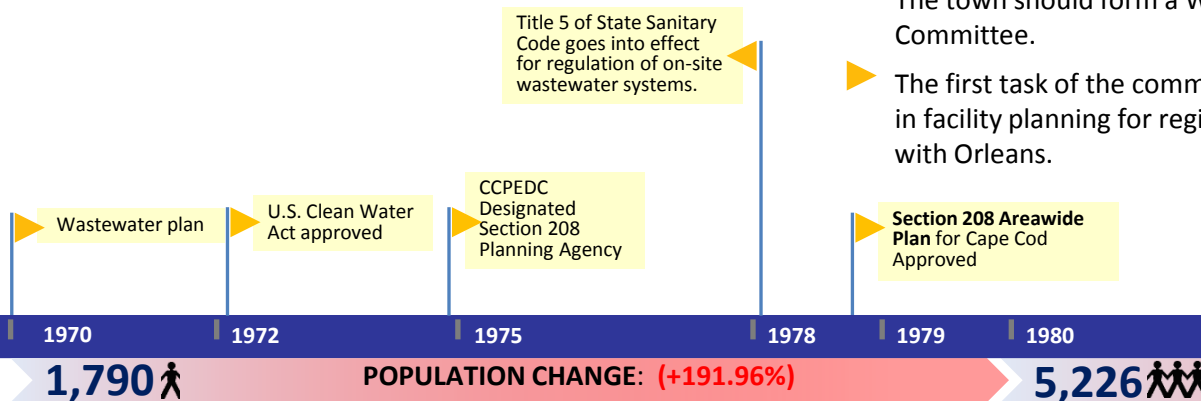
WASTEWATER: It is expected that no new problem areas will develop and that present problem areas will be controlled during the planning period.

The Orleans 201 facility plan will soon be underway and the cooperation of Brewster in the planning of a septage facility in Orleans that can meet Brewster's septage treatment needs is highly recommended.

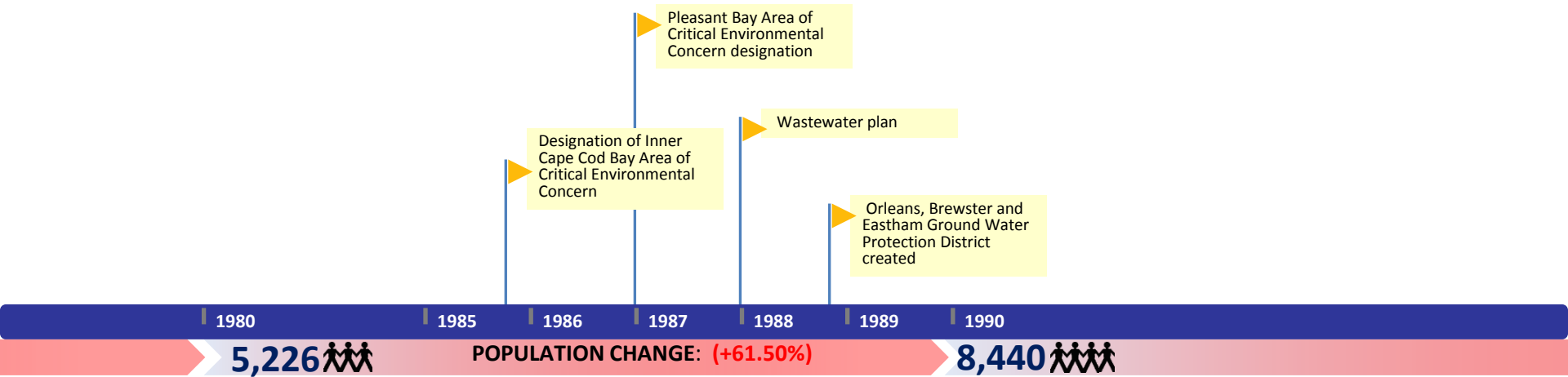
It is recommended that Brewster consider cooperating in a regional landfill monitoring program.

The town should form a Water Quality Advisory Committee.

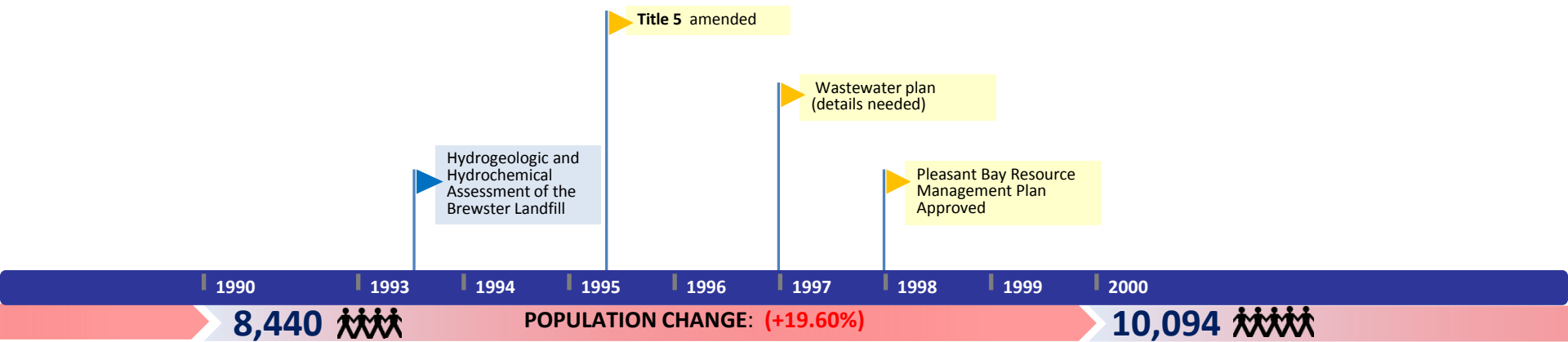
The first task of the committee might be participation in facility planning for regional septage treatment with Orleans.



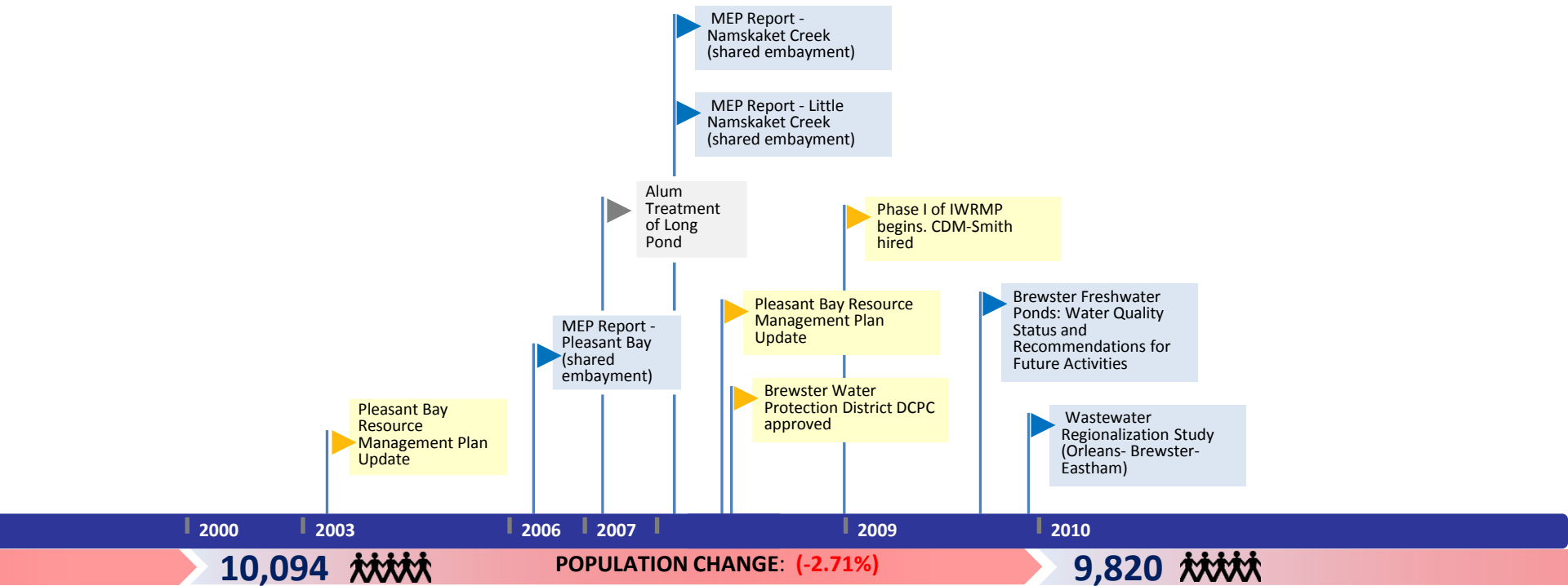
Brewster: 1970-2013



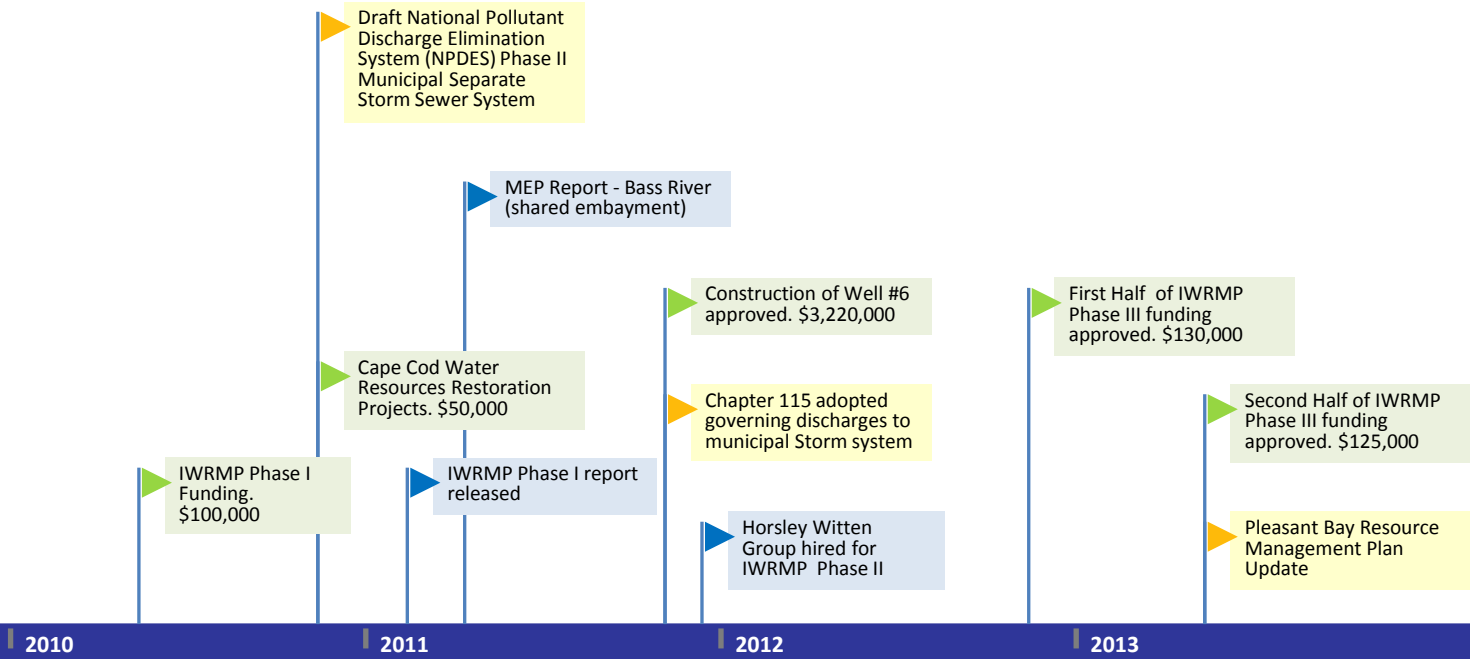
Brewster: 1970-2013



Brewster: 1970-2013



Brewster: 1970-2013



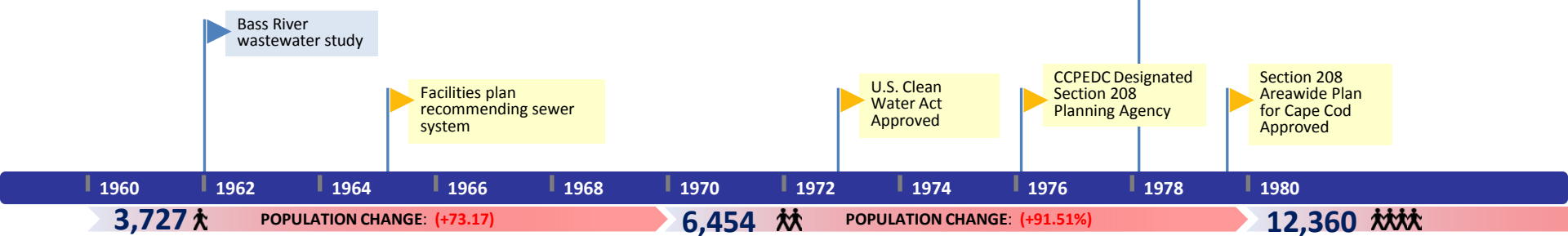
2010
9,820 

Dennis

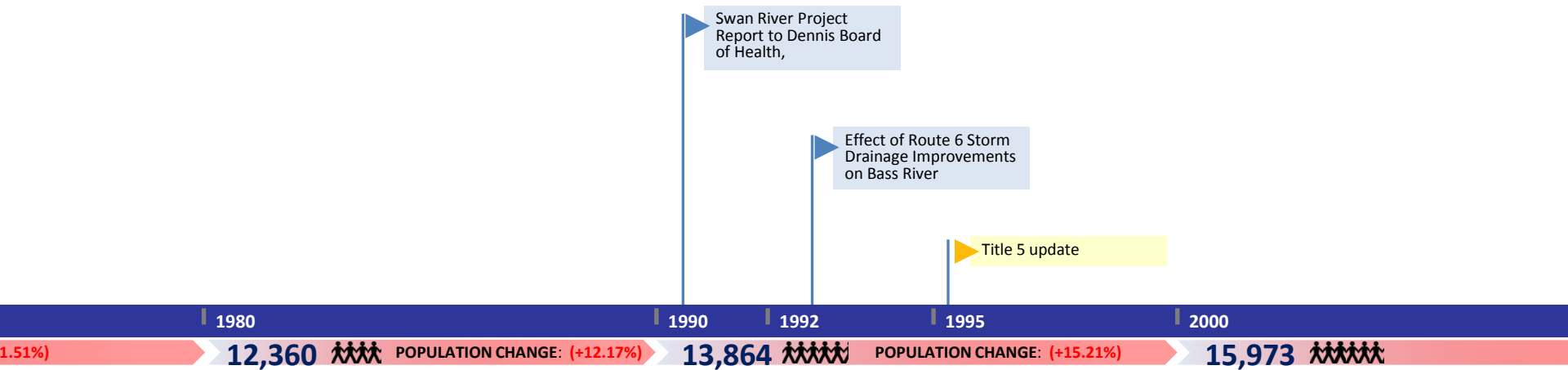
From 1978 Section 208 Plan

- ▶ Dennis has a professional health agent and the town's health regulations already implement many of the 208 plan recommendations.
- ▶ It is recommended that the town consider creating a "Seasonal Residential District" in the area south of Lower County Road and carefully control the conversion of seasonal dwellings in this area.
- ▶ Septage treatment is a problem in Dennis. It is recommended in the discussion of "Facility Planning in Non-Sewered Areas" that Dennis should join with Yarmouth in a regional facility.
- ▶ Since the town is not planning to construct any sewage collection systems, septage flows may be large enough to make a separate facility cost-effective. Another possibility that should be investigated is regionalization with Harwich.
- ▶ Implementation of the 208 water quality plan in Dennis should give priority to establishing watershed protection districts and implementing on-site system management and septage treatment.
- ▶ The Water District has developed extensive wellfields and pumping capacity, which should require little expansion to serve the 1995 population
- ▶ Dennis may have water resources in excess of its needs, which could be called upon to supply other towns in the future.
- ▶ Dense development in the southern half of Dennis and along Bass River may restrict the amount or area available for recharge protection purposes.

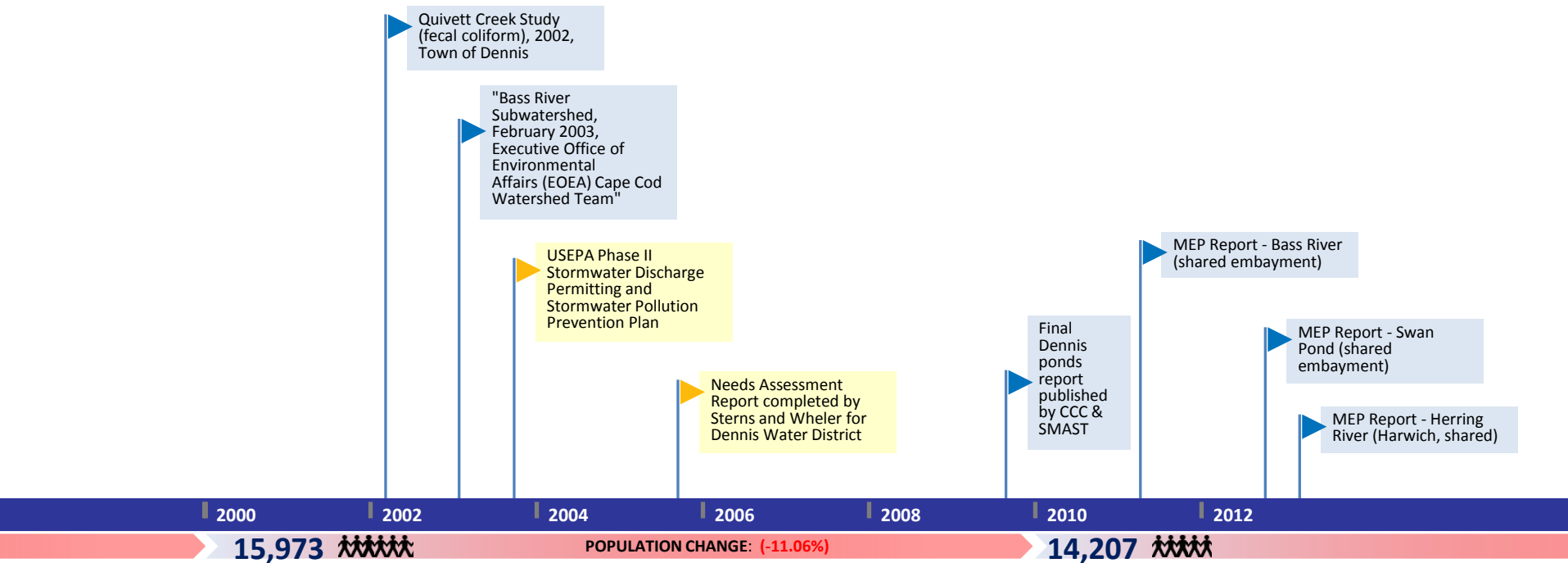
Title 5 of State Sanitary Code goes into effect for regulation of on-site wastewater systems.



