

**Cape Cod 208 Area Water Quality Planning
Nauset and Cape Cod Bay Marsh Group Watershed Working Group**

**Meeting One
Draft Meeting Agenda
Wednesday, September 25, 2013
Eastham Town Hall, 2500 State Hwy, Eastham, MA 02642
8:30 am - 12:30 pm**

- 8:30 Welcome – *Cape Cod Commission*
- 8:35 Introductions, confirm working group membership and participation –
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 – *Facilitator and Working
Group*
- 10:00 Baseline Conditions: Understanding Your Watershed and its Water Quality
Problem – *Area Manager*
- 10:45 Break
- 11:00 Discussion of Baseline Conditions - *Facilitator and Working Group*
- 11:30 Review/Discuss Process Protocols - *Facilitator and Working Group*
- 12:00 Framework for Moving Forward: Preview Meetings 2 and 3 – *Area Manager*
- 12:10 Public Comments
- 12:30 Adjourn

Nauset & Cape Cod Bay Marsh 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

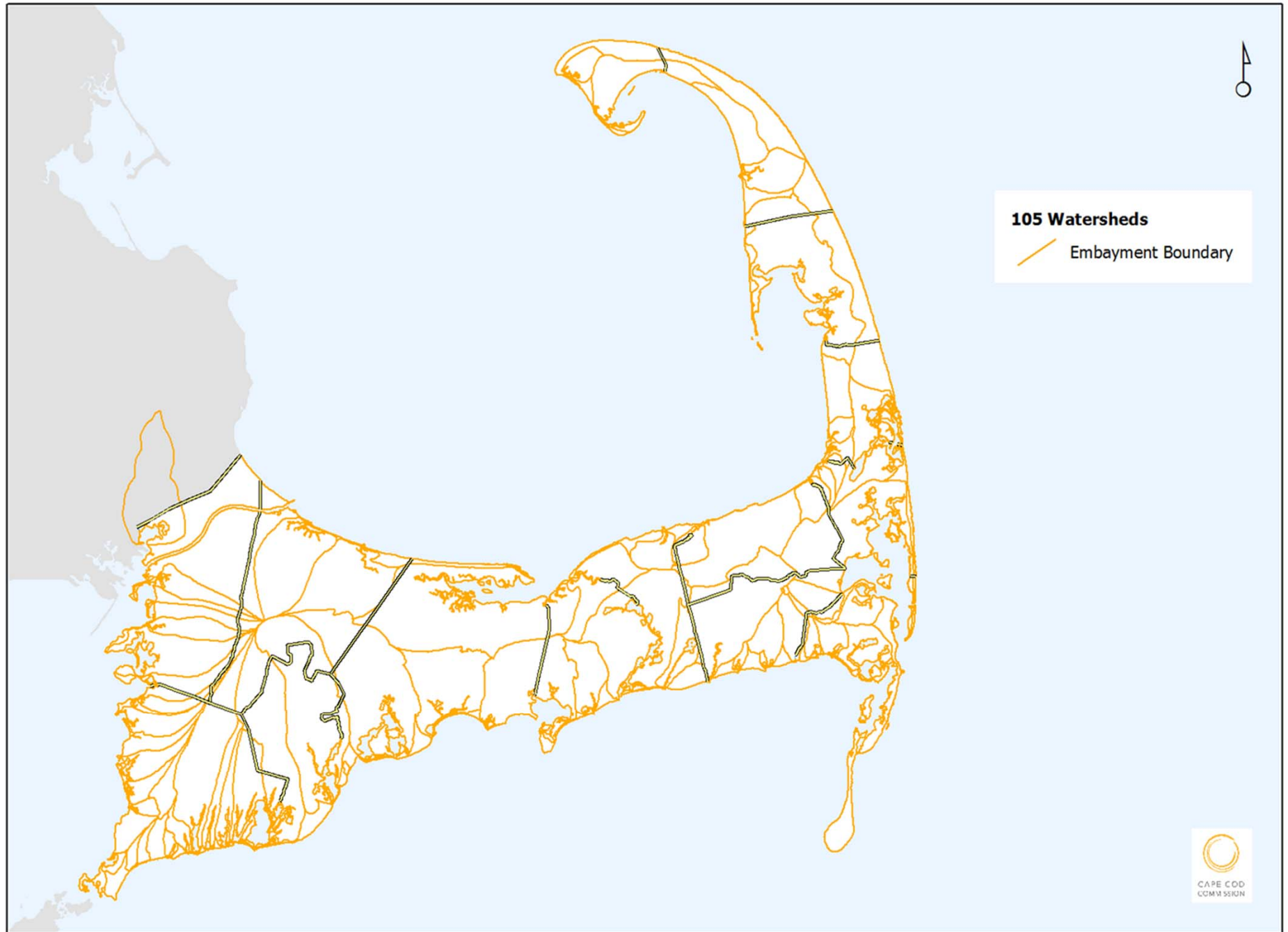
Focus on 21st Century Problems

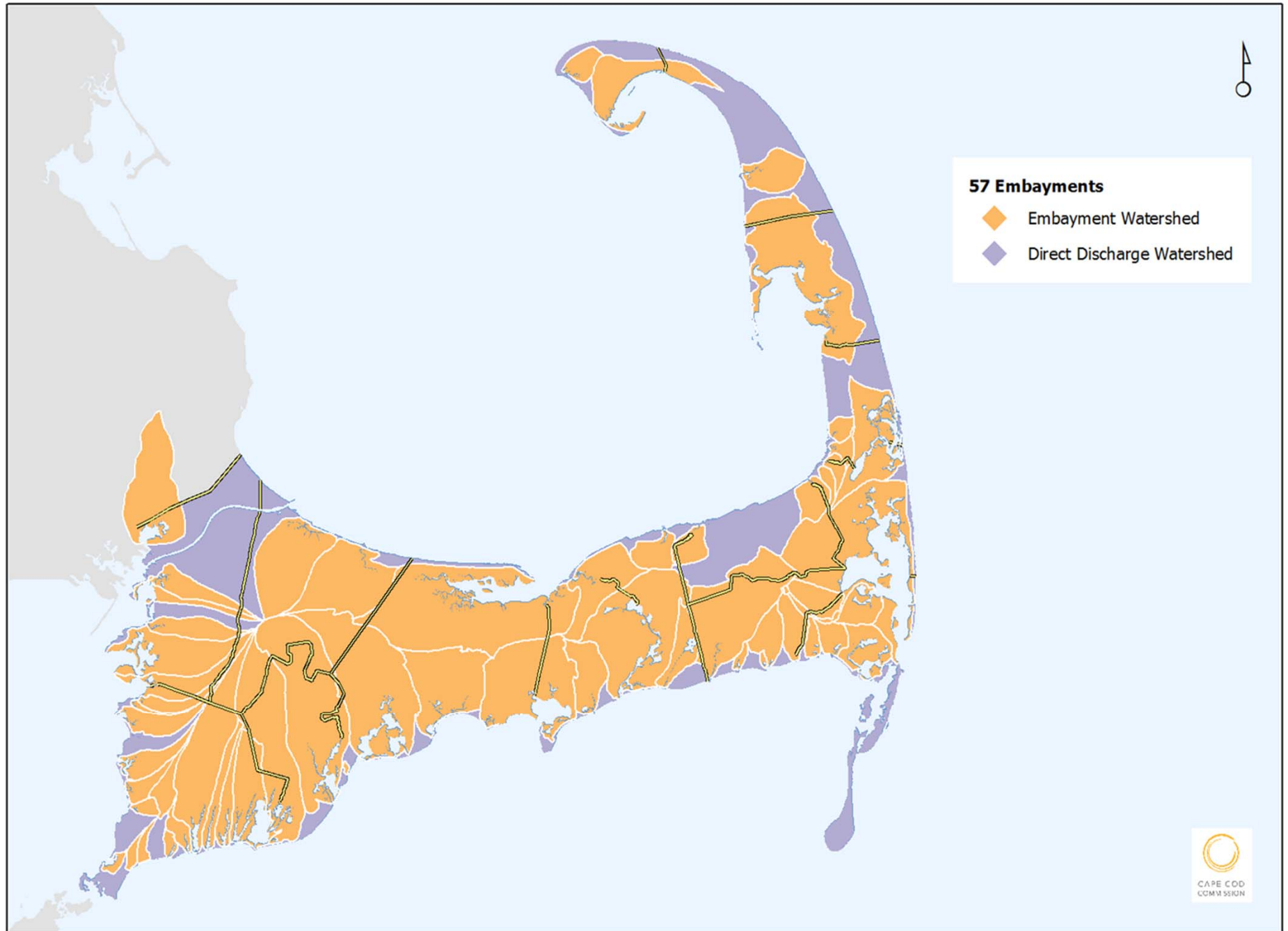


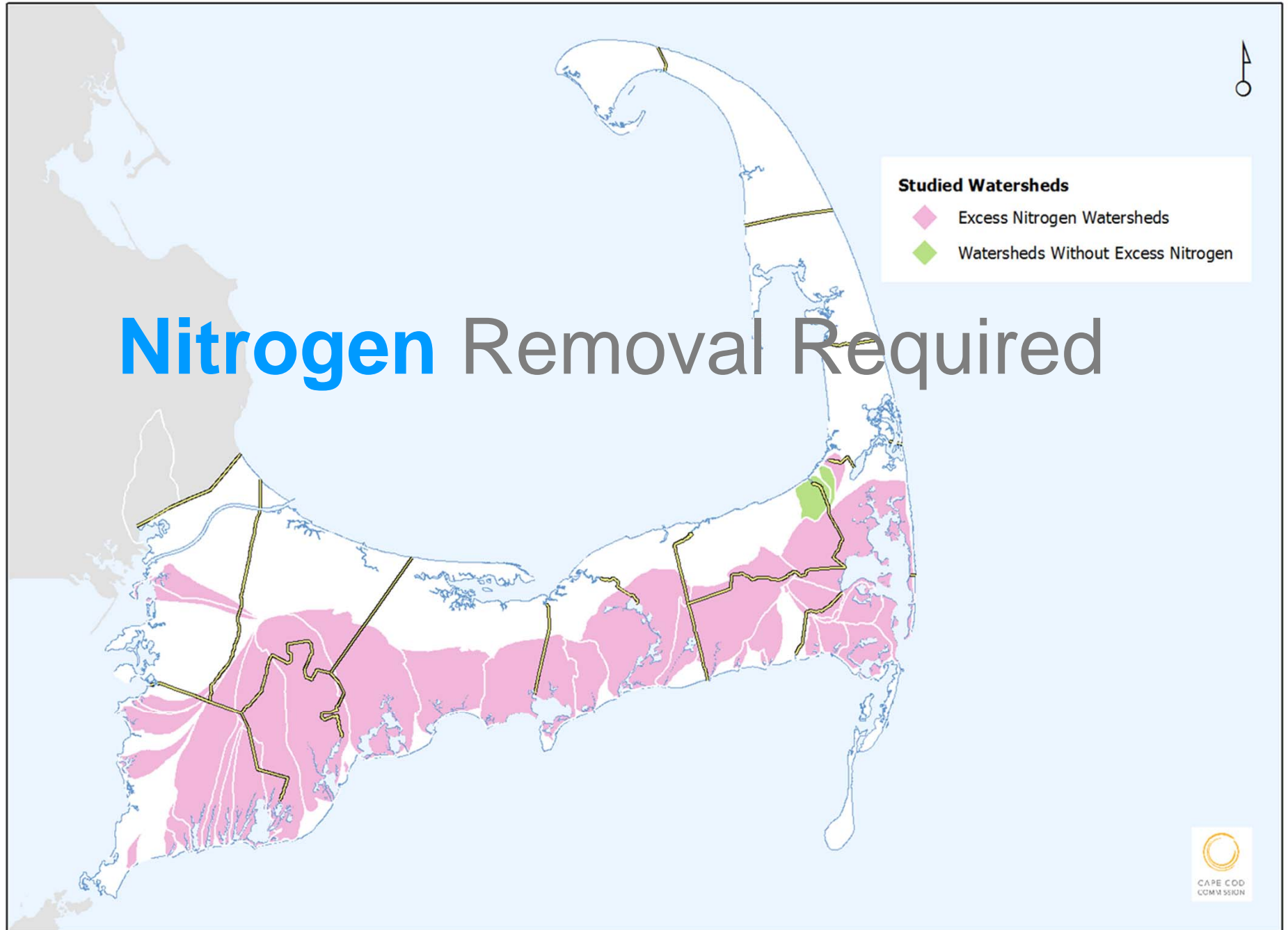
**Nitrogen:
Saline Waters**

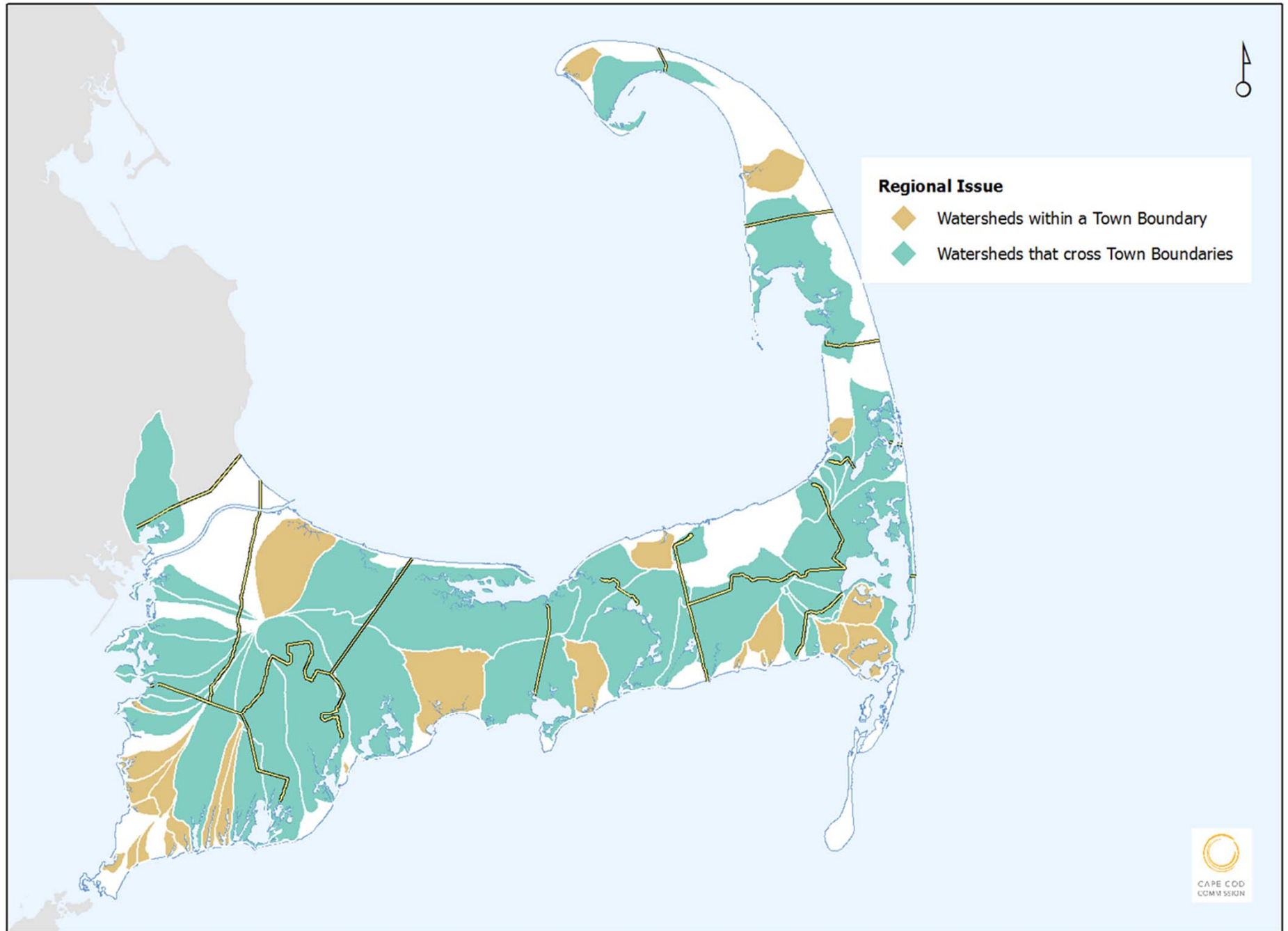
**Phosphorus:
Fresh Waters**

**Growth &
Title 5
Limitations**

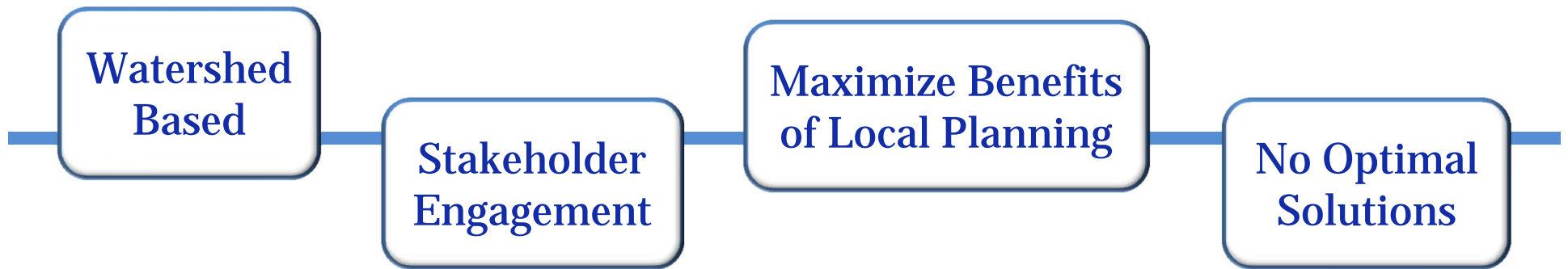






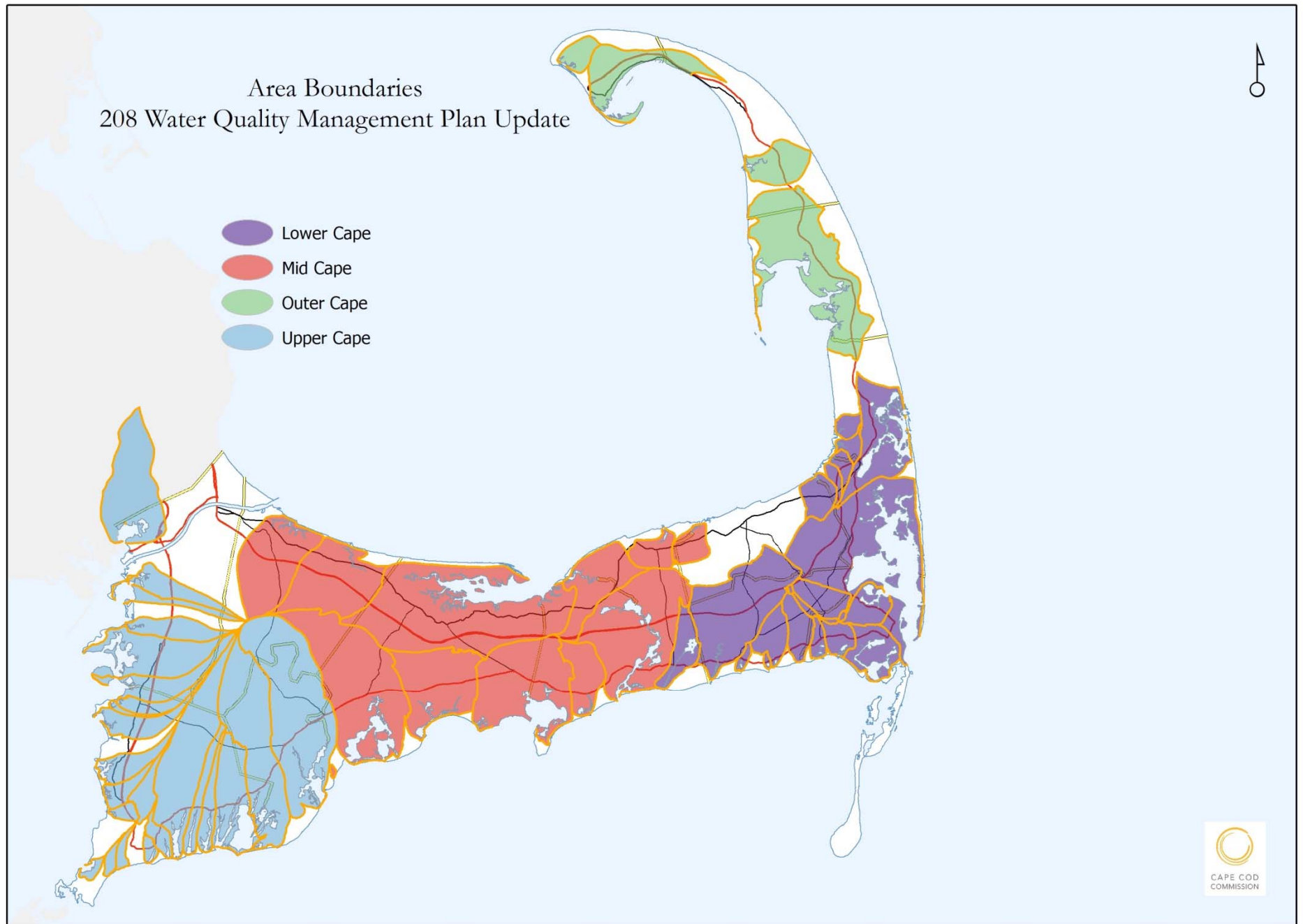


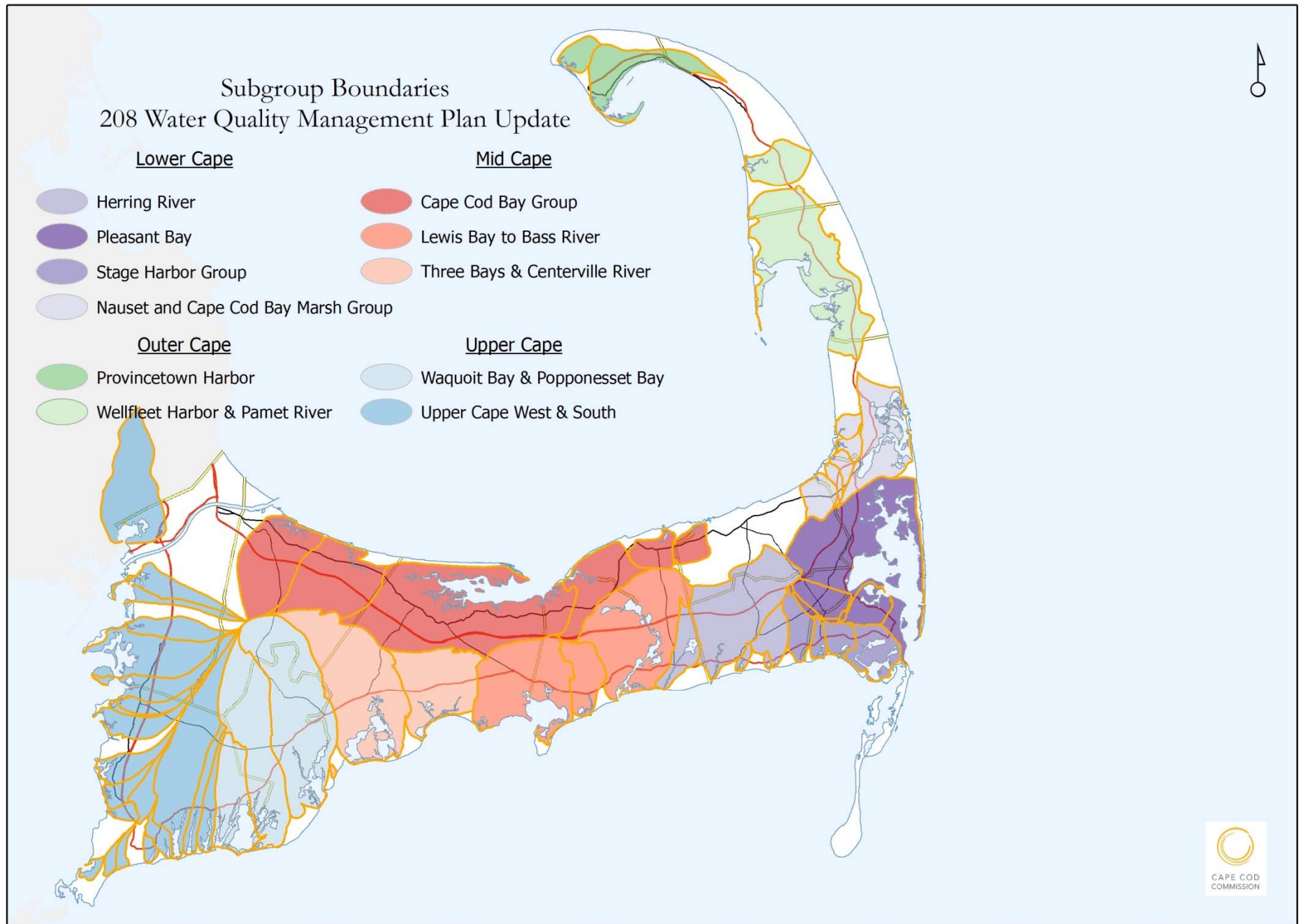