Dennis: 1970-2013



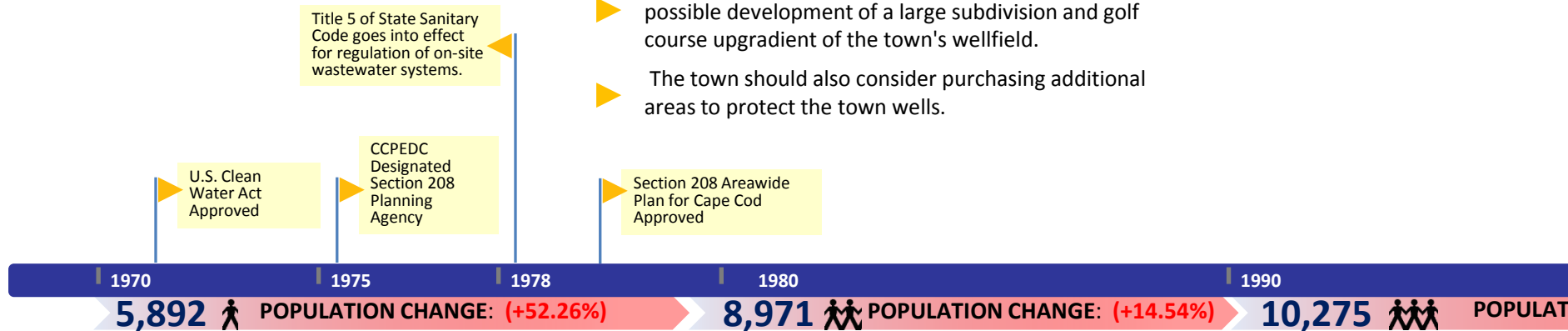
Dennis: 1970-2013



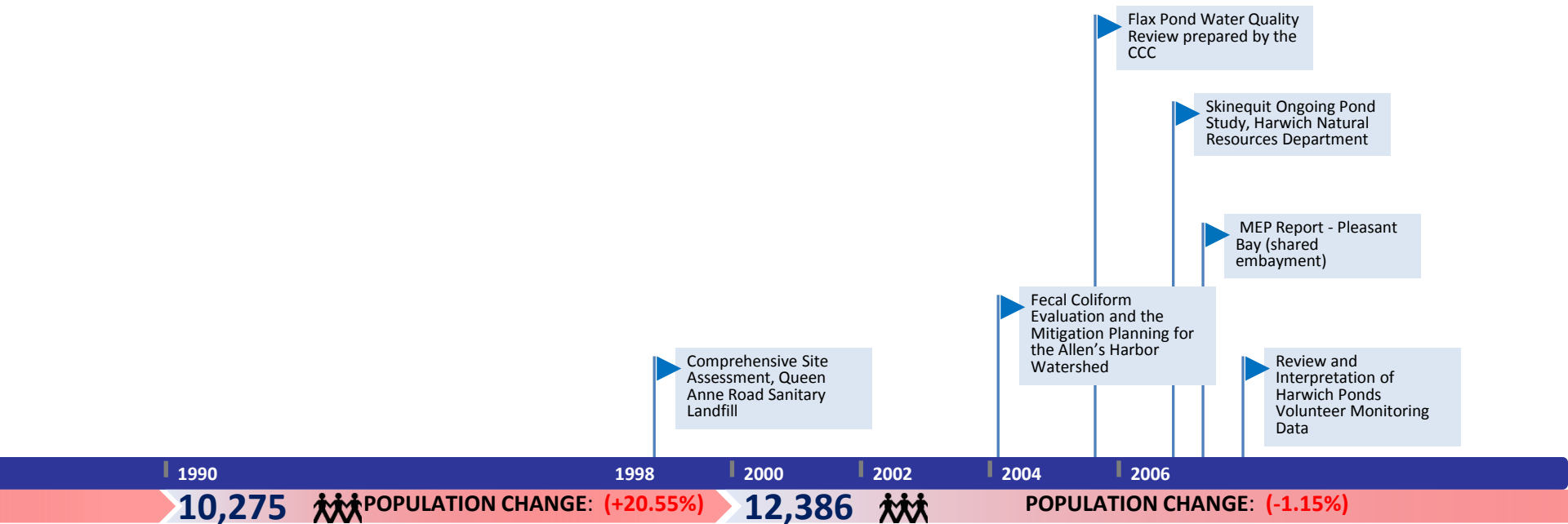
Harwich: 1970-2013

From 1978 Section 208 Plan

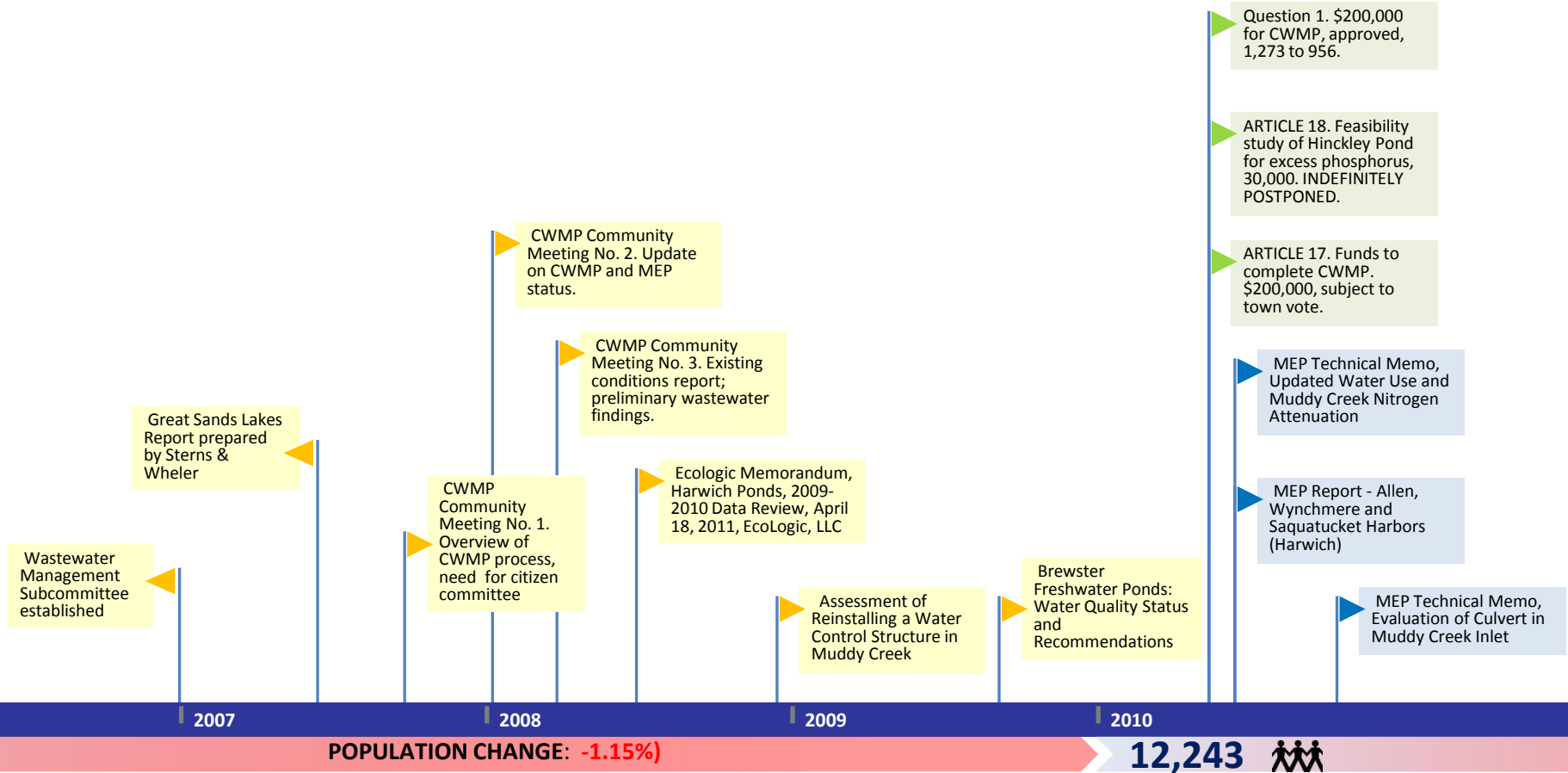
- ▶ That the town recognize that the Category 2 problem areas on the south side of town need special attention.
- ▶ It is also suggested that the town consider establishing "Seasonal Residential Districts" in this area to control the conversion of seasonal dwellings to year-round occupancy.
- ▶ The 208 plan does not indicate a sewer need in Harwich.
- ▶ This means that the town will not be eligible for a major central collection system for twenty years.
- ▶ New wastewater management problems created by the town's failure to take recommended actions for on-site system management will not be eligible for future 201 construction funds.
- ▶ While Harwich presently has a state approved interim lagoon, the town should not view this system as a long-term solution to its septage treatment problems.
- ▶ There has been considerable concern raised over the possible development of a large subdivision and golf course upgradient of the town's wellfield.
- ▶ The town should also consider purchasing additional areas to protect the town wells.



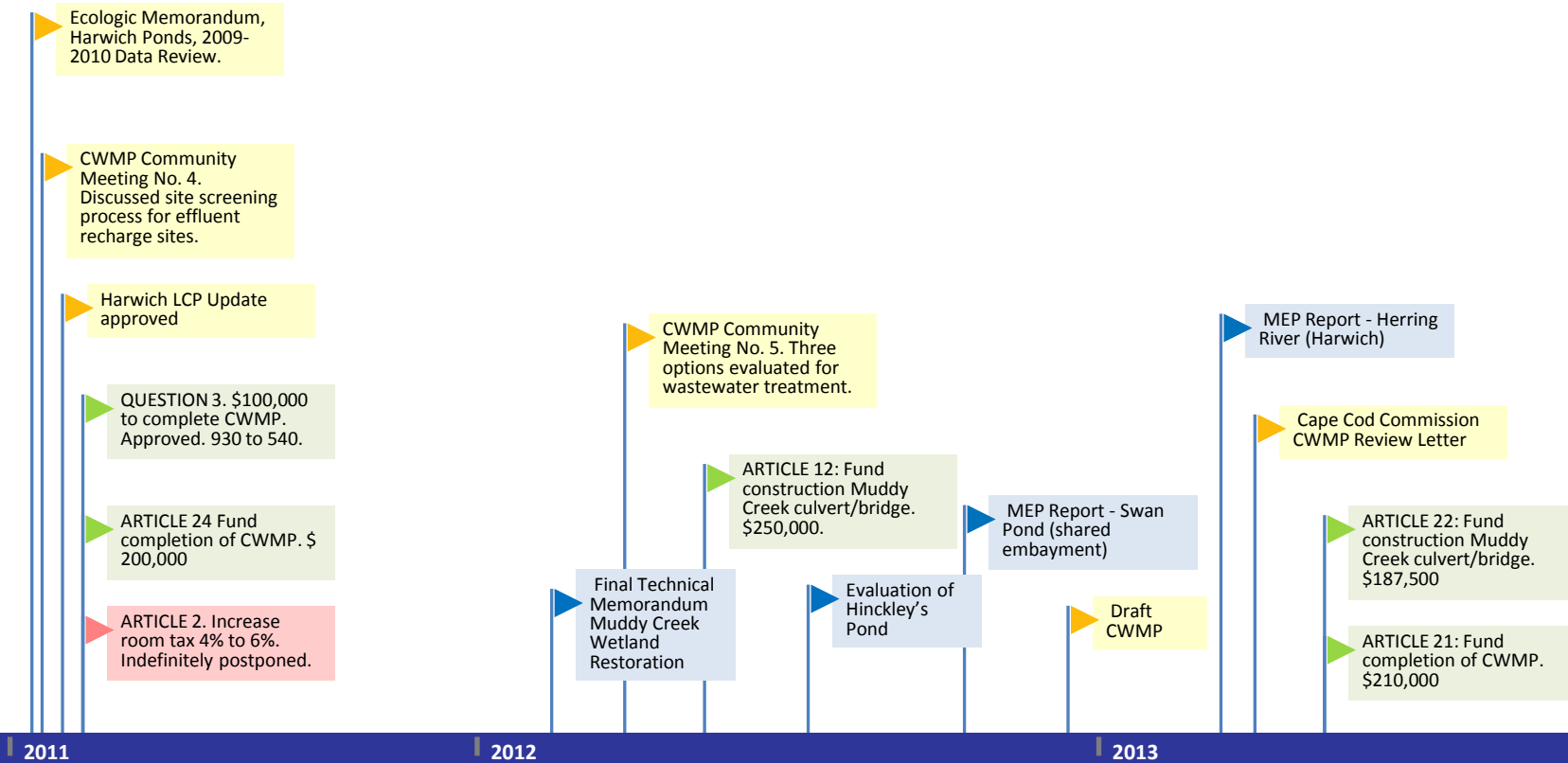
Harwich: 1970-2013



Harwich: 1970-2013



Harwich: 1970-2013



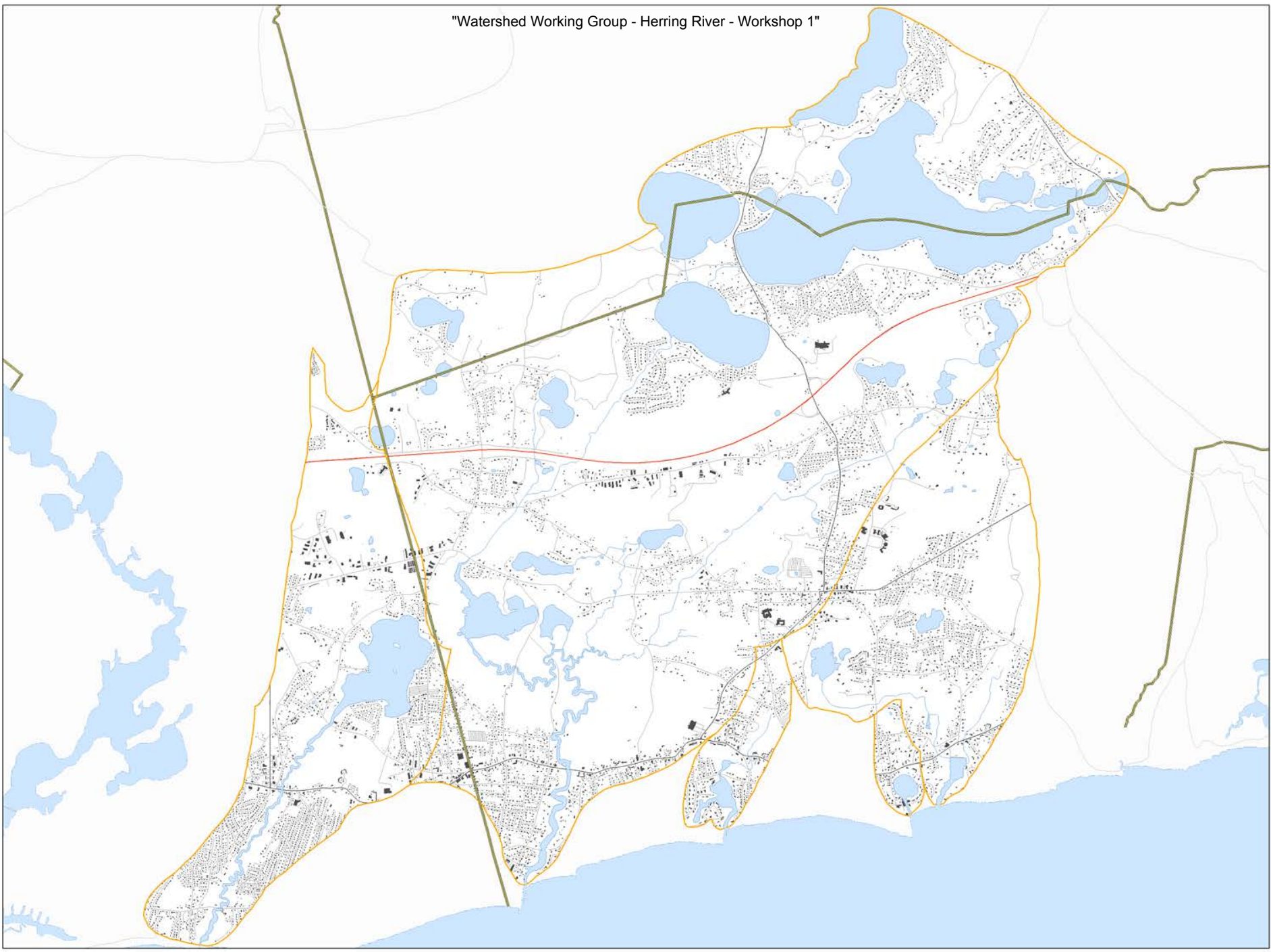
Did we miss anything?