Approach to the 208 Plan Update



Goal:

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





What is the stakeholder process?

Public Meetings

Watershed Working Groups



July

August

September

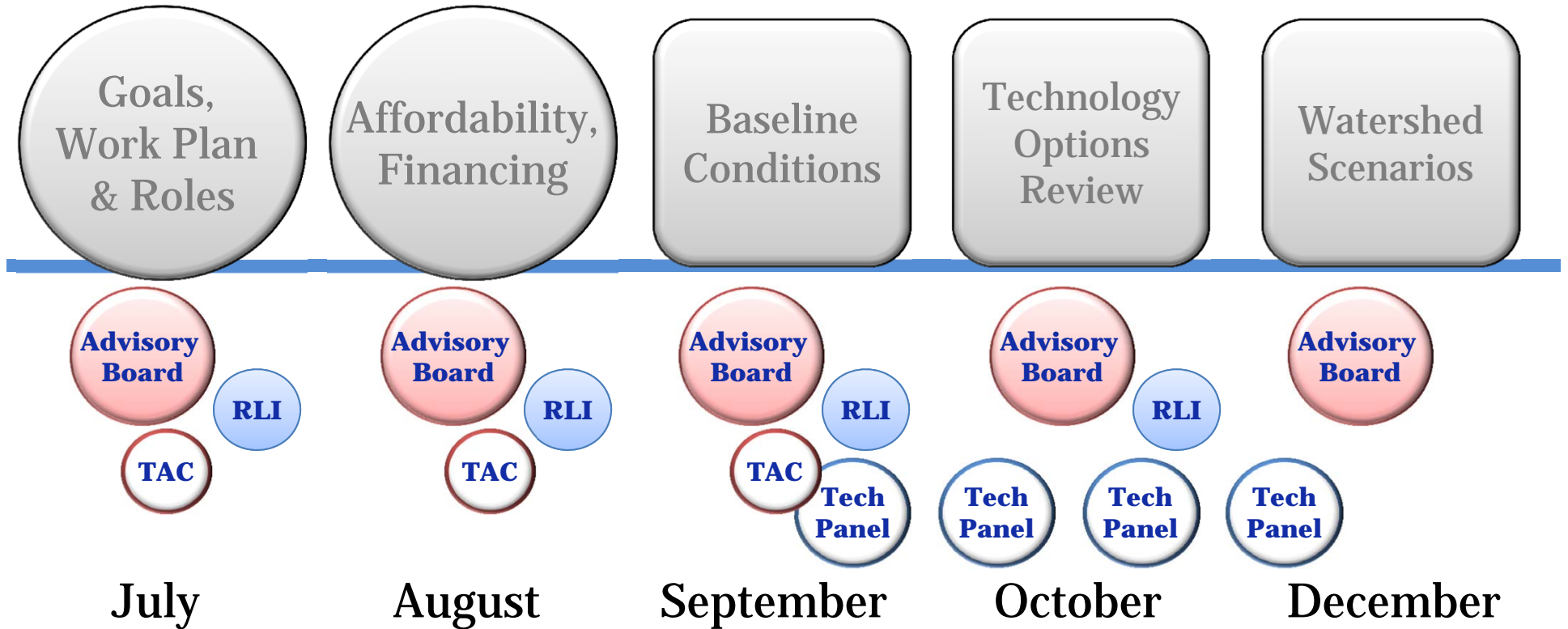
October

December

208 Planning Process

Public Meetings

Watershed Working Groups



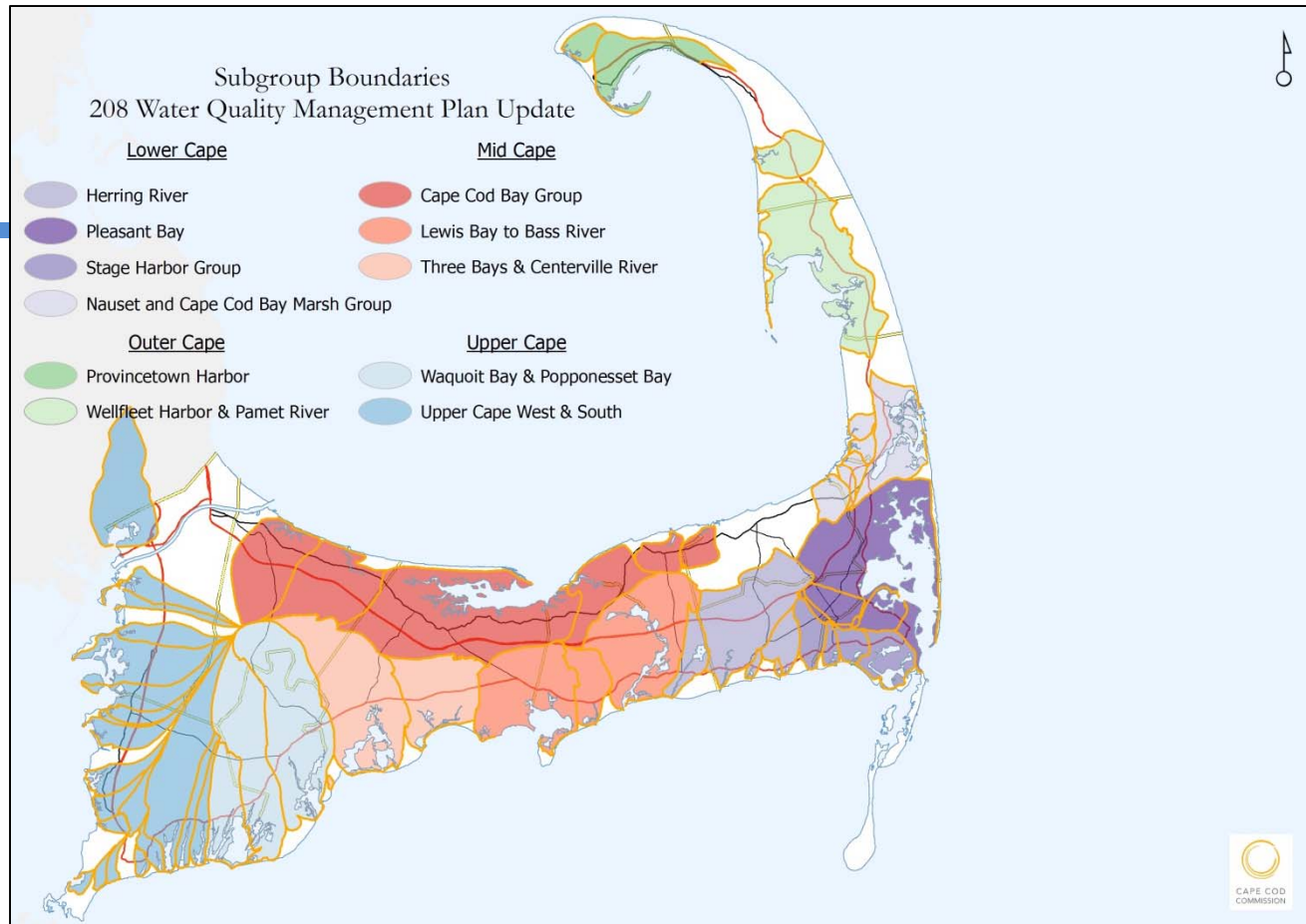
RLI Regulatory, Legal & Institutional Work Group

TAC Technical Advisory Committee of Cape Cod Water Protection Collaborative

208 Planning Process

Baseline Conditions

11 Working Group Meetings:
Sept 18-27



208 Planning Process

Baseline Conditions
 11 Working Group Meetings:
 Sept 18-27

Technology Options Review
 11 Working Group Meetings:
 Oct 21-Nov 5



● Wastewater
● Stormwater
● Existing Water Bodies
● Regulatory

208 Planning Process

Baseline
Conditions

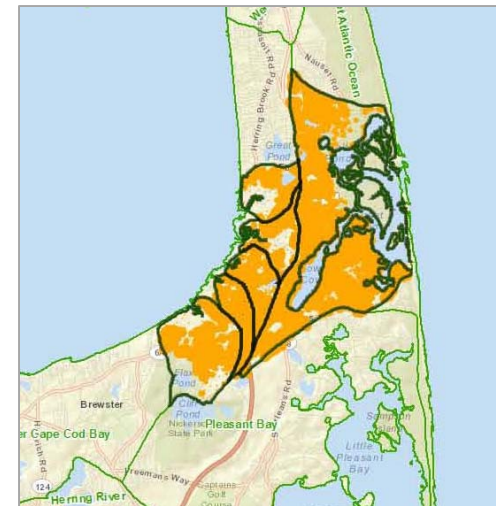
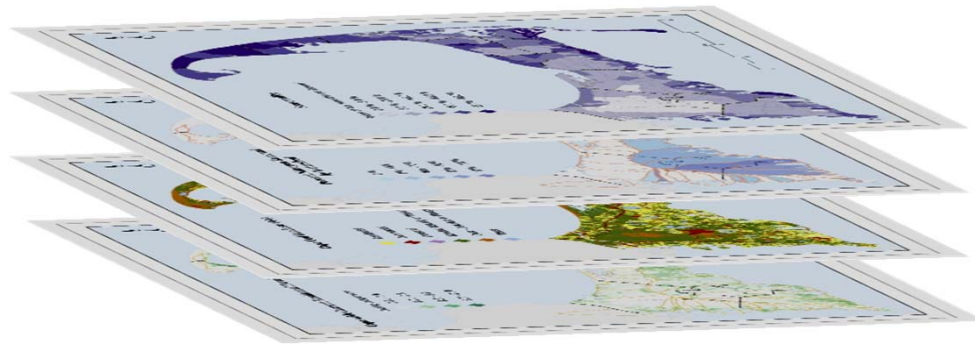
11 Working
Group Meetings:
Sept 18-27

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**

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

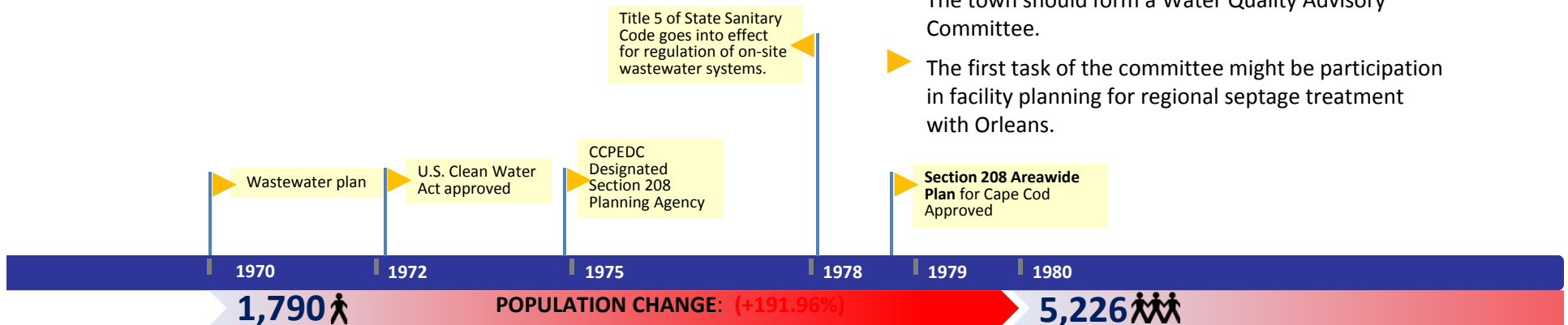


Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh

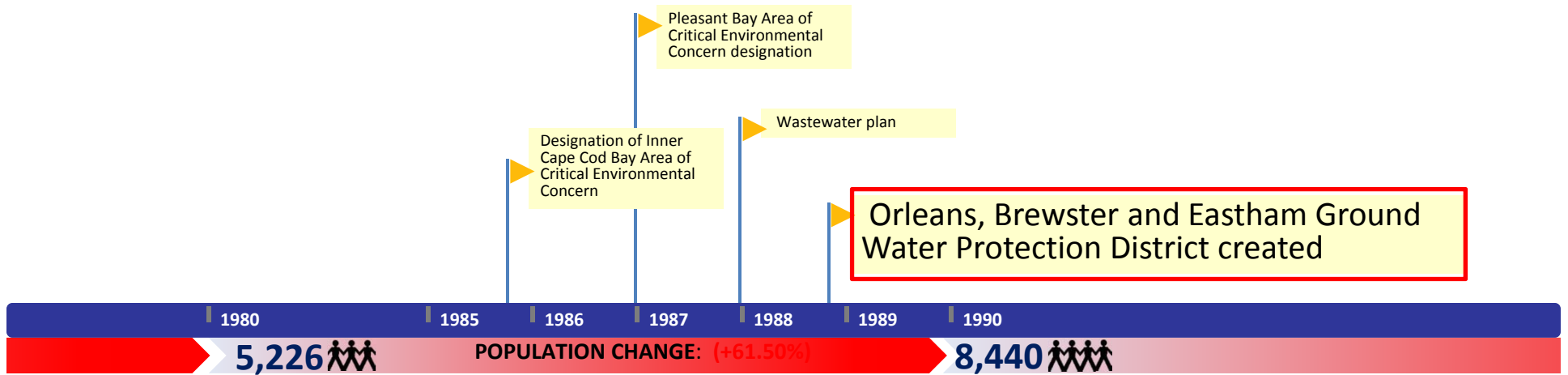
Brewster

From 1978 Section 208 Plan

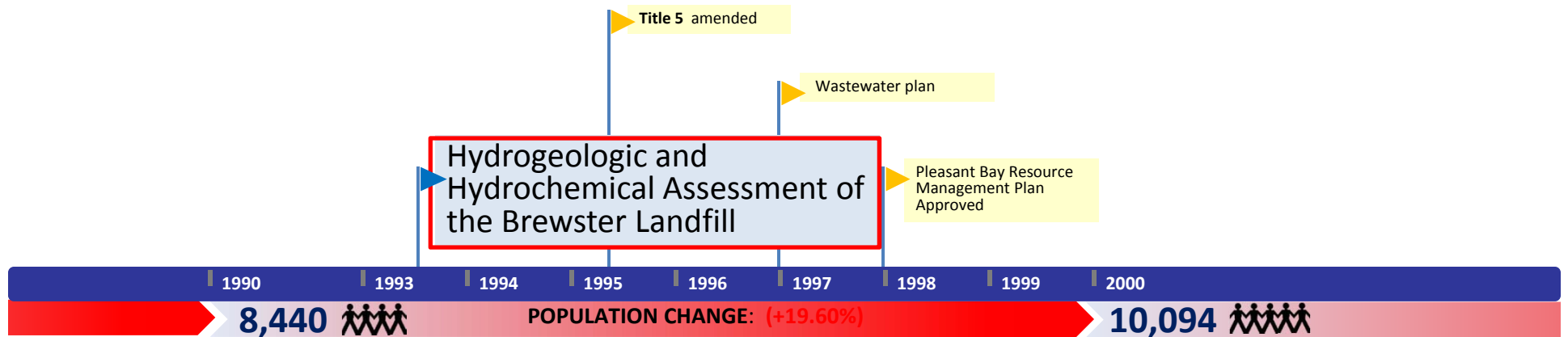
- ▶ Present and future town well sites should be protected from the non-point sources resulting from New development by creating Watershed Protection Districts.
- ▶ The town should cooperate in regional water supply planning to determine future water supply needs of neighboring towns and whether it can 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.