Your Watersheds



Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor

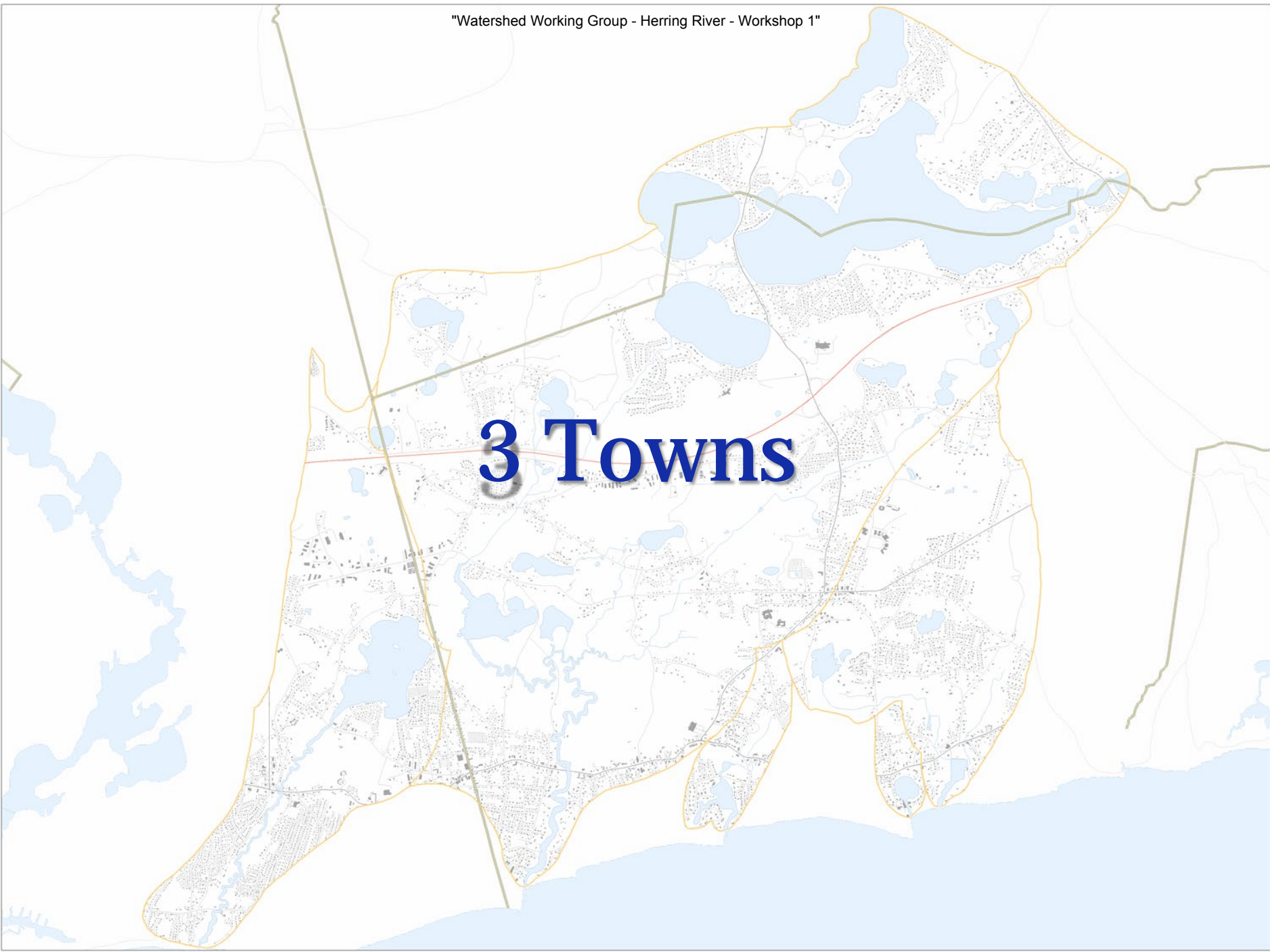
"Watershed Working Group - Herring River - Workshop 1"



A map of a watershed area, outlined in orange, showing a network of roads and several large blue water bodies. A prominent road runs vertically through the center. The text "21.2 square miles" is overlaid in a large, bold, blue serif font across the middle of the map.

21.2 square miles


3 Towns



Natural Features


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway

 State Highway


 Roads


 Structures

 Ponds


Natural Areas


 Natural Heritage & Endangered Species Program (NHESP) Certified Vernal Pools

 Water Table Contours

 Cranberry Bogs

 Wetlands


 Sea, Lake, & Overland Surges from Hurricanes (SLOSH) Update 2013

 Preliminary FEMA Flood Insurance Rate Map (FIRM) Zones 2013

Managed Surfaces


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures


 Ponds

Managed Surfaces

 Approximate Managed Ground Surfaces

 Approximate Residential Managed Lawns


 Approximate Managed Golf Courses

 Approximate Municipal Managed Natural Surfaces

Regulatory


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway


 State Highway


 Roads


 Structures

 Ponds


Regulatory


 Areas of Critical Environmental Concern

 DEP Approved Wellhead Protection Areas (Zone IIs)

 Growth Incentive Zone


OpenSpace: Level of Protection


 In Perpetuity

 Limited


 None


Landuse Vision Map


 Economic Center

 Industrial and Service Trade Area

 Village

 Resource Protection Area


 Other

 Undesignated

Land Use Change


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures


 Ponds


LandUse Change

 Residential

 Commercial

 Industrial

 Wooded, Natural, or Wetlands

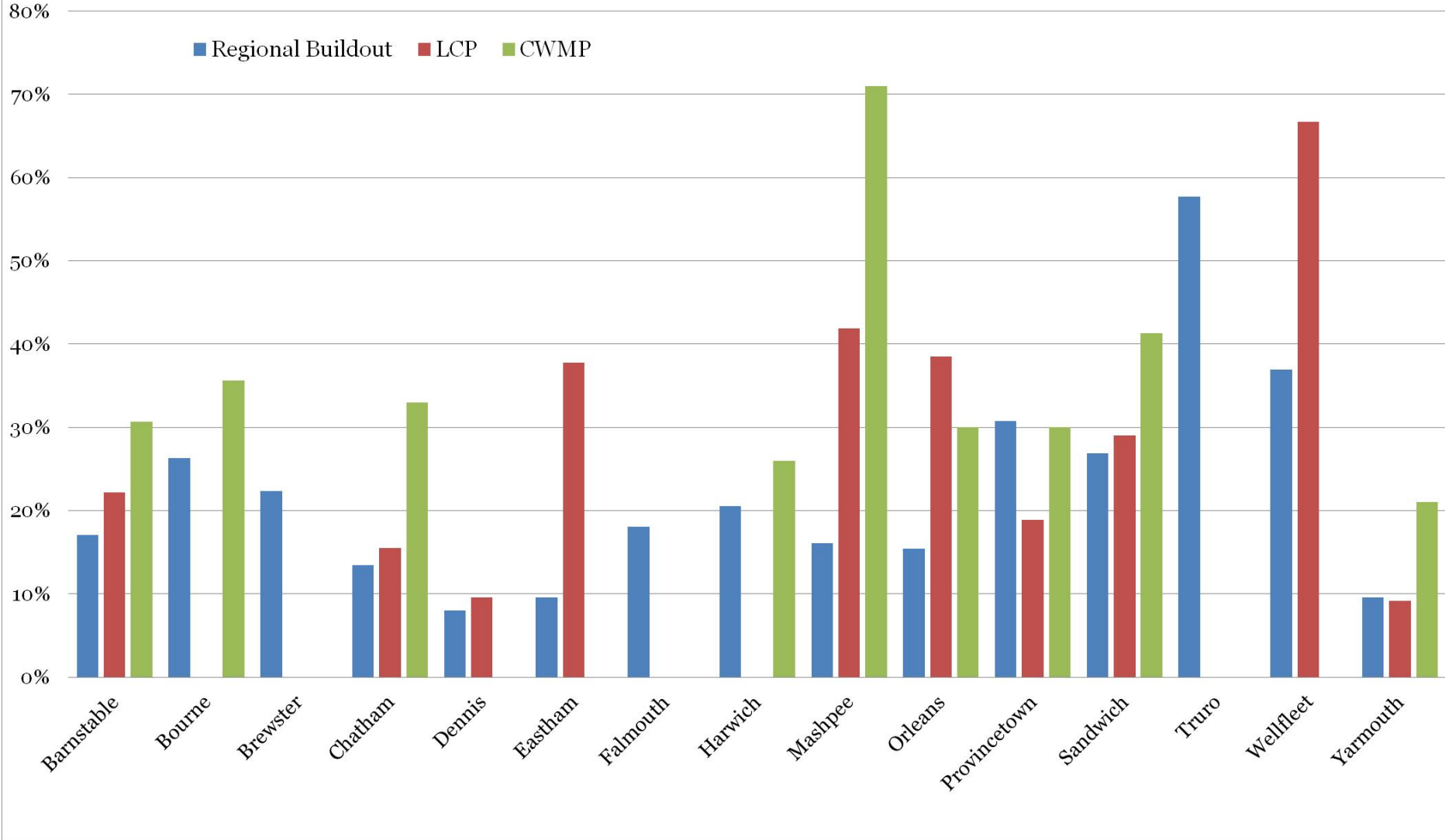
 Open - Disturbed or Managed

 Water

Cape Wide Cost Estimate:
30% growth will increase
capital costs by 40%

Increase in Dwellings

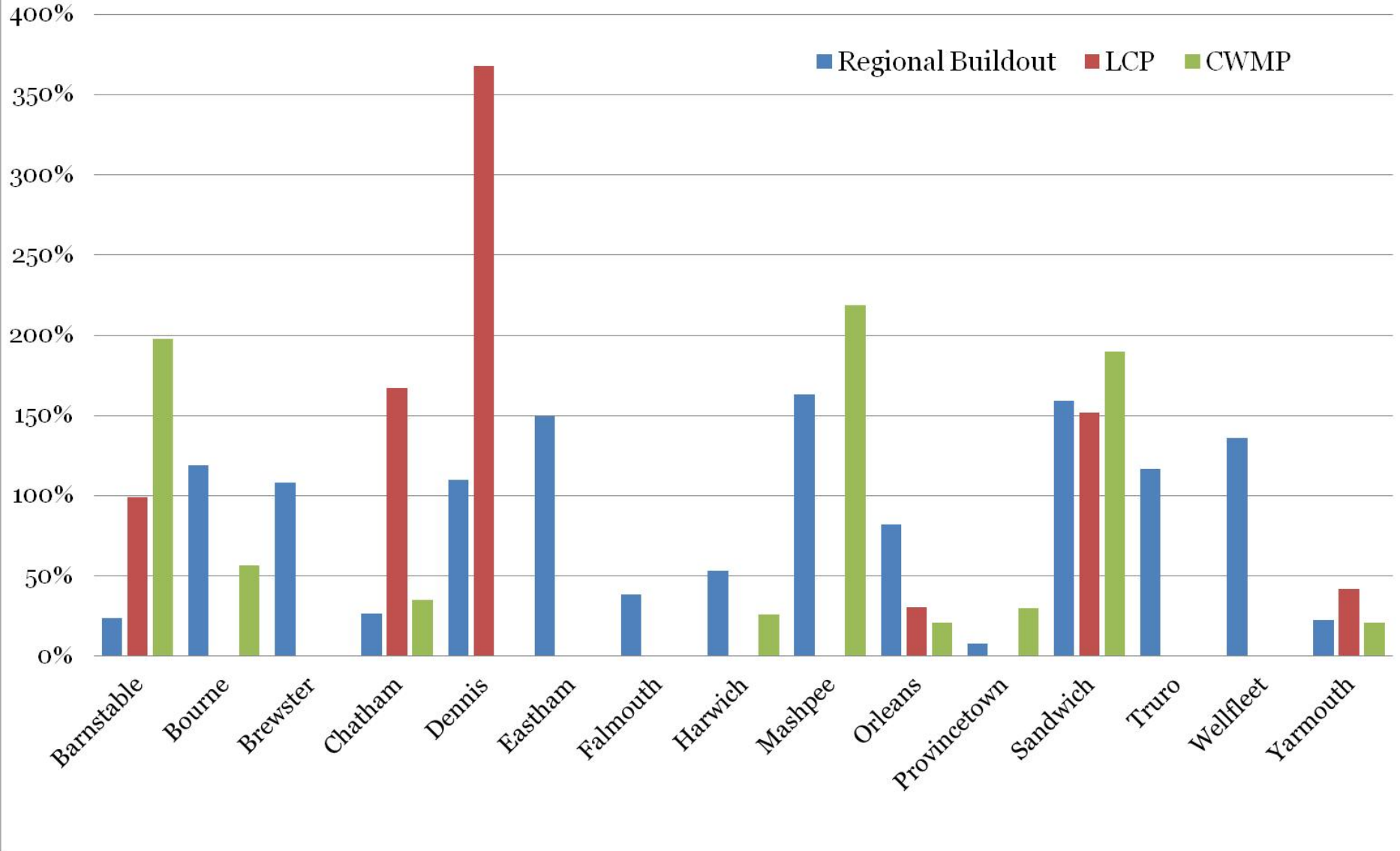
■ Regional Buildout ■ LCP ■ CWMP



Buildout

"Watershed Working Group - Herring River - Workshop 1"

Increase in Non-Residential Square Footage





The People

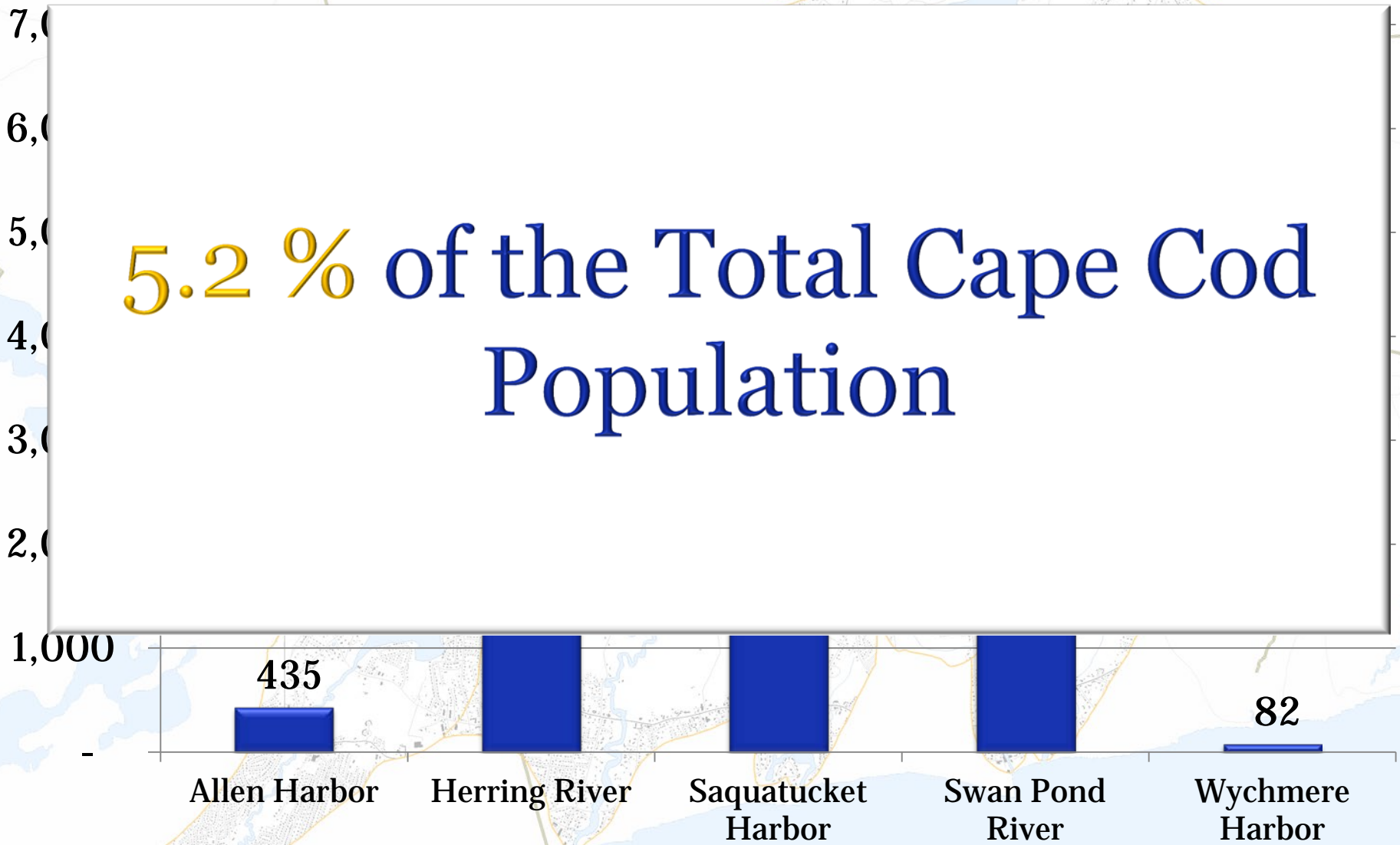
Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor

A map of the Herring River watershed showing population distribution in 2010. The map features a network of roads and numerous small black dots representing individual households. Several large blue areas represent water bodies, including a prominent lake in the upper right and a larger body of water at the bottom. The watershed boundary is outlined in orange, and a brown line indicates a major road or boundary. The text "Total Population (2010) = 11,163" is overlaid in the center in a large, bold, blue font.

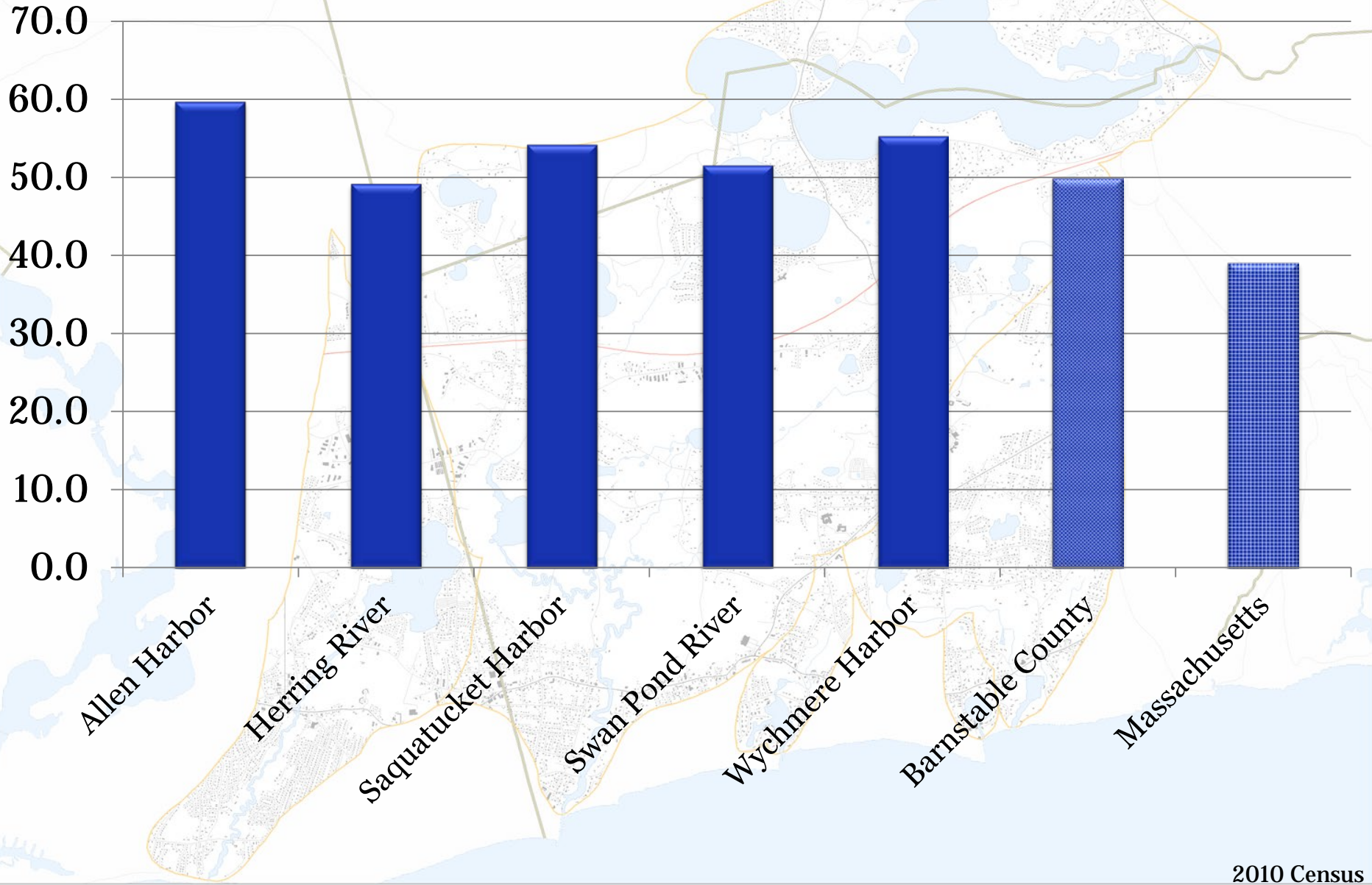
Total Population (2010) = 11,163

Population (2010)

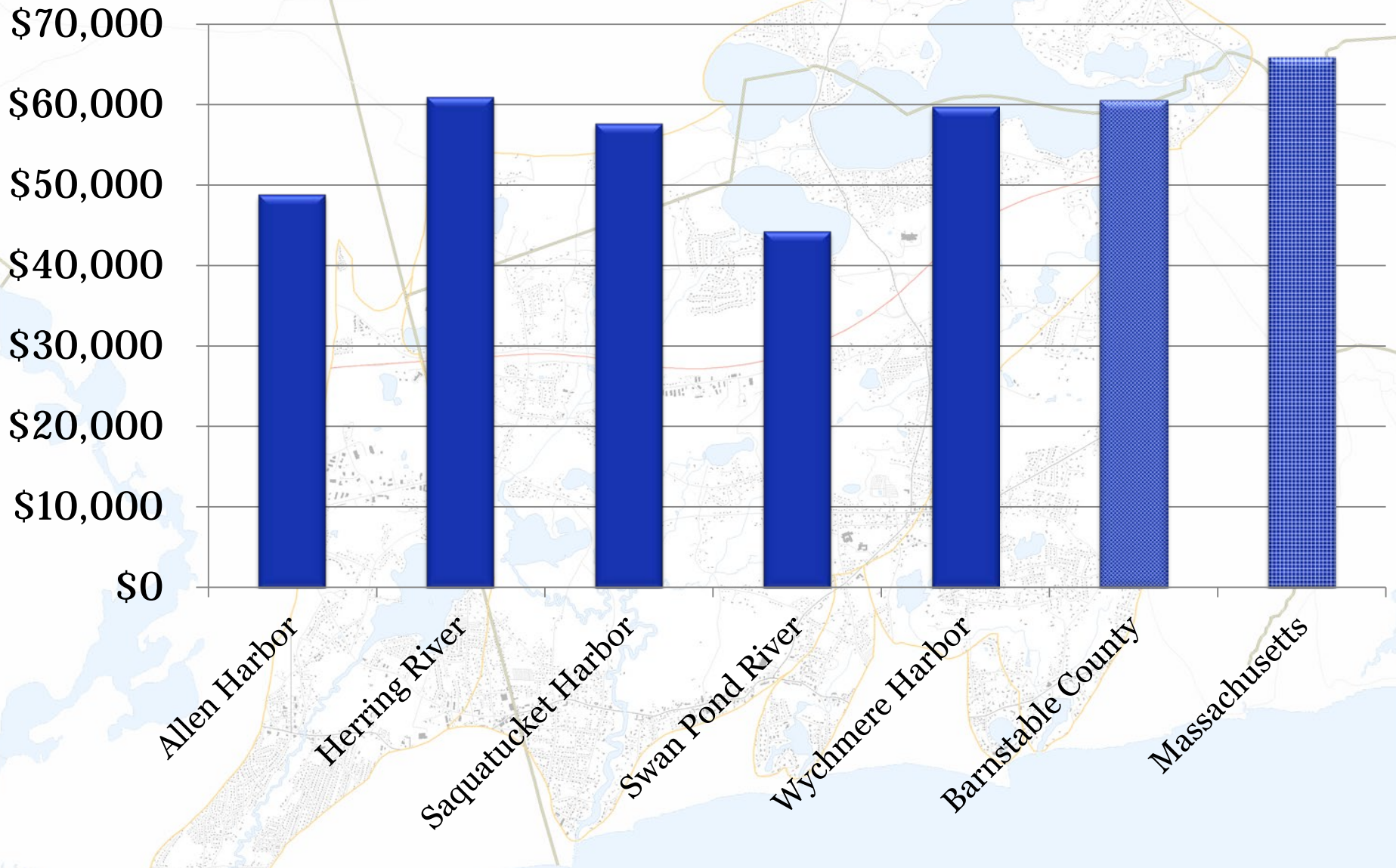
5.2 % of the Total Cape Cod Population



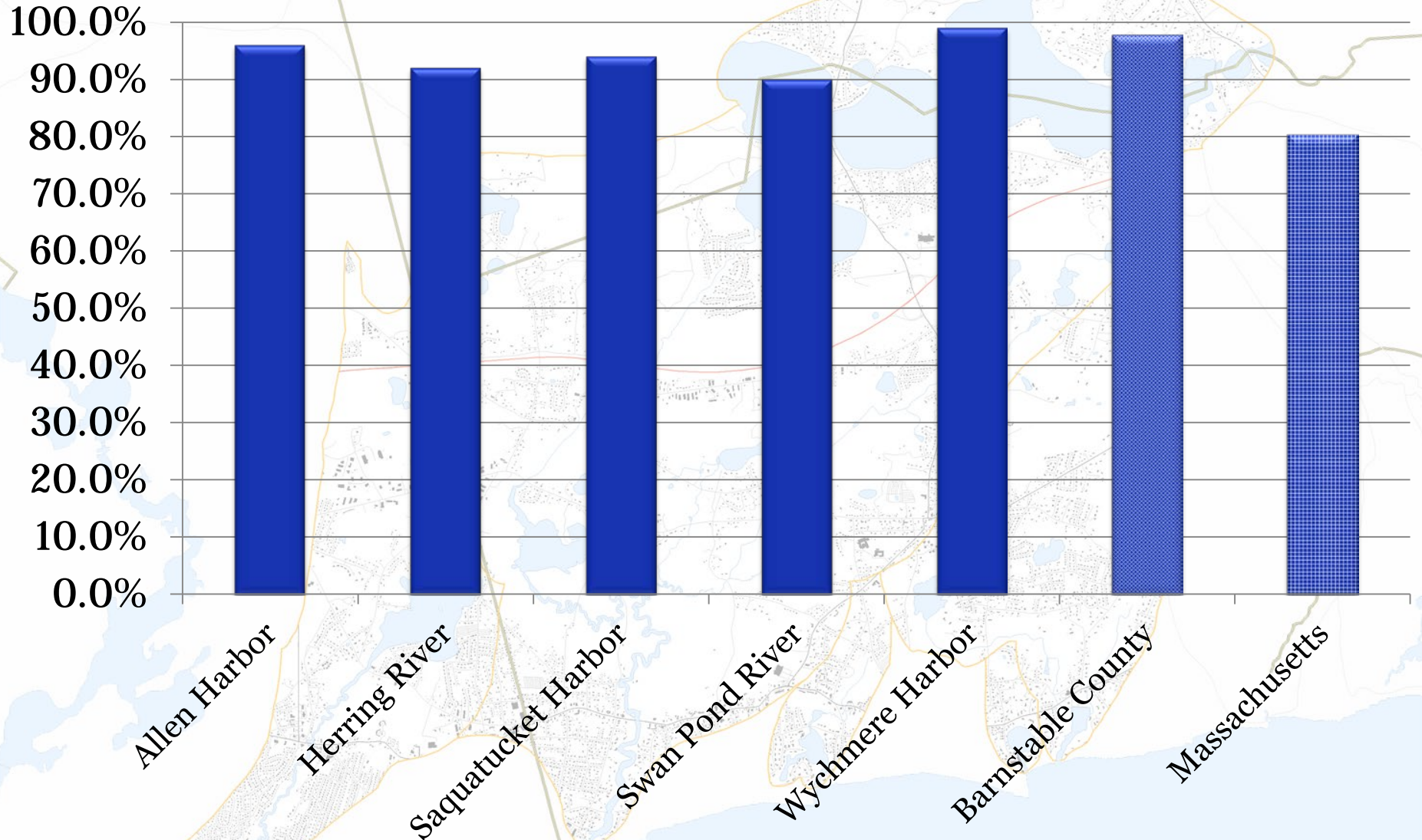
Median Age (2010)



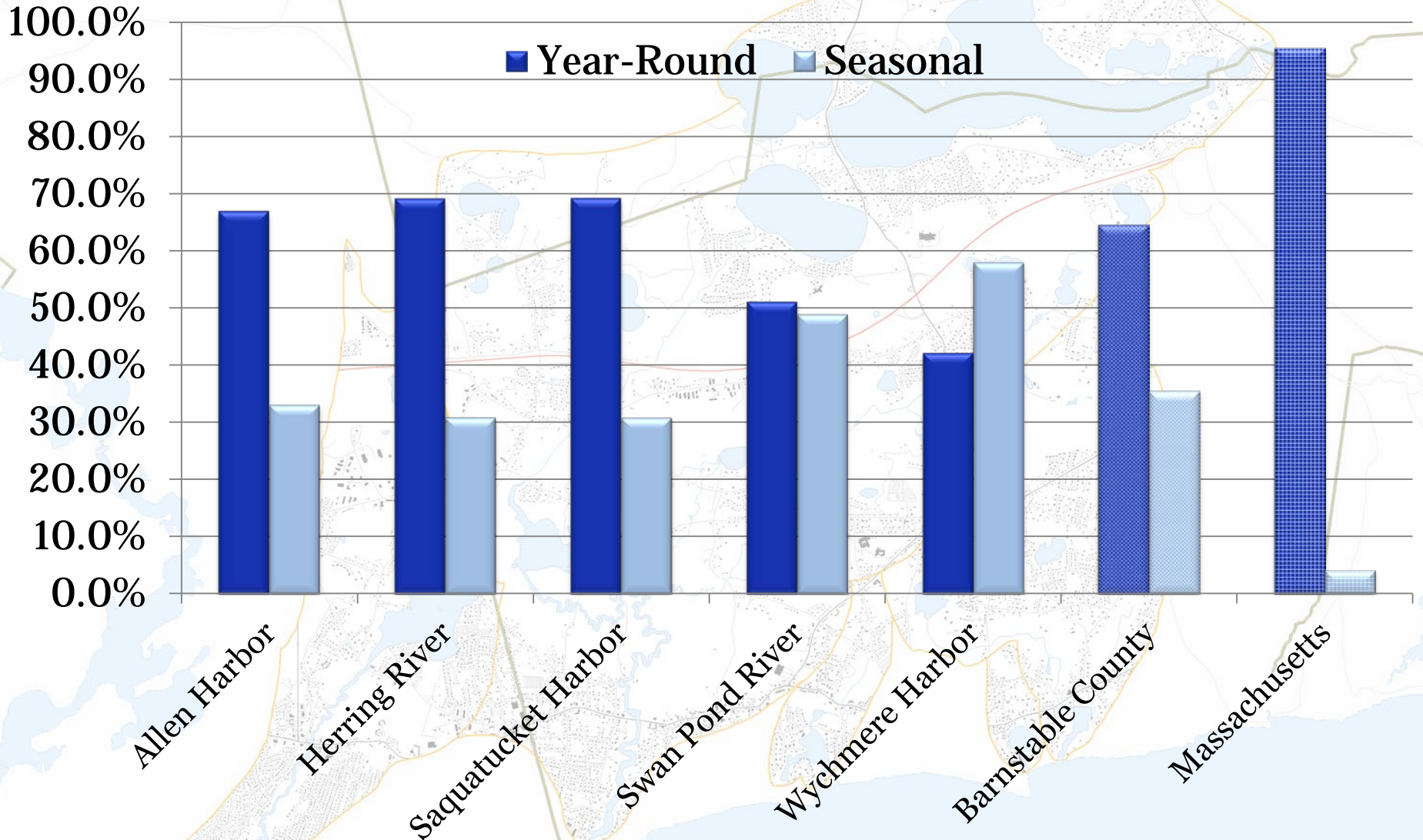
Average Median Income (2010)



Race - % White (2010)



Seasonal vs. Year Round Housing (2010)



Average Assessed Home Value (2010)