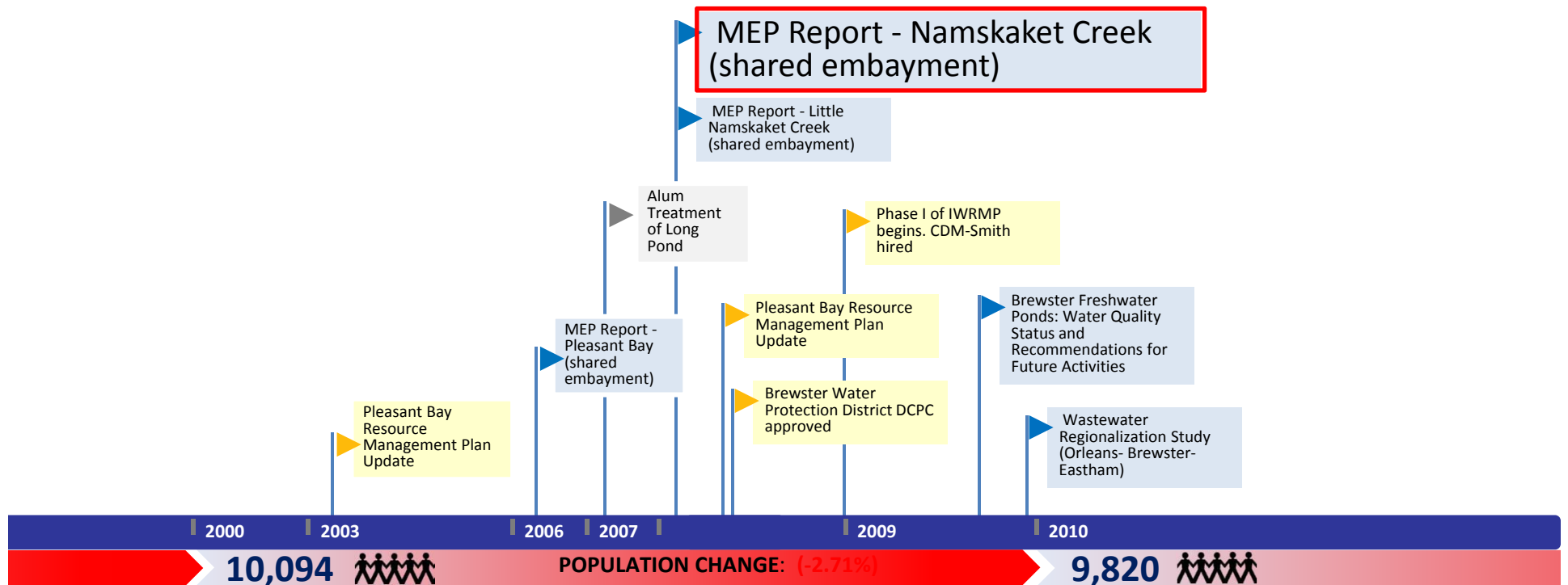
Brewster: 1970-2013



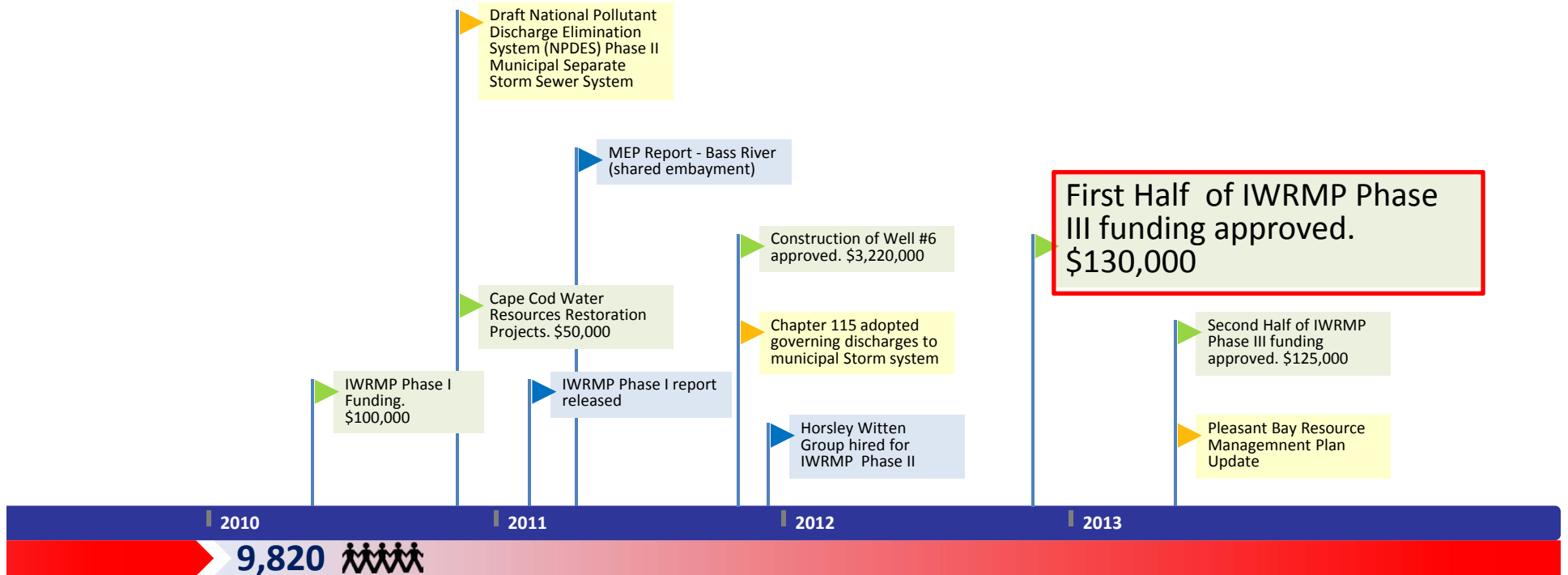
Brewster: 1970-2013



Brewster: 1970-2013



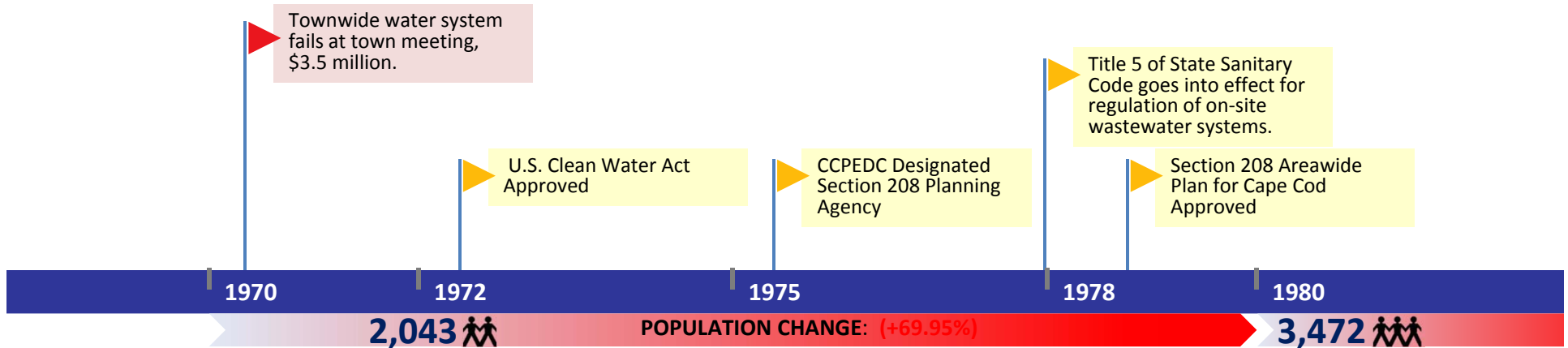
Brewster: 1970-2013



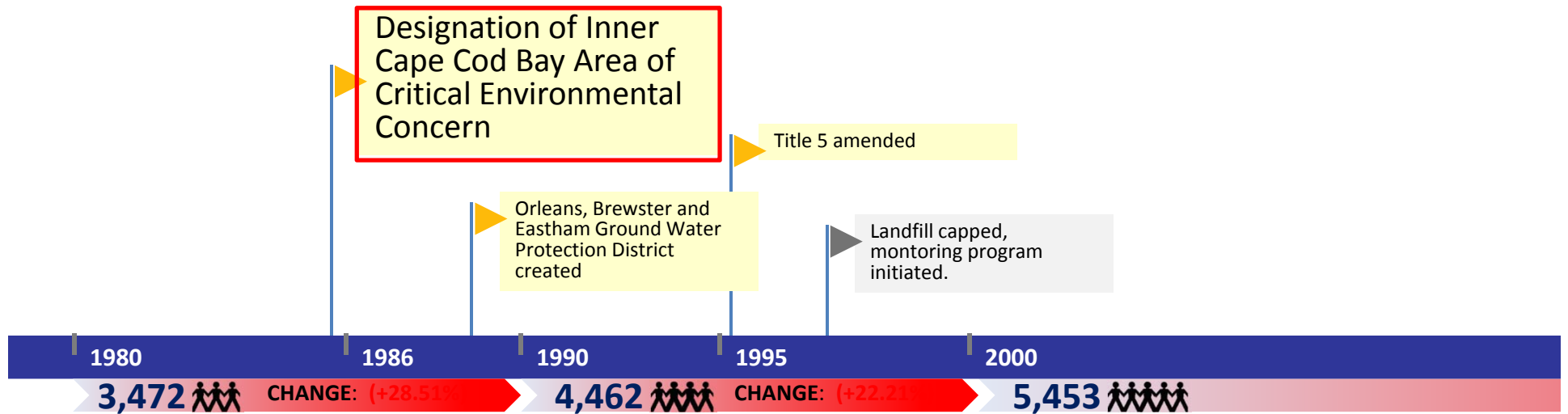
Eastham

From 1978 Section 208 Plan

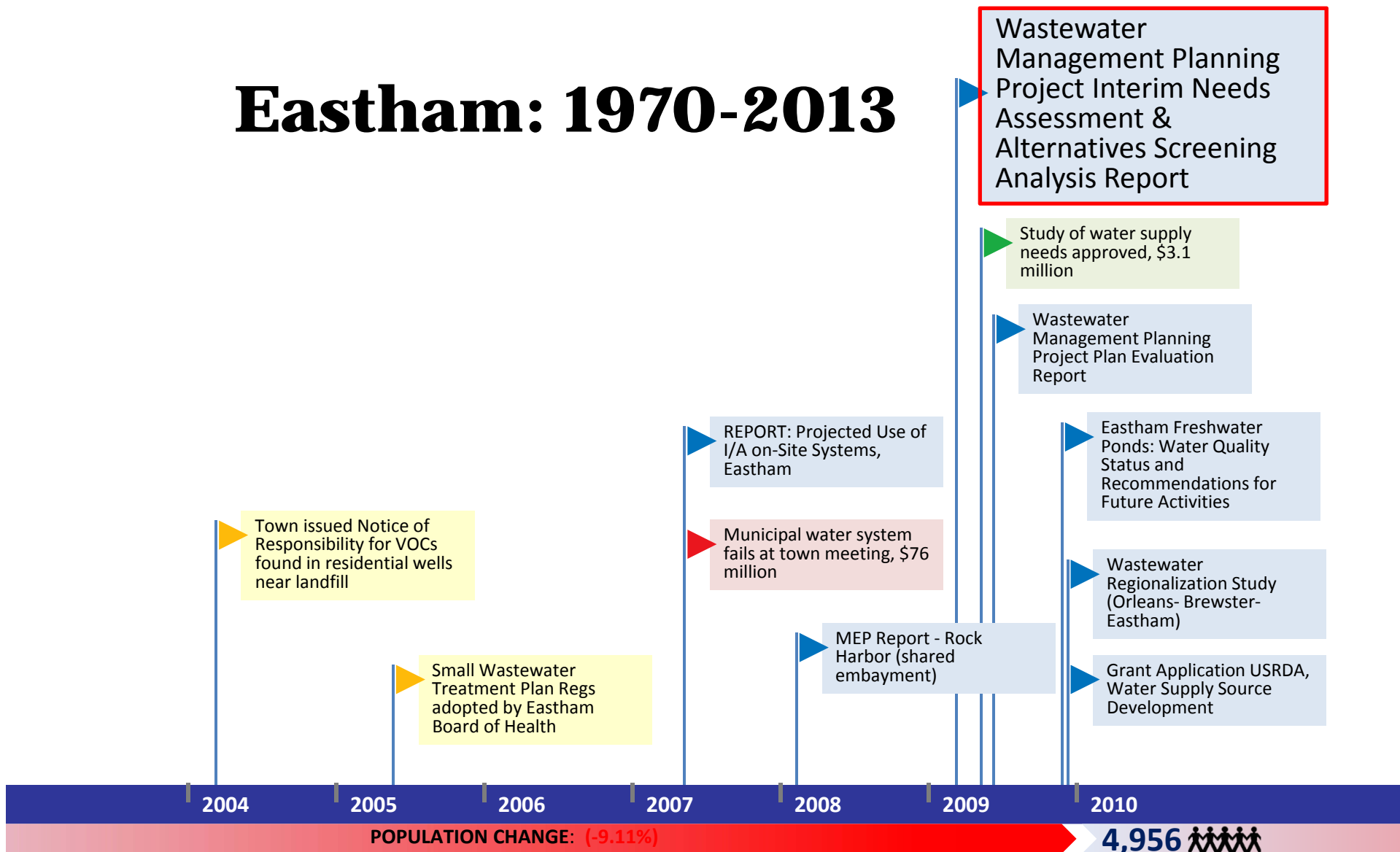
- ▶ Eastham should give priority to improving Title 5 enforcement and controlling conversion of seasonal dwellings.
- ▶ The town should work with CCPEDC to implement a Seasonal Residential District for the western shore of Eastham.
- ▶ Water supply is also of concern in Eastham. The high density areas and the town's present 20,000 square foot minimum lot size are not considered to provide adequate protection of private wells.
- ▶ It is suggested that the town begin to implement its water supply plan in the near future to serve densely populated areas, and areas around the town landfill.
- ▶ The town should install water table wells around the existing landfill to determine the probable direction of groundwater flow from the site.
- ▶ Further studies in cooperation with USGS may be necessary to locate the plume, since public water is not available and development is encroaching on the landfill area.
- ▶ The town should join regional waste disposal planning efforts in the hopes that a regional solution will be available before the existing site is exhausted.
- ▶ Eastham should join with Orleans in construction of a regional septage facility.