Total Assessed Value of
Residential Homes=
\$2,723,874,350

Allen Harbu

Herring River

Saquatucket Harbu

Swan Pond River

Wychmere Harbu

Barnstable Coun

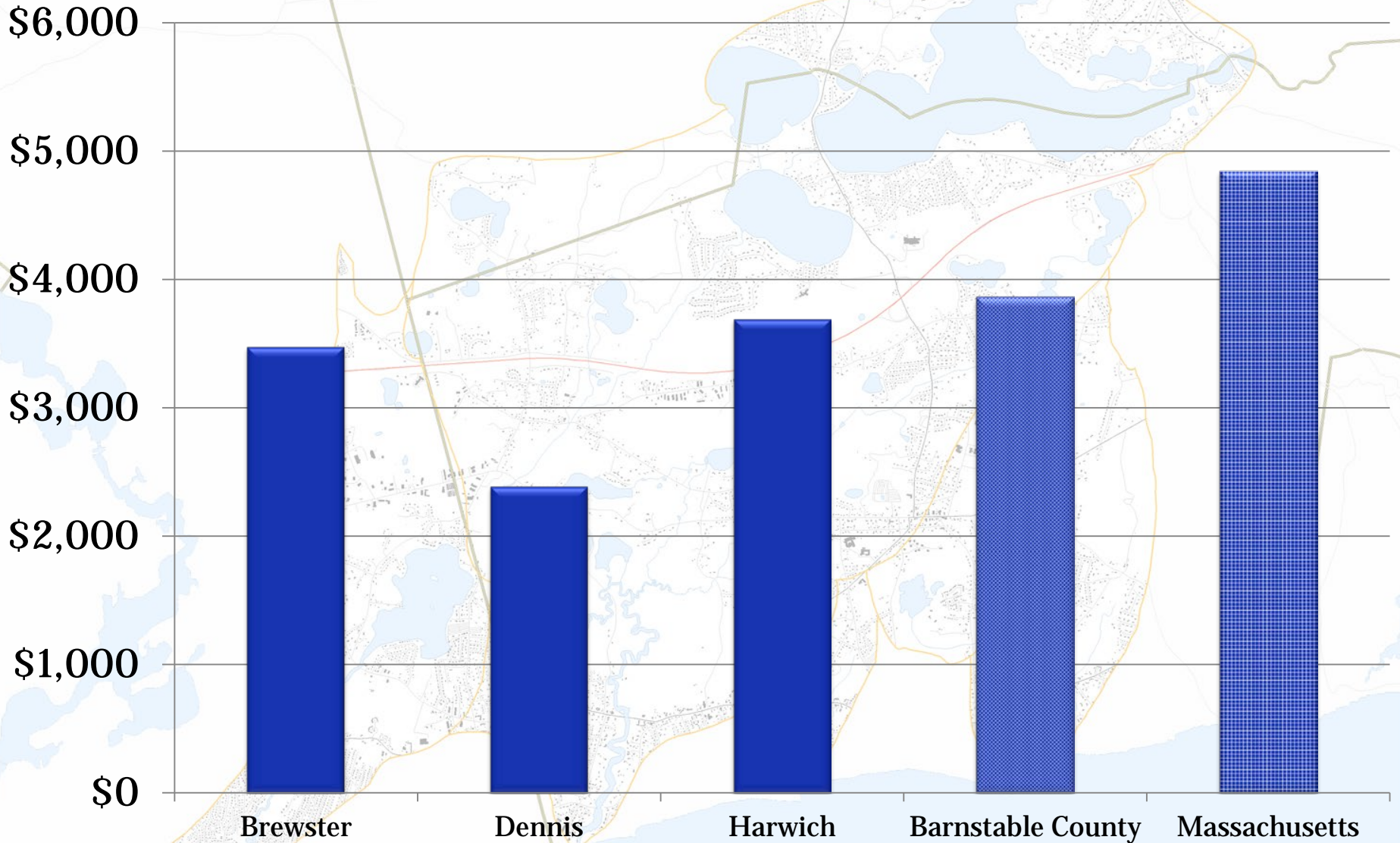
Massachuset

Your Government & Taxes

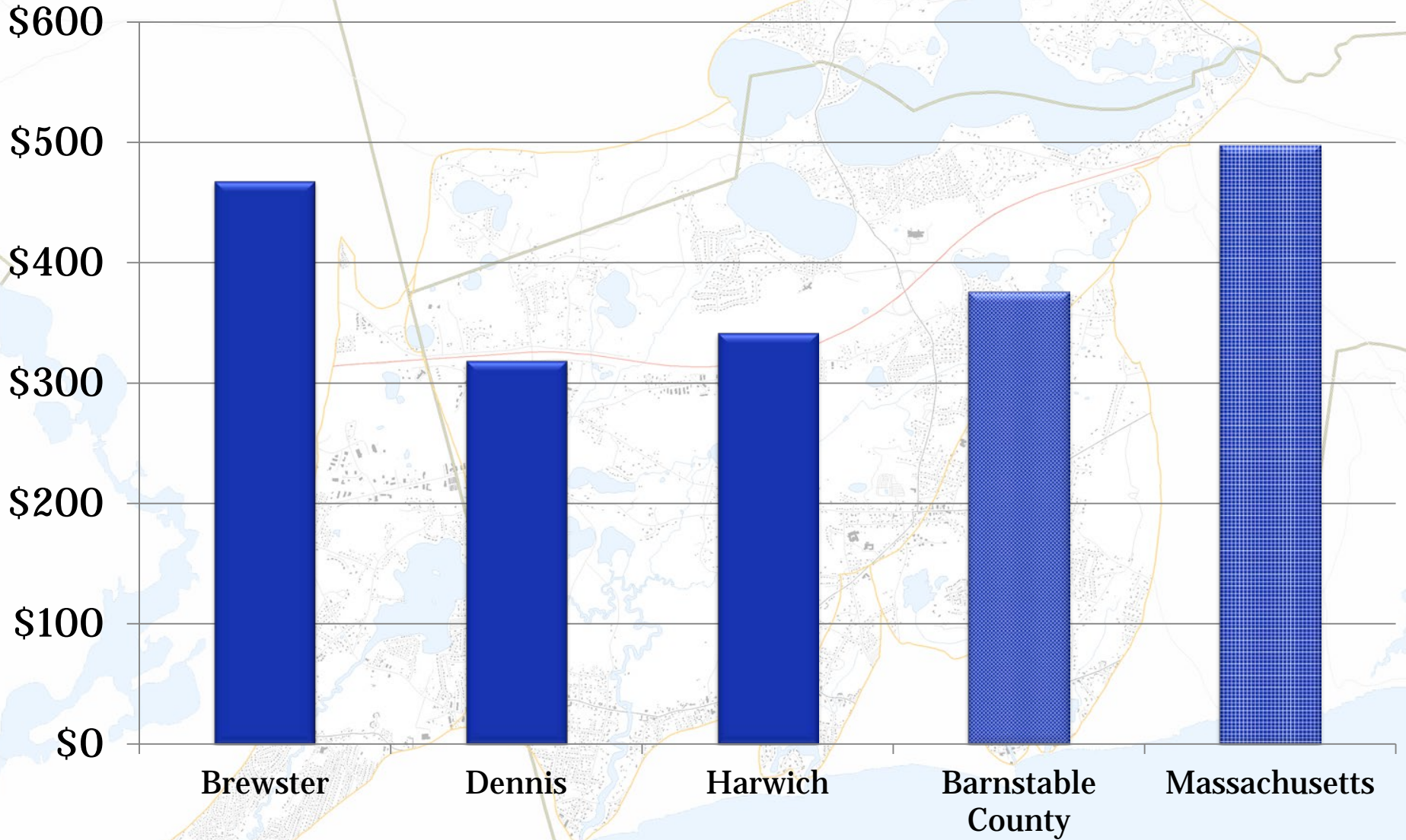


**Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor**

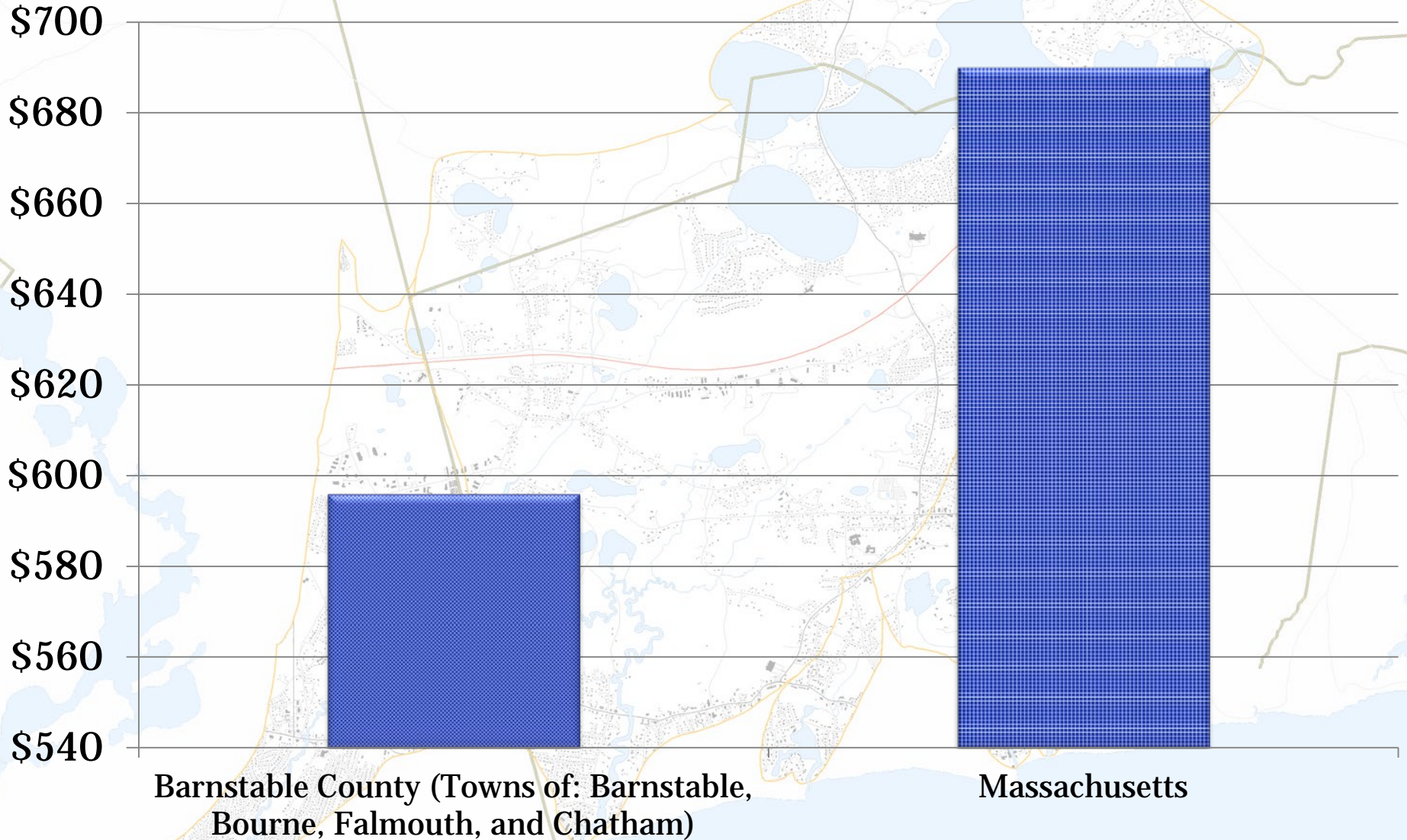
Average Single Family Property Tax Bill (2013)



Average Annual Water Bill (2012)



Average Annual Sewer Bill (2012)





The Problem

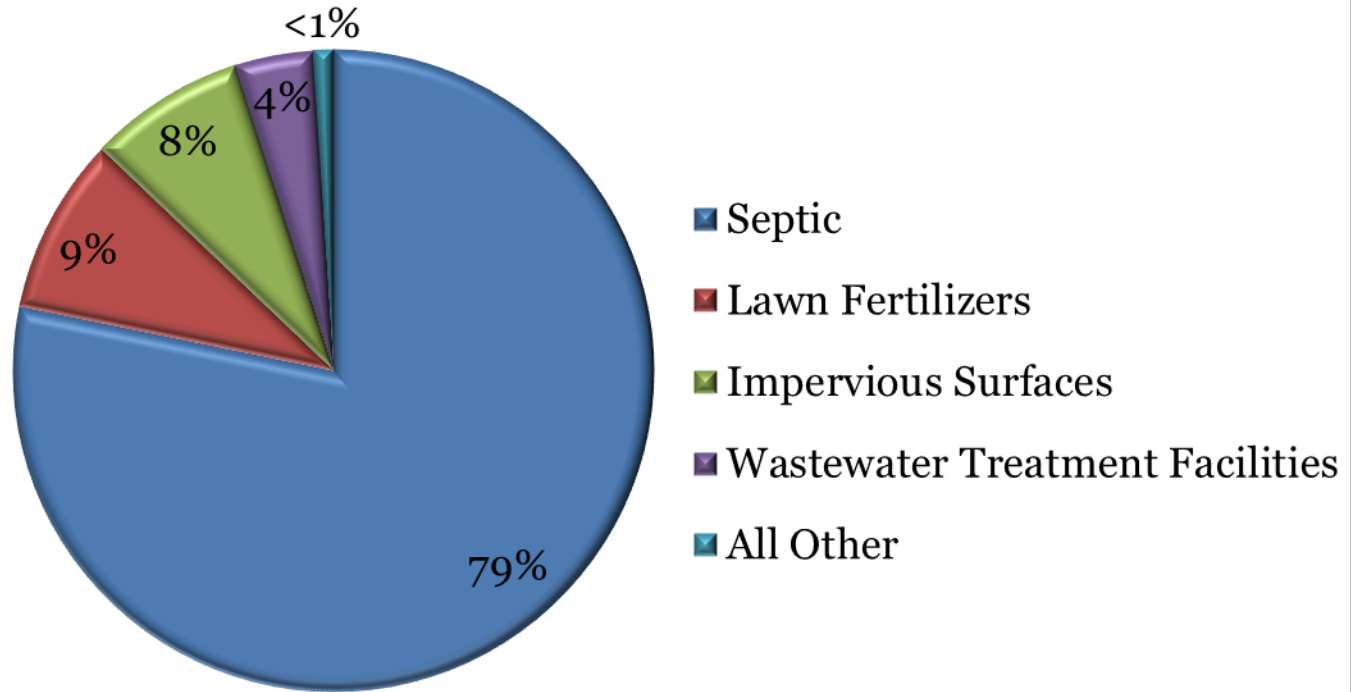
Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor



Massachusetts Estuaries Project

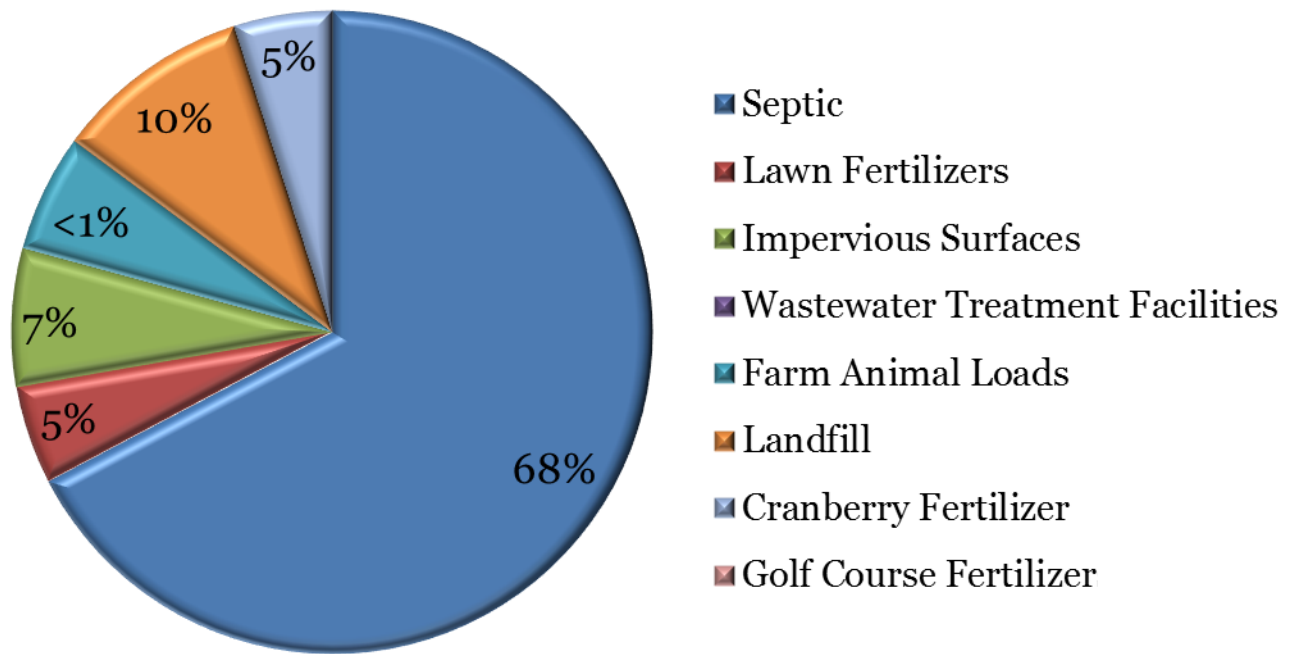
- Opportunity for towns to obtain independent analysis of nitrogen loading and its impact on water quality
- Provides water quality, nutrient loading, and hydrodynamic information
- Water quality monitoring – minimum of 3 years of data for each embayment
- Watershed model links water quality data to nitrogen loads

Cape-Wide Controllable Nitrogen Loads



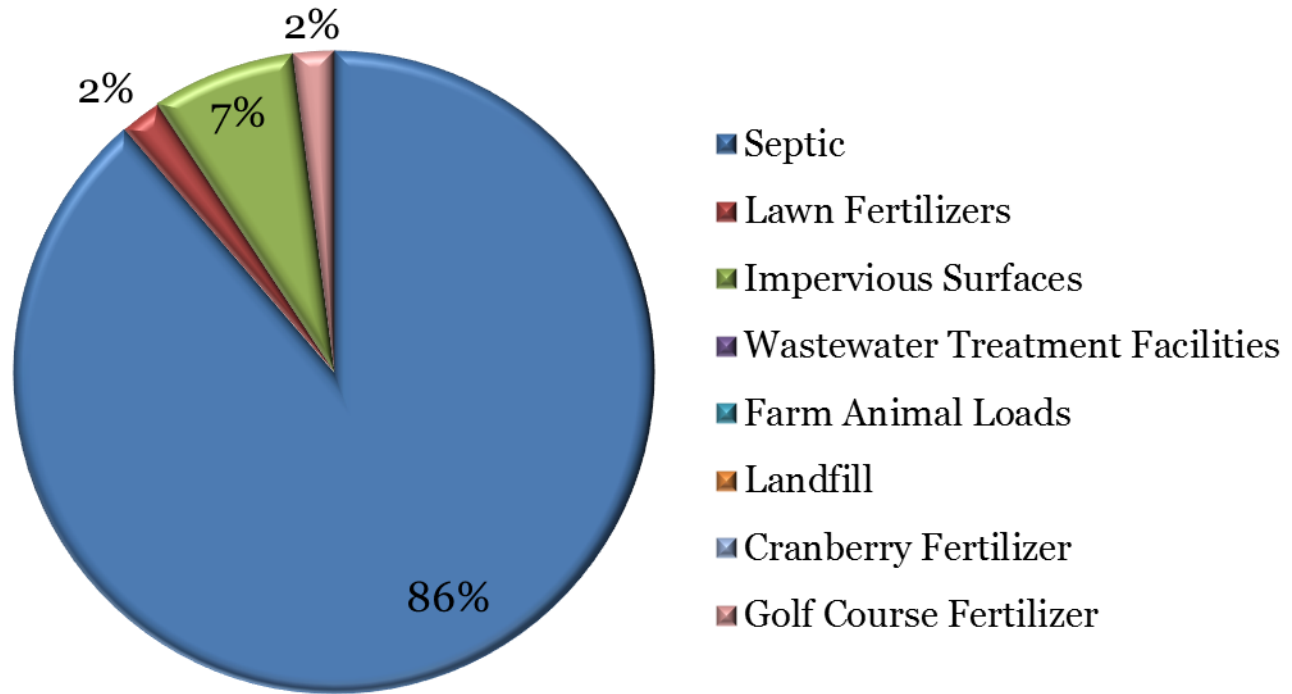
Note: Data averaged from existing Massachusetts Estuaries Project Reports

Herring River Controllable Nitrogen Loads



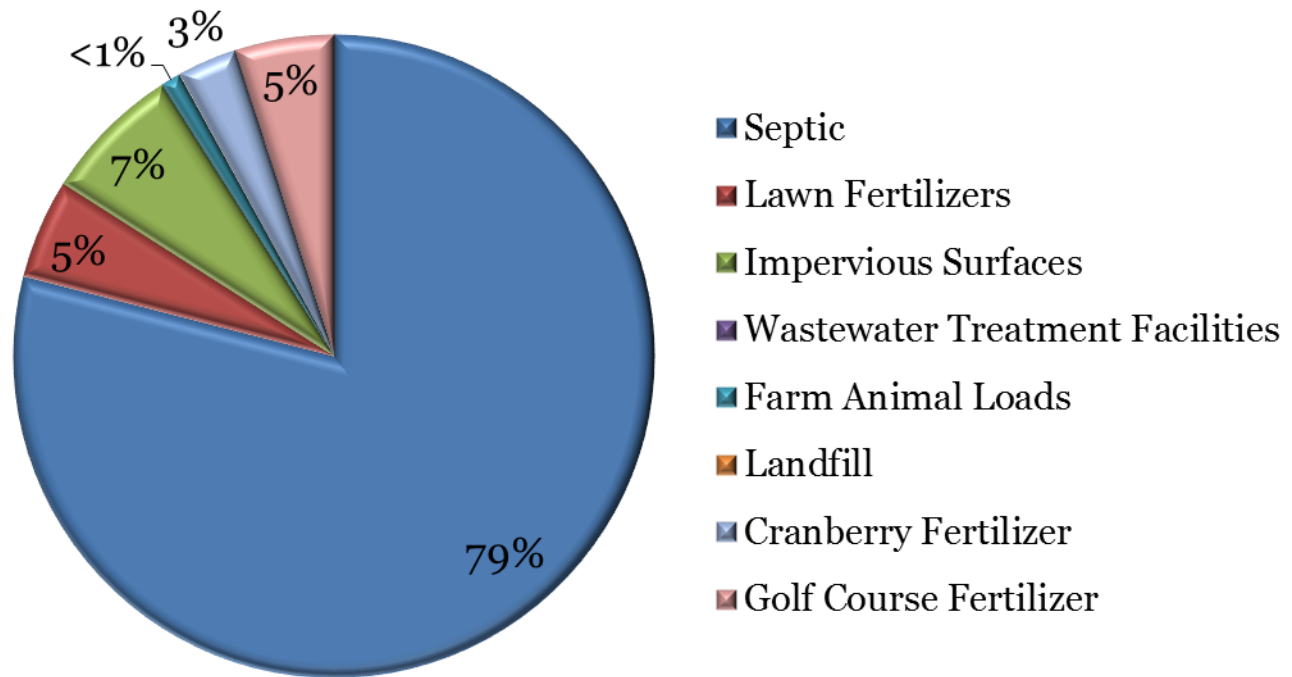
Massachusetts Estuaries Project, Mar 2013

Allen Harbor Controllable Nitrogen Loads



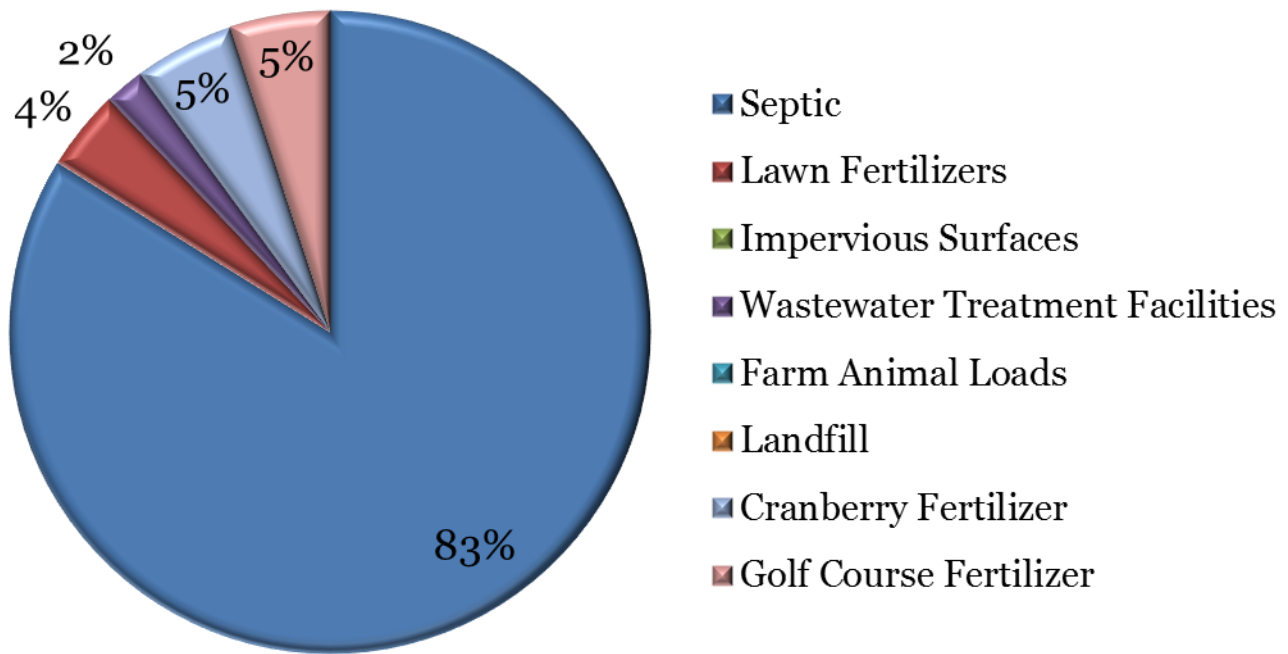
Massachusetts Estuaries Project, 2010

Saquatucket Harbor Controllable Nitrogen Loads



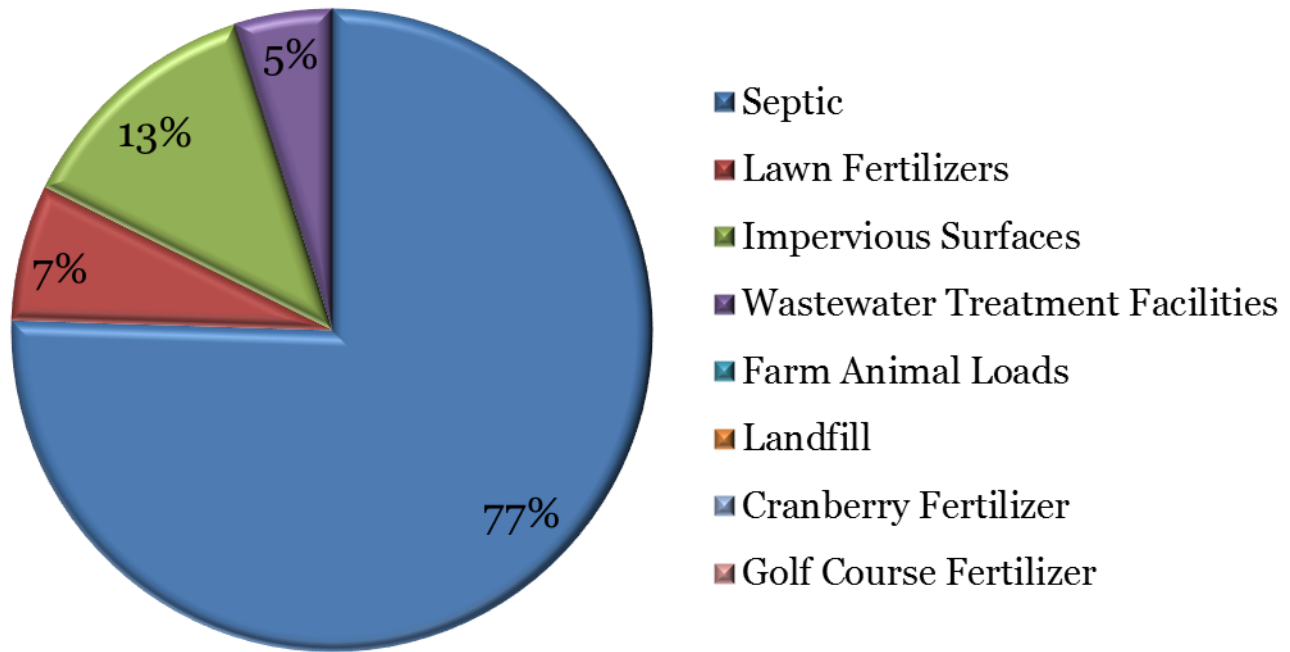
Massachusetts Estuaries Project, 2010

Wychmere Harbor Controllable Nitrogen Loads



Massachusetts Estuaries Project, 2010

Swan Pond River Controllable Nitrogen Loads




Massachusetts Estuaries Project, 2012

Nitrogen Problem


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway

 State Highway









 Roads

 Structures





 Ponds

Nitrogen

Water Quality Stations


-  Healthy
-  Healthy/Moderately Impacted
-  Healthy/Significantly Impacted
-  Moderately Impacted
-  Moderately Impacted/Significantly Impacted
-  Significantly Impacted
-  Significantly Impacted/Significantly Degraded
-  Significantly Degraded


Yearly Nitrate Concentration Averages


-  0 - 0.5 mg/l **in Public Water Supply Wells**
-  0.5 - 1 mg/l
-  1 - 2.5 mg/l
-  2.5 - 5 mg/l


Embayments with Removal Target


Total NLoad Percent Removal

 0 %

 1 - 52 %


 53 - 72 %


 73 - 86 %


 87 - 100 %


Subwatersheds with Removal Target


Total NLoad Percent Removal

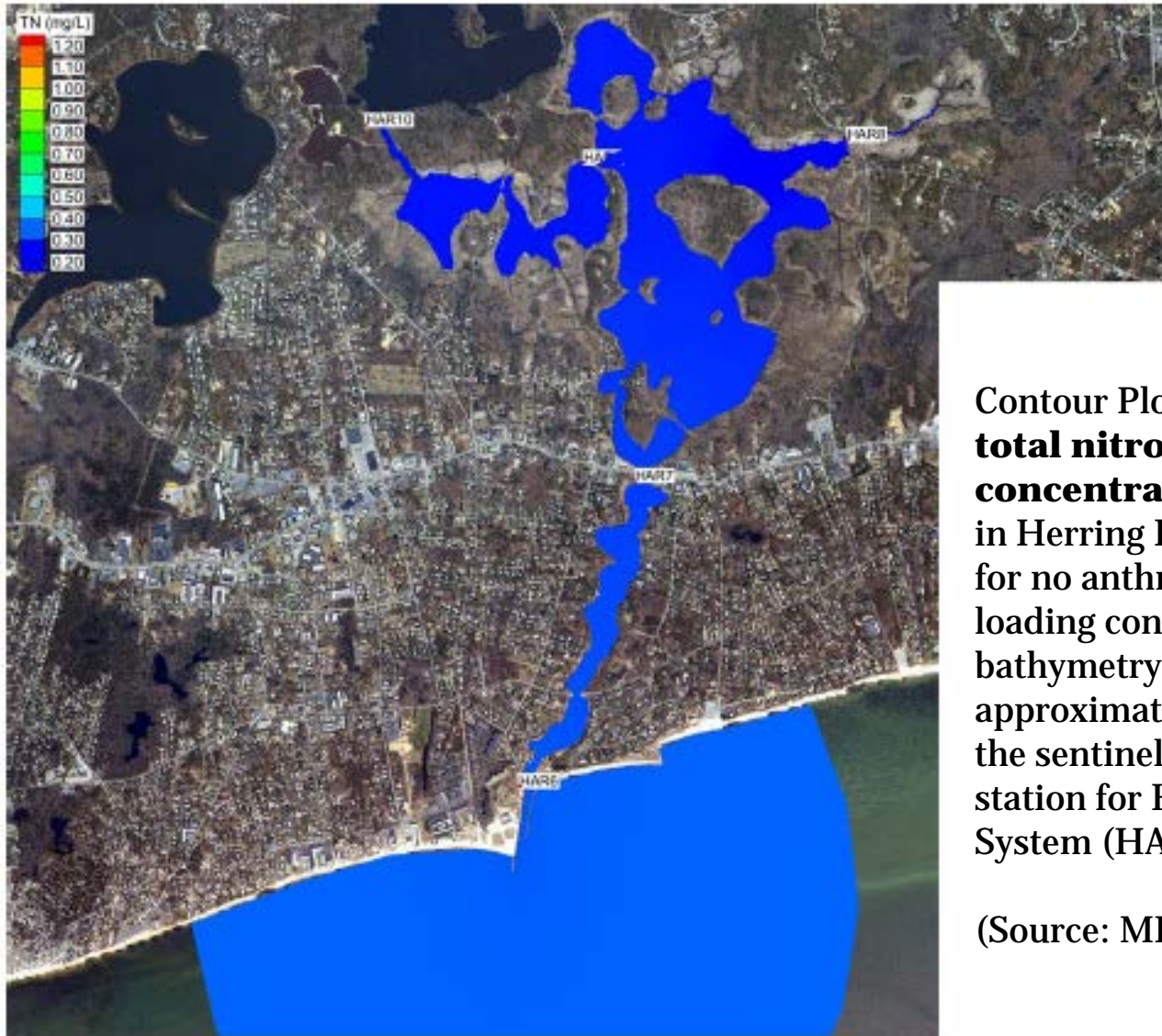
 0.1 % - 9%

 9.1 % - 38 %

 38.1 % - 62 %

 62.1 % - 86 %

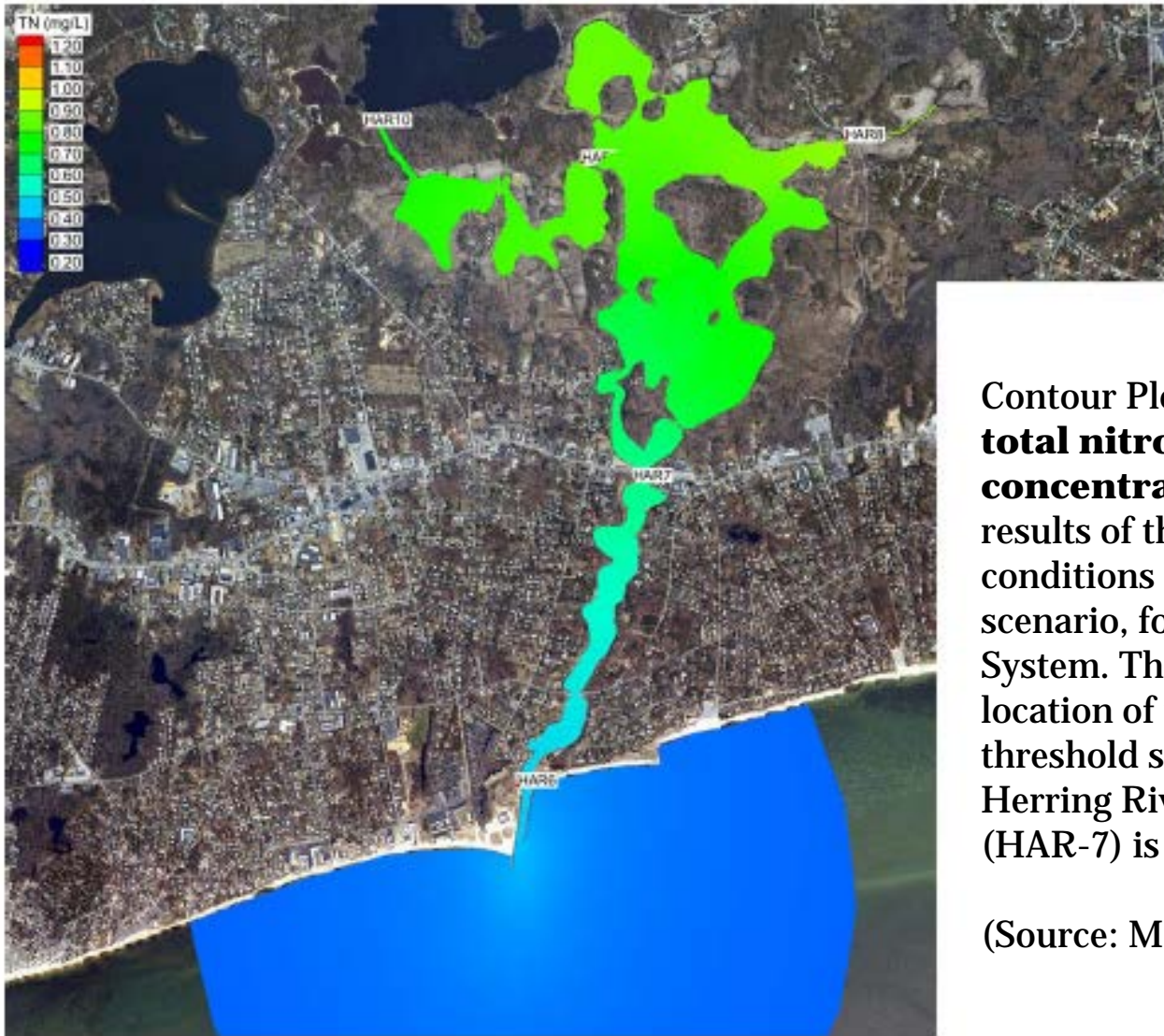
 86.1 % - 100%



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in Herring River System, for no anthropogenic loading conditions, and bathymetry. The approximate location of the sentinel threshold station for Herring River System (HAR-7) is shown.

(Source: MEP 2013)

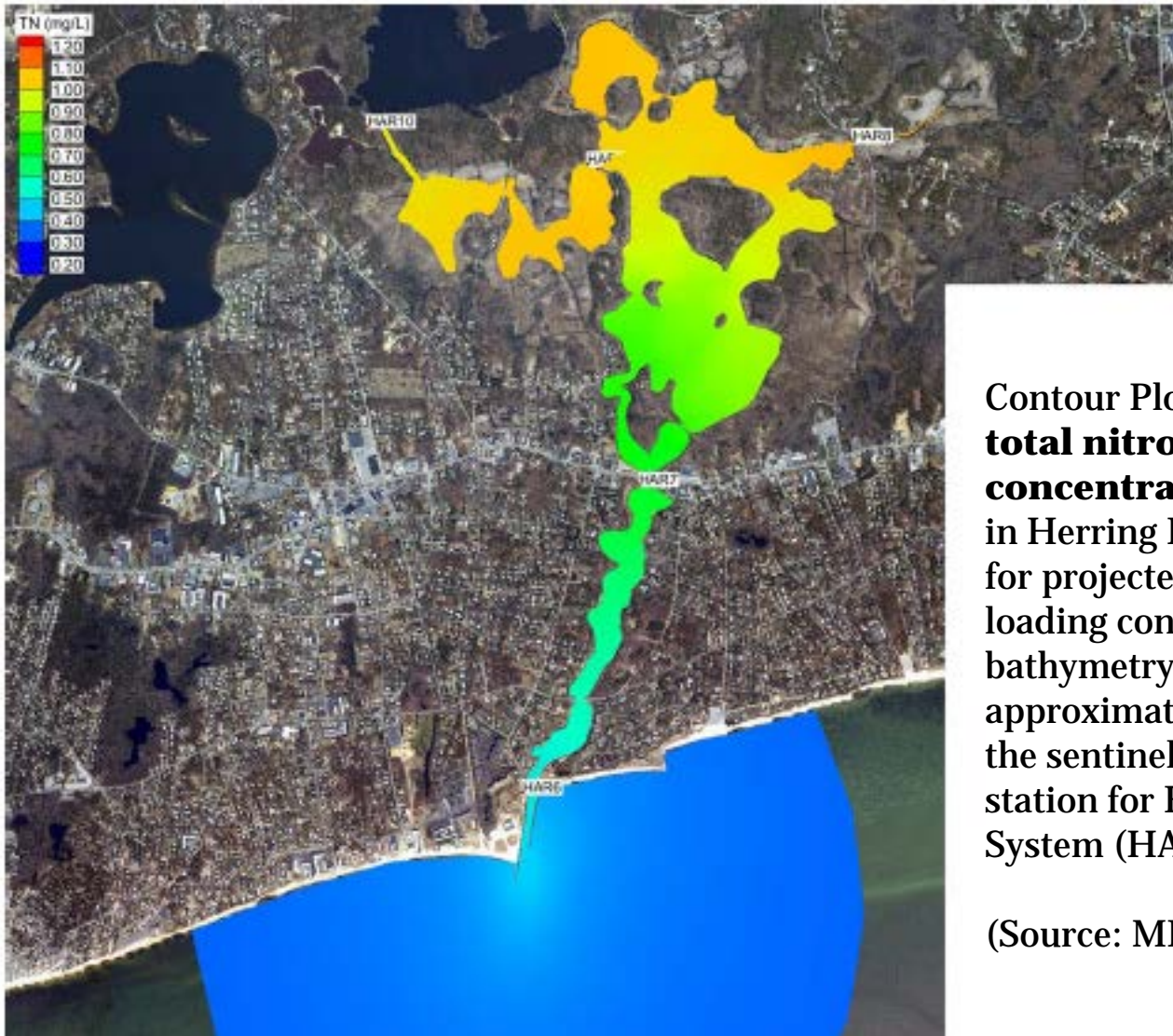
Pre-Colonial Conditions: Herring River



Contour Plot of **average total nitrogen concentrations** from results of the present conditions loading scenario, for Herring River System. The approximate location of the sentinel threshold station for Herring River System (HAR-7) is shown.

(Source: MEP 2013)

Present Conditions: Herring River



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in Herring River System, for projected build-out loading conditions, and bathymetry. The approximate location of the sentinel threshold station for Herring River System (HAR-7) is shown.

(Source: MEP 2013)

Build-out Conditions: Herring River



Contour Plots of **modeled total nitrogen concentrations (mg/L)** in the Allen Harbor, Wychmere Harbor and Saquatucket Harbor estuarine systems, for no anthropogenic loading conditions and bathymetry. The approximate location of the sentinel threshold stations for Allen Harbor (HAR-4), Wychmere Harbor (HAR-3), and Saquatucket Harbor (HAR-2) are shown.

(Source: MEP 2010)

Pre-Colonial Conditions: Allen Harbor, Saquatucket Harbor, & Wychmere Harbor



Contour plots of **average total nitrogen concentrations** from results of the present conditions loading scenario, for Allen Harbor, Wychmere Harbor and Saquatucket Harbor estuarine systems.

(Source: MEP 2010)

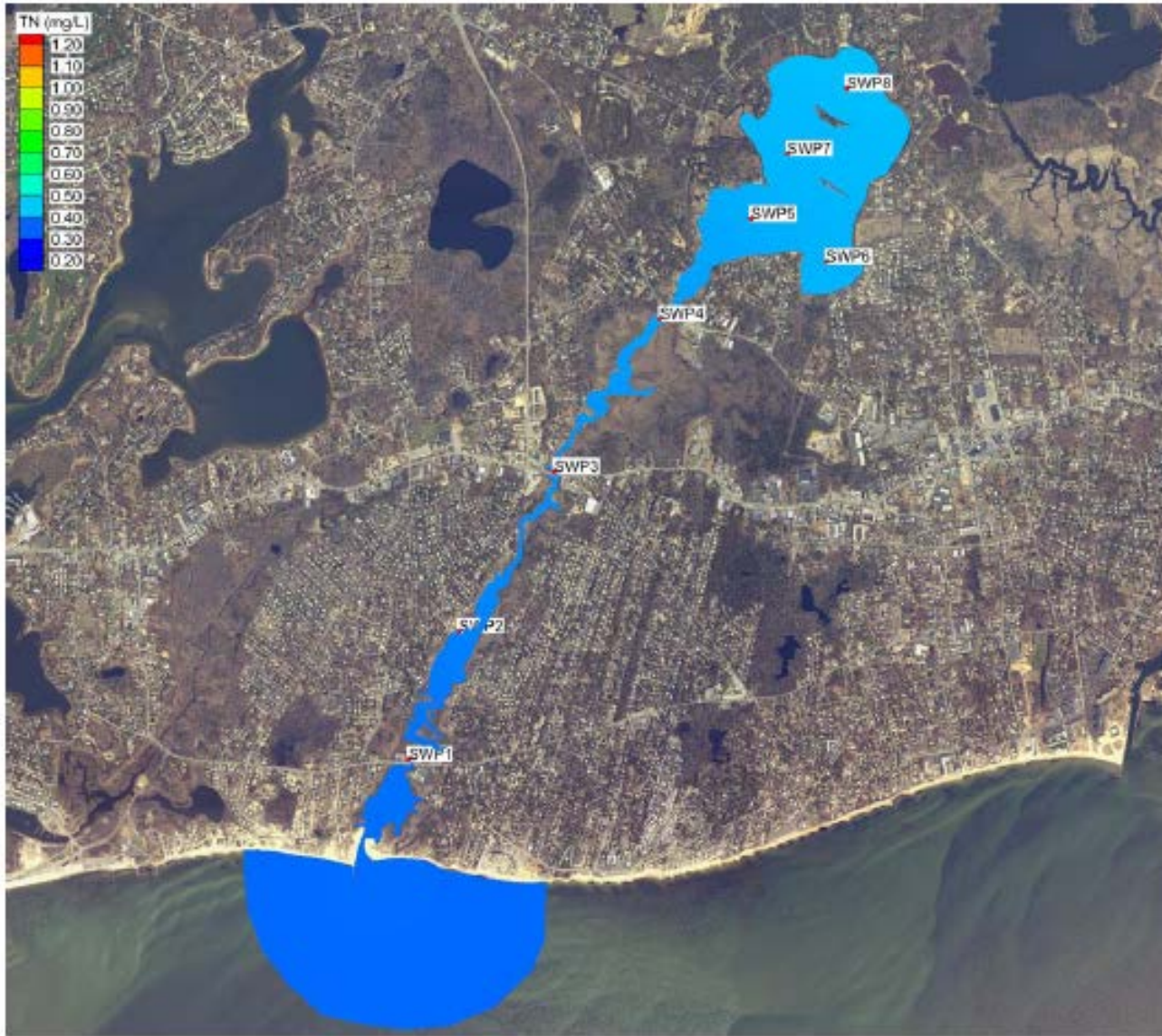
Present Conditions: Allen Harbor, Saquatucket Harbor, & Wychmere Harbor



Contour plots of **modeled total nitrogen concentrations (mg/L)** in Allen Harbor, Wychmere Harbor and Saquatucket Harbor estuarine systems, for projected build-out loading conditions. The approximate location of the sentinel threshold stations for Allen Harbor (HAR-4), Wychmere Harbor (HAR-3), and Saquatucket Harbor (HAR-2) are shown.

(Source: MEP 2010)

Buildout Conditions: Allen Harbor, Saquatucket Harbor, & Wychmere Harbor



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in Swan Pond River system, for no anthropogenic loading conditions, and bathymetry. The approximate location of the sentinel threshold station for Swan Pond River system (SWP-2) is shown.

(Source: MEP 2012)

Pre-Colonial Conditions: Swan Pond River



Contour Plot of **average total nitrogen concentrations (mg/L)** from the results of the present conditions loading scenario, for Swan Pond River system. The approximate location of the sentinel threshold station for Swan Pond River system (SWP-2) is shown.

(Source: MEP 2012)

Present Conditions: Swan Pond River



Contour plots of **modeled total nitrogen concentrations (mg/L)** in Swan Pond River system, for projected build-out loading conditions, and bathymetry. The approximate location of the sentinel threshold station for Swan Pond River System (SWP-2) is shown.


(Source: MEP 2012)

Build-out Conditions: Swan Pond River

Nitrogen Problem


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea


Major Roads

 US Highway

 State Highway









 Roads

 Structures





 Ponds

Nitrogen

Water Quality Stations


-  Healthy
-  Healthy/Moderately Impacted
-  Healthy/Significantly Impacted
-  Moderately Impacted
-  Moderately Impacted/Significantly Impacted
-  Significantly Impacted
-  Significantly Impacted/Significantly Degraded
-  Significantly Degraded


Yearly Nitrate Concentration Averages


-  0 - 0.5 mg/l **in Public Water Supply Wells**
-  0.5 - 1 mg/l
-  1 - 2.5 mg/l
-  2.5 - 5 mg/l


Embayments with Removal Target


Total NLoad Percent Removal

 0 %

 1 - 52 %


 53 - 72 %


 73 - 86 %


 87 - 100 %


Subwatersheds with Removal Target


Total NLoad Percent Removal

 0.1 % - 9%

 9.1 % - 38 %

 38.1 % - 62 %


 62.1 % - 86 %

 86.1 % - 100%

Eelgrass Extent


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway


 State Highway

 Roads

 Structures

 Ponds


Eelgrass

 Eelgrass Extent

Phosphorus Problem


Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway

 State Highway

 Roads

 Structures


 Ponds


Phosphorus


Priority Ponds

Trophic Status

 Eutrophic *Most Impacted*


 Mesotrophic

 Oligotrophic *Least Impacted*

 Not Interpreted


Title 5 Compliance Issues


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway


 State Highway


 Roads

 Structures


 Ponds


Existing Conditions

 Approx. Locations of Loans Issued for Title 5 Repair

 Potential Title 5 Compliance Issues

 Wastewater Treatment Facility

 Groundwater Discharge Points

 Sewered Parcels


Existing & Proposed Solutions



Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor


Existing Infrastructure


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway


 State Highway


 Roads


 Structures


 Ponds


Existing Conditions

 Approx. Locations of Loans Issued for Title 5 Repair

 Potential Title 5 Compliance Issues


 Wastewater Treatment Facility

 Groundwater Discharge Points


 Sewered Parcels

Enhanced Attenuation Sites


 Pipe


 Stormwater


Public Supply Wells

 Public Water Supply Well

 Small Volume Wells, Non-Transient

 Proposed Public Water Supply Well


 Surface Water Supply

 Small Volume Wells, Transient

Proposed Infrastructure


"Watershed Working Group - Herring River - Workshop 1"


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea


Major Roads

 US Highway

 State Highway

 Roads


 Structures

 Ponds

Proposed Conditions

Natural Attenuation Sites

 Bridge

 Culvert


 Inlet

 Pipe


 Sewer Alternatives


 Stormwater


CWMP Sewershed Phasing


 No Date Set


Phase Date

 2001 - 2010

 2011 - 2020

 2021 - 2030

 2031 - 2040

 2041 - 2050



Framework for Addressing Solutions Moving Forward

Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor

Site Scale

"Watershed Working Group - Herring River - Workshop 1"

Neighborhood

Watershed

Cape-Wide

Prevention

- Compact Development
- Remediation of Ex. Dev.
- Fertilizer Management
- TDR
- Transfer of Dev. Rights
- Stormwater BMPs

Reduction

- Title 5 Replacement
- Cluster Treatment
- Adv. Central. Treatment
- I/A On-site Denitrifying
- Satellite Treatment
- Wastewater Transport
- Enhanced I/A Systems
- STEP/STEG
- Treated Effluent Disposal
- Toilets: Urine Diversion
- Conventional Treatment
- Toilets: Composting
- Wetlands: Surface Flow
- Toilets: Packaging
- Wetlands: Subsurface Flow
- Stormwater: Bioretention
- Disposal: Out of Watershed
- Stormwater: Wetlands
- Disposal: Ocean
- Eco-Machines & Living Machines
- Phyto-Irrigation

Remediation

- Phyto-buffers
- Fertigation
- PRB Permeable React. Bar.
- Aquaculture/Shellfish
- Inlet / Culvert Widening
- Pond / Estuary Dredging
- Surface Water Remediation Wetlands

- Wastewater
- Stormwater
- Existing Water Bodies
- Regulatory



Wastewater



Existing Water Bodies



Regulatory

Alternatives: Screening Method

1
2
3
4
5
6
7



Targets/ Goals

Present Load:
X kg/day



Target:
Y kg/day



Reduction Required:
N kg/day

Composite Target Areas

- A. High Nitrogen Reduction Areas
- B. Pond Recharge Areas

- C. Title 5 Problem Areas

Low Barrier to Implementation

- A. Fertilizer Management
- B. Stormwater Mitigation



Watershed/Embayment Options

- A. Permeable Reactive Barriers
- B. Inlet/Culvert Openings

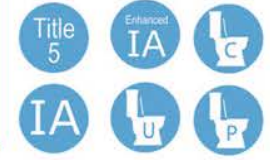
- C. Constructed Wetlands
- D. Dredging



Alternative On-Site Options

- A. Eco-toilets (UD & Compost)
- B. I/A Technologies

- C. Enhanced I/A Technologies
- D. Shared Systems



Priority Collection/High-Density Areas

- A. Greater Than 1 Dwelling Unit/acre
- B. Village Centers

- C. Economic Centers
- D. Growth Incentive Zones



Supplemental Sewering



All materials and resources for the Herring River Group will be available on the Cape Cod Commission website:

<http://watersheds.capecodcommission.org/index.php/watersheds/lower-cape/herring-river>

Allen Harbor
Herring River
Saquatucket Harbor
Swan Pond River
Wychmere Harbor

**Cape Cod 208 Area Water Quality Planning
Herring River Working Group**

Meeting One Summary¹

Thursday, September 19, 2013

Harwich Community Center, 100 Oak Street, Harwich, MA 02645

Draft Meeting Summary

This summary is a draft. Please send your comments on any errors or omissions to the working group facilitator. This summary will be corrected and finalized after the second working group meeting.

ACTION ITEMS

Next Meeting: Monday, October 21, 2013

8:30 am- 12:30 pm

Harwich Town Hall, Selectmen's Meeting Room *** note new location for this meeting*

732 Main Street Harwich, MA 02645

The following action items came out of the Working Group meeting:

- Working Group members:
 - Send concrete suggestions for encouraging public participation to Erin Perry.
 - Provide the Cape Cod Commission with any additional updates to the chronologies and with data that may be helpful for the group to assess the issues. Please provide comments to: wastewater@capecodcommission.org
 - Review technology fact-sheets in advance of the October 31 meeting.
(Technology fact sheets will be distributed in early October)
- Cape Cod Commission:
 - Update the timelines for Brewster, Dennis, and Harwich to reflect the efforts that the towns made under the original Section 208 Area-wide planning process.
 - Update information about Brewster, Dennis, and Harwich of various kinds, including:
 - Dennis Vision Mapping,
 - Harwich planning documents,

¹ Meeting summary prepared by the Consensus Building Institute

- Alum treatment efforts made by Brewster in 2007-2008,
- Diagnostic study of the Herring River,
- Land banking for all three towns,
- Update Title 5 and cesspool data for all three towns,
- Update information about current and proposed stormwater projects and culvert data for all three towns,
- Include information about the proposed work on Route 28 / Cold Brook Road,
- Include information about owners unknown land in Harwich – information about this is available in Figure 5 of the Harwich OpenSpace and Recreation Study,
- Include information about turf and leaching from golf courses – information about this is available in Barnstable County health data from the 1990s,
- Include information about onsite nitrogen reduction systems – Barnstable County has data about these,
- Include information from geologists about inlets and culvert openings as these interventions may have detrimental secondary effects.
- Information about potential future buildout scenarios, pending different changes to zoning regulations.
- Share the GIS layers showing land use changes over time with Working Group members.
- Consensus Building Institute (CBI)
 - Distribute the link to the slides and notes from the Cape Cod Commission's affordability/financial presentation.
 - Distribute September meeting summary, PowerPoint, and GIS data layers link.
 - Distribute meeting materials for October meeting: fact sheets and agendas.
 - Follow up with Working Group member Paula Miller regarding 208 Plan development history.

WELCOME AND INTRODUCTIONS

The Cape Cod Commission opened the meeting and welcomed those in attendance. An attendance list can be found in Appendix A. All meeting documents and presentations for the Herring River Watershed Working Group are located here:

<http://watersheds.capecodcommission.org/index.php/watersheds/lower-cape/herring-river>

REVIEW OF GOALS AND PROCESS

The stated goal of the meeting was: "To review and develop shared understanding of the characteristics of these watersheds, the work done to date, existing data and information available, and how to apply all of this to planning for water quality improvements for these watersheds moving forward."

The meeting facilitator, Ms. Kate Harvey, Consensus Building Institute, noted that the Herring River Working Group covers the watershed that encompasses the municipalities of Brewster, Harwich, and Dennis. She explained that, over the course of the Section 208 Water Quality Planning process, the Working Group will examine different options and will explore how to evaluate those different options. She added that the role of the Working Group would be to provide information and insight into the exploration and evaluation of those options.

Ms. Erin Perry, Cape Cod Commission, reviewed the structure and timeline of the 208 Planning Process. She explained that the current process is designed to bring Cape Cod communities into compliance with Section 208 of the Clean Water Act, with a focus on nitrogen loads in saline waters, phosphorus loads in fresh waters, and address challenges posed by future growth and Title 5 limitations. She noted that the Cape has 105 watersheds and 57 embayments. The Massachusetts Estuaries Project (MEP) has found that almost all of the embayments that it has studied on the Cape require nitrogen removal. She said that, since 32 of the 57 embayment watersheds cross a town boundary, water quality concerns on the Cape are really a regional issue. Ms. Perry explained that the goal of the 208 Update Process is to "generate a series of approaches in each watershed that will meet water quality standards." The process is watershed-based, includes a focus on both stakeholder engagement and technical work, seeks to maximize the benefits of local planning, and favors allowing local stakeholders to decide which of a range of options to pursue instead of mandating a single "optimal" solution. Ms. Perry noted that the 208 Update Planning Process is occurring simultaneously in 11 subgroups across the Cape, with the Herring River subgroup being one of these 11.

Ms. Perry reviewed the timeline of the 208 Planning Process. Public meetings were held in July and August, and the Watershed Working Groups will meet in September, October, and early December. The current, September, meetings are focused on baseline conditions, with the October meetings focused on technology options and the December meetings focused on reviewing different scenarios for the local watersheds covered by the Working Group. The efforts of each Working Group will be supported by an Advisory Board; a Regulatory, Legal and Institutional Work Group (RLI); the Technical Advisory Committee of the Cape Cod Water

Protection Collaborative (TAC); and a Technology Panel. The advisory board consists of former local officials, individuals with experience advancing regional plans, and representatives of the environmental community. Representatives from the MassDEP, the EPA, the Cape Cod Commission, the Army Corp of Engineers, and other state and federal partners comprise the RLI. Local municipal technical staff comprise the TAC, which is a committee of the Cape Cod Water Protection Collaborative. The Technology Panel consists of local, regional, national and international academic and research institutions, state watershed managers, and consultants. The mission statements and membership of advisory boards, committees and groups can be found at <http://watersheds.capecodcommission.org/index.php/208-plan>

LOCAL PROGRESS TO DATE

Ms. Patty Daley, Cape Cod Commission and Herring River Working Group Area Manager, provided an overview of efforts made across the Cape, and in the municipalities of Brewster, Dennis, and Harwich, to address water pollutants. She stated that, since Title 5 of the Massachusetts Sanitary Code for the regulation of on-site wastewater systems went into effect (1975) and the Section 208 Area-wide Plan for Cape Cod was approved in 1978, most Cape Cod municipalities have worked hard to address point-source pollutants. Many Cape Cod towns hired health agents in the late 1970s to implement Title 5 programs and systems. Since that time, however, non-point-source pollutants have become more of a concern and these need to be addressed today. Ms. Daley also noted that Brewster, Dennis, and Harwich have worked hard to clean and protect their ponds.

Working Group members were given time to examine timelines of water-quality developments for the three Herring River towns (Brewster, Dennis, and Harwich) and to provide input about amendments and additions that should be made to the timelines. Working Group members provided the following input:

- The towns of Brewster, Dennis, and Harwich performed significantly more work under the original Section 208 Area-wide planning process than is reflected on the timelines. The timelines should acknowledge the efforts that the towns have already made.
- The Dennis Water and Sewer District no longer exists.
- The results of the Vision Mapping process performed by Dennis will need to be reconciled with the recommendations made under the current Section 208 planning process. Dan Fortier is the contact person for the Dennis Vision Mapping process.
- Brewster and Dennis have cooperated on water protection measures.

- Harwich has a number of planning documents which should be taken into account when considering the Section 208 planning process, including the Harwich Heritage Report, a report titled "Moving Toward the River," and an open space and recreation plan.
- More information should be included about the alum treatment efforts made by Brewster in 2007-2008.
- A diagnostic study of the Herring River was conducted during late 1990s. This study could serve as a resource for the Section 208 planning efforts. Mike Lach has more information about this study.
- Various sorts of information need to be included for Dennis. Diane Chamberlain has more information about these items.
- Information about land banking should be included for all three towns.
 - Add Dennis town meeting votes
 - Add Dennis land purchase in Brewster for drinking water protection

Ms. Kate Harvey, the facilitator, asked the Working Group to reflect on what stood out to them as they reviewed the chronology. She asked the group to identify some "lessons learned" from the past that should be applied going forward. Working Group members identified the following lessons learned and key insights:

Comments about collaboration between the Towns of Brewster, Dennis, and Harwich:

- The three towns need to work together and collaborate.
 - There is some history of the towns successfully working together on septage.
 - Harwich has collaborated with Brewster on alum treatment.
 - Harwich has collaborated with Brewster on Muddy Creek.
 - Harwich has collaborated with both Brewster and Dennis on communication and information sharing.
 - The water district in Dennis bought land in the Town of Brewster and this was the first time that land was bought across town borders for water.
 - Collaboration over Pleasant Bay can serve as a model.

Comments about public participation:

- In many ways, Section 208 Planning is really a messaging and a branding exercise. We need to improve our communication strategies and really focus on selling the final results that we are looking for.
- Public awareness and interest in these issues is lacking. We need to do more and better to get the general public engaged.

- Public libraries and transfer stations can be good places for conducting public outreach and having presentations about the Section 208 planning efforts.
- *Comments from Cape Cod Commission personnel:* The Section 208 Working Group meetings are public and are advertised, but more public outreach could be conducted to encourage attendance. The Cape Cod Commission is also working to engage citizens through an online game called Cape 2.0 and around the affordability issue. The Commission is also developing an online tool called Cape Cod H₂O that allows people to click on different geographic areas and find out more about what the different watershed issues are in those areas.
 - *In response to these comments from Cape Cod Commission personnel, Working Group members made the following comments:*
 - While the online tools sound promising, the Cape's population is getting older and these people are less likely to be online and using online tools. *A Commission staff member noted that more than 70% of people playing Cape 2.0 were over 50 years old.*
 - Older residents are often less willing to vote to invest for the future.
 - When people are not informed about the issues, they are less willing to vote in favor of raising taxes to pay for infrastructure and investments, and so it is critical that the Section 208 process educate the broader public.
 - The conventional wisdom holds that older people will not support education, but Harwich has shown that this is not always true. The key to generating support from older residents is to frame the issues well and to illustrate for people what the final goals and outcomes will look like.
 - Section 208 Working Group meetings are scheduled during the day and so business owners and working people cannot attend. These people also are not going to play video games at night.

Other comments:

- The Town of Dennis has worked really hard and has spent a lot of money protecting its water and has a very independent spirit. The idea, presented in the 1978 208 Plan summary, that Dennis has water resources to share and the assumptions built into that sort of language will set people in Dennis against this whole effort.

BASELINE CONDITIONS

Ms. Patty Daley, Area Manager, presented a number of slides and GIS maps illustrating the water quality challenges the Cape faces as well as some of the data the Commission uses for its modeling and analysis. Working Group members were asked to identify anything they believed was missing from the data, as well as any differences of opinion they had with the Commissions' analysis or approach.

Ms. Daley noted that the Herring River watershed group covers five watersheds across three towns.

Natural Features – The natural features data layer shows the locations of cranberry bogs, wetlands, Natural Heritage and Endangered Species Program (NHESP) Certified Vernal Pools Water Table Contours; Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Update 2013, and preliminary FEMA Flood Insurance Rate Map (FIRM) Zones 2013. In response to a question from a working group member, Cape Cod Commission personnel explained that the new FIRM map expands those areas in flood zones because it uses more detailed, 2 foot contours, as opposed to the less precise, 10 foot contours that were previously used. In response to a question from a Working Group member asking about the focus on embayments areas (to the exclusion of the areas adjacent to embayments), a Commission employee clarified that the focus is currently on embayments because greater data exists for these areas. The Commission suggested that it could devote additional resources in the future to examine areas adjacent to embayments.

Managed Surfaces – The managed surfaces data layer includes managed ground surfaces (impervious and disturbed surfaces), residential managed lawns, and municipal managed natural surfaces. The residential managed lawns layer includes only private land surfaces where fertilizer application might occur. The municipal managed natural surfaces layer includes only public lands likely to receive fertilizer applications.

Regulatory Layer – The regulatory layer illustrates Areas of Critical Environmental Concern, MassDEP Approved Wellhead Protection Areas, and Growth Incentive Zones. OpenSpace data is displayed in three levels of land protection: land protected in perpetuity, limited protection, and no protection. Landuse Vision Map data delineates economic centers; industrial and service trade areas, village boundaries, resource protection areas, other designations, and undesignated lands. Ms. Daley noted that the amount of open space shown on the map attests

to the good work that Brewster, Dennis and Harwich have done in purchasing and protecting open spaces. She explained that Land Use Vision Maps guide how the Cape Cod Commission applies its regulations when a project with a regional impact is considered and, in response to a question as to why the Town of Harwich has not adopted a Land Use Vision Map, responded that each Town decides independently whether to create a Land Use Vision Map.

Land Use Change Layer – The land use changes layer is based on McConnell land use data from 1951, 1971, and 1999. These layers illustrate the locations of the following land uses: residential; commercial; industrial; wooded, natural and wetlands; water, and; open disturbed or managed. A 2005 data layer is also available, but was not displayed since the collection methodology was different than the 1951, 1971, and 1999 data. The Herring River watershed group map illustrated that while the area of commercial coverage has generally remained constant, the area of residential coverage has expanded significantly. In response to a request from a Working Group member, the Commission agreed to share the GIS layers showing land use changes over time.

Density and Buildout Layers – Ms. Daley proceeded to display information about the density of development in the Herring River watershed group. She explained that density is an important variable because the proximity of homes to each other makes a big difference in terms of the economic feasibility of installing a wastewater collection system. A collection system could mean a traditional sewer system or alternative systems such as constructed wetlands or eco machines. The design of a collection system would have to consider both existing units and likely buildout in the future. Ms. Daley stated that the communities will need to consider how they are going to grow, as it is much more expensive to grow in a more sprawled out fashion rather than compactly. Cape-wide, 30% growth is anticipated to increase capital costs of sewerage by 40%. Working group participants discussed the causes and implications of growth and recent population decline, noting that many homes in Harwich are owned by elderly people and are increasingly being turned into second homes when they turn over, that a single-family home on a large plot of land is a housing model that does not provide for the most affordable mode of living for lots of people, and that even with a recent decline in population, the built infrastructure (including buildings) remain in place.

People Data

The Section 208 Update will also consider demographic changes that could influence the selection of technologies to improve water quality. The Cape Cod Commission presented the demographic data, most of which was derived from the 2010 Census. The Herring River

watershed group includes the locales of Allen Harbor, Herring River, Saquatucket Harbor, Swan Pond River, and Wychmere Harbor. The total population of the watershed group is 11,163 residents, according to the 2010 U.S. Census, which represents 5.2% of Cape Cod's population. The median age of the Herring River watershed group is older, whiter, has a lower average median income, and consists of more seasonal housing than Barnstable County and than the state of Massachusetts as a whole. The total assessed value of homes is \$2.7 billion for this watershed group. In response to a question from a Working Group member, Ms. Daley explained that the demographic data came from the U.S. Census and that the Commission is also attempting to supplement the Census data with more fine-grained data based on water and electricity usage. Ms. Daley also showed information indicating that the average single family property tax bill in Brewster, Dennis, and Harwich is lower than in Barnstable County and than in Massachusetts; the average annual water bill in Dennis and Harwich being lower than in Barnstable County and than in Massachusetts (with Brewster being somewhat higher); and the average annual sewer bill in Barnstable County being lower than in Massachusetts. Ms. Daley noted that Cape Cod is anomalous as compared to the rest of the state in generally lacking wastewater infrastructure. In response to a question from a Working Group member, Cape Cod Commission personnel clarified that the data for water and sewer bills reflect these two categories separately, not combined water and sewer bills.

THE PROBLEM

Ms. Daley proceeded to describe the key challenges facing Cape Cod and the Herring River watershed group with regards to wastewater treatment and water quality. She explained that the MEP provides water quality, nutrient loading, and hydrodynamic information, thereby providing Cape Cod towns with the opportunity to obtain independent analysis of nitrogen loading and its impact on water quality. She recounted that, Cape-wide, 79% of controllable nitrogen load is from septic systems, while in the Herring River watershed group, 68% of controllable nitrogen load is from septic systems, with the balance coming from landfills, impervious surfaces, cranberry and golf course fertilizers, and farm animals. In response to a question from a Working Group member, a Commission staff member reported that the Commission would be pursuing an adaptive management strategy to address issues like surface runoff. In addition, a Working Group member stated that strong turf produces minimal runoff and golf courses have committed to eliminating the use of phosphorous in fertilization. A Commission staff member noted that towns have an opportunity to adopt good fertilizer management practices and doing so may allow them to reduce the amount of treatment infrastructure that has to be built and the amount of land that would have to be brought under treatment facilities.

Ms. Daley explained that the MEP report focuses on the health of embayments. Swan Pond and the harbor mouths all have significantly elevated nitrogen levels. Ms. Daley proceeded to present a series of maps and diagrams illustrating past, current, and anticipated future nitrogen loads in the Herring River, Allen Harbor, Saquatucket Harbor, Wychmere Harbor, and Swan Pond River. Working Group members discussed the positive impact that the dredging of Swan Pond may have had on reducing nitrogen loads, with a working group member suggesting that the dredging should have had a significant impact while another Working Group member responded that, while the dredging may have precluded algae blooms, it has not fundamentally altered nitrogen levels since the hydrology of Swan Pond greatly slows clearance and flow from the Pond. A Cape Cod Commission staff member also noted that the level of flushing from Nantucket Sound is also much lower (approximately 3 feet) than the level of flushing from Cape Cod Bay (approximately 10 feet). A Working Group member suggested that the Commission strive to show conditions in the areas adjacent to embayments so that members of the public understand impacts on eel grass.

Ms. Daley next showed maps with target nitrogen load removal levels from embayments and watersheds, noting that many areas within the watershed group have removal targets of between 80% and 100% for new nitrogen sources. The upshot of this information is that it can help to guide where it may be best to place nitrogen-removal infrastructure to have the greatest impact. Noting that many of the areas with the highest targets are in the southern part of the watershed group, nearer to Nantucket Sound, Ms. Daley suggested that nitrogen-removal efforts could be more heavily focused in these areas. Ms. Daley also showed maps of eelgrass distribution, noting that eelgrass is an indicator species for water health. A Working Group member commented that older residents remember water quality conditions in the past based on the presence and extent of eelgrass. Next, Ms. Daley displayed maps showing phosphorus levels in freshwater ponds, with ponds that are more heavily impacted by fertilizer being eutrophic (that is, supporting heavy plant growth) and therefore unhealthy. Hinckley's Pond is the most eutrophic pond in the Herring River watershed group. Ms. Daley noted that freshwater ponds store nitrogen and mitigate nitrogen loads before water flows to the ocean. Finally, Ms. Daley displayed a map showing various types of Title 5 compliance issues, including groundwater discharge points, locations of loans issued by the County for Title 5 repairs, and areas with potential Title 5 compliance issues. A Working Group member pointed out that many older properties have cesspools and do not fall under Title 5 and inquired as to whether the Cape Cod Commission was assuming that all properties have Title 5 systems installed. In response, a Commission staff member answered that the Commission has no data regarding

cesspools and is currently in the process of contacting municipalities to locate properties that have cesspools and/or Title 5 compliance issues.

Finally, Ms. Daley displayed maps showing various types of existing and proposed solutions for handling wastewater. In the Herring River watershed group, existing infrastructure includes public water supply wells, a wastewater treatment facility, and loans issued for conducting Title 5 repairs in different sites. Proposed infrastructure includes enhanced attenuation systems (such as culvert openings and stormwater projects). Working Group members added that a stormwater project has been proposed for Route 124, a restoration project has been proposed for Cold Brook Road, and that a sewage treatment plant may be sited near the landfill in Harwich.

What data should be added to the baseline conditions?

Working Group members proposed that the following types of information be added to the survey of baseline conditions:

- Update Title 5 and cesspool date for all three towns,
- Update information about current and proposed stormwater projects and culvert data for all three towns,
- Include information about the proposed work on Route 28 / Cold Brook Road,
- Include information about the owners unknown properties in Harwich – information about this is available in Figure 5 of the Harwich OpenSpace and Recreation Study,
- Include information about turf and leaching from golf courses – information about this is available in Barnstable County health data from the 1990s,
- Include information about onsite nitrogen reduction systems – Barnstable County has data about these,
- Include information from geologists about inlets and culvert openings as these interventions may have detrimental secondary effects.
- Information about potential future buildout scenarios, pending different changes to zoning regulations.

Working Group members identified the following areas of priority:

- The Harwich comprehensive plan indicates that looking at land use patterns and potential future land uses would be very important,
- Ponds do not seem to be an area of focus, and these are especially important for the Town of Brewster,

- The ponds in the Herring River watershed seem like they could have a big impact on what happens further down the watershed,
- Changing fertilization practices could be low-hanging fruit in that these sorts of behavioral changes are arguably cheaper than building infrastructure to treat wastewater,
- Maintenance dredging, for example for Swam Pond,
- Runoff from state highways,
- Smart Growth options and Land Use Vision Maps,
 - In response to questions and comments, Cape Cod Commission staff members said that they are hoping to use tools such as scenario-based cost estimates, graphics, and heat maps to illustrate different growth patterns and their associated costs in terms of infrastructure construction. Especially in relation to fulfilling requirements under Title 5, zoning can have a significant impact.
- Land management options, including fertilizer bans, smart management of lawns and turf, creation of a fertilizer-free buffer around ponds, and education and outreach around effective and environmentally-conscious fertilization practices.

OPERATING PROTOCOLS

Ms. Kate Harvey, the facilitator, reviewed a Draft Process Protocols document with Watershed Working Group members, covering topics such as the scope of the effort, the constituency of membership in the Working Group, membership roles and responsibilities, responsibilities of the Cape Cod Commission, the role of the facilitator, expectations around communication, the process around meeting summaries, meeting notification, public comment, and the presence and conduct of members of the media and Working Group meetings.

Working Group members suggested that it would be beneficial to involve more Town Selectmen and a representative from the Fisherman's Association in the meetings of the Working Group.

NEXT STEPS

Ms. Patty Daley, Cape Cod Commission, provided an overview of the work that the Working Group will be tackling in coming months. She explained that there are many different technologies and options on the table for the group to consider, and that these range in both the type of approach – preventative efforts using regulatory tools, wastewater and stormwater reduction efforts, and remediation of existing water bodies – and in the scale at which the intervention would take place – at the site-level, neighborhood-level, watershed-level, or Cape-

wide. Ms. Daley explained that the Commission would provide more information to Working Group members about the technologies and other interventions, including visual representations as much as possible, to facilitate understanding of the options on the table. The Commission is hoping to get feedback from Working Group members about what options they are interested in and which ones are acceptable or unacceptable. The CCC will do some background research to learn more about which options would, and would not, work in different places, including the Herring River watershed group, to make it easier for Working Group members to understand the relevant details. Ms. Daley also laid out a seven-step screening process for consideration of different options that begins with considering targets and goals for the intervention and proceeds progressively from low-cost / low-barrier options to higher-cost options. Ultimately, the Cape Cod Commission will synthesize input received from the eleven Watershed Working Groups and create a regional plan for the Cape that offers a series of options for localities to choose between.

In response to questions from Working Group members, Commission staff members reported that they are working with AECOM, the TAC, and the Panel on Technologies to create cost ranges and cost efficiencies with regards to different interventions for nitrogen reduction. Staff members also said that they are hoping to create between 3 and 5 scenarios for the December Watershed Working Group meetings for Working Group members to provide feedback on. Commission staff members also lauded a comment from a Working Group member suggesting that an opportunity to grow shellfish could create buy-in among local residents and added that the Cape Cod Commission is hoping to work with the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection to implement adaptive management approaches that would allow for the implementation of innovative and alternative interventions that could, among other effects, create a sense of investment and ownership among residents.

A Working Group member added that language about the beneficial impact that sewerage can have for businesses could raise red flags for some people as they may balk at funding infrastructure investments for the benefit of businesses.

PUBLIC COMMENTS

No public comments were given.

**Appendix A
Attendance**

Name	Affiliation
Larry Ballantine	Selectman, Harwich
Diane Chamberlain	Comprehensive Wastewater Management Task Force, Dennis
Steve Kleinberg	Emergency Sheltering Branch Director (attending as an observer)
Jason Klump	Planning Board, Brewster
Joan Kozar	Planning Board, Harwich
Michael Lach	Harwich Conservation Trust
Paula Miller	Comprehensive Water Planning Committee, Brewster
Ed Nash	Golf Course Superintendents of Cape Cod
Russell Schell	Brewster Comprehensive Water Planning Committee
Steve Swain	Citizen
David Spitz	Planner, Harwich
Brooke Williams	Harwich Civic Association
<i>Staff</i>	
Patty Daley	Cape Cod Commission
Scott Michaud	Cape Cod Commission
Erin Perry	Cape Cod Commission
Kate Harvey	Consensus Building Institute
Tushar Kansal	Consensus Building Institute