Eastham: 1970-2013

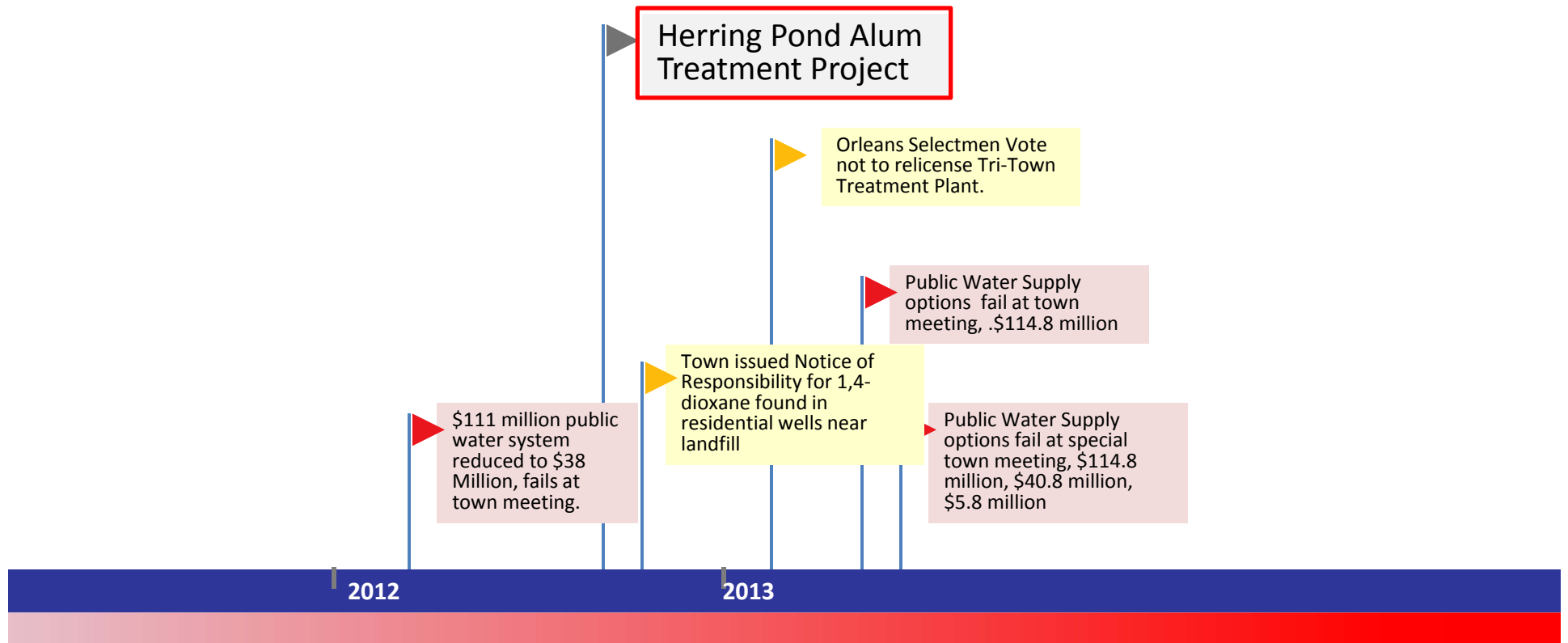


Eastham: 1970-2013



POPULATION: 4,956
(-9.11%)

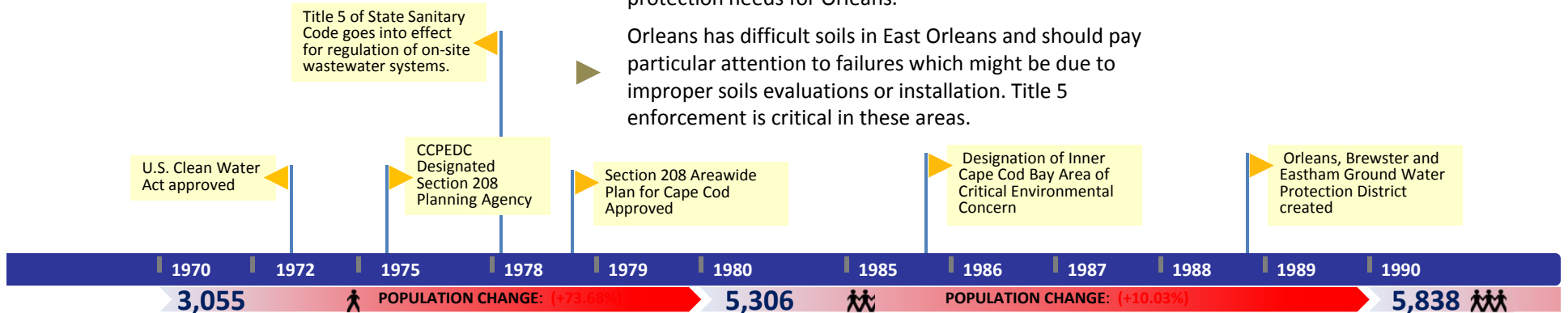
Eastham: 1970-2013



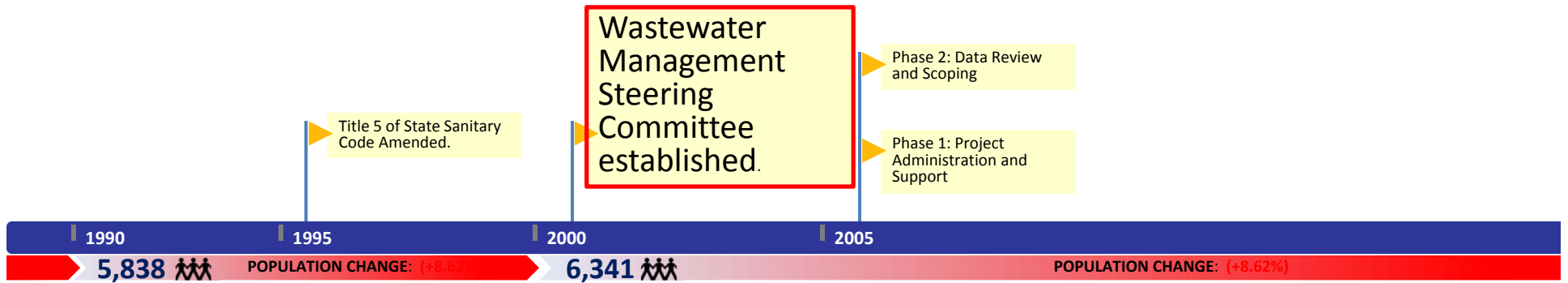
Orleans

From 1978 Section 208 Plan

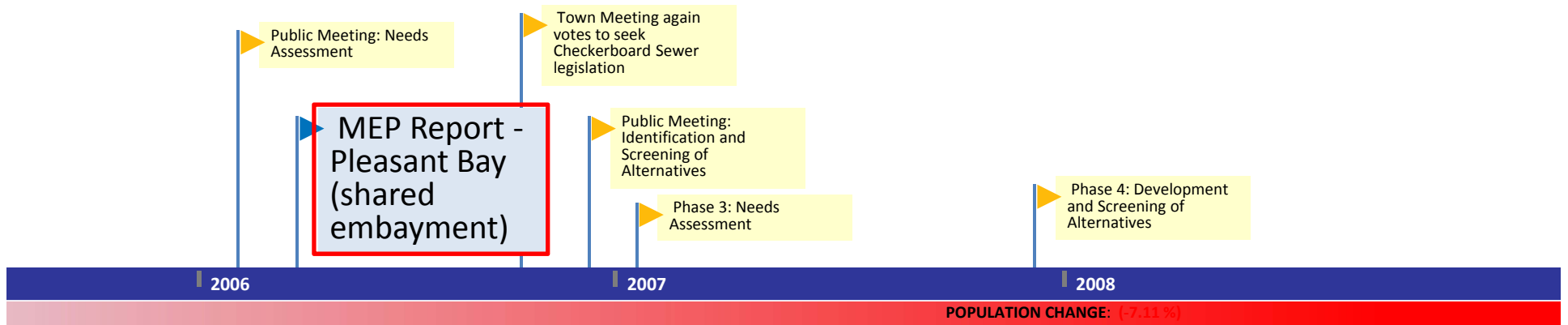
- ▶ The major problems in Orleans at present are septage management, failing systems in the town center, and protection of water quality in the municipal wells.
- ▶ Orleans is one of the first towns on the Cape to take positive action to abate the serious problems posed by septage disposal.
- ▶ A scope of work that would adequately address the problems in downtown Orleans, which may need to be sewerred with a small neighborhood system was developed.
- ▶ The scope of work considered regionalized septage treatment with Eastham and Brewster.
- ▶ The actual landfill plume location has not been determined. This is critical if the site is to be used as a septage disposal site in the future.
- ▶ A coordinated land use analysis coordinated with Brewster is necessary to determine watershed protection needs for Orleans.
- ▶ Orleans has difficult soils in East Orleans and should pay particular attention to failures which might be due to improper soils evaluations or installation. Title 5 enforcement is critical in these areas.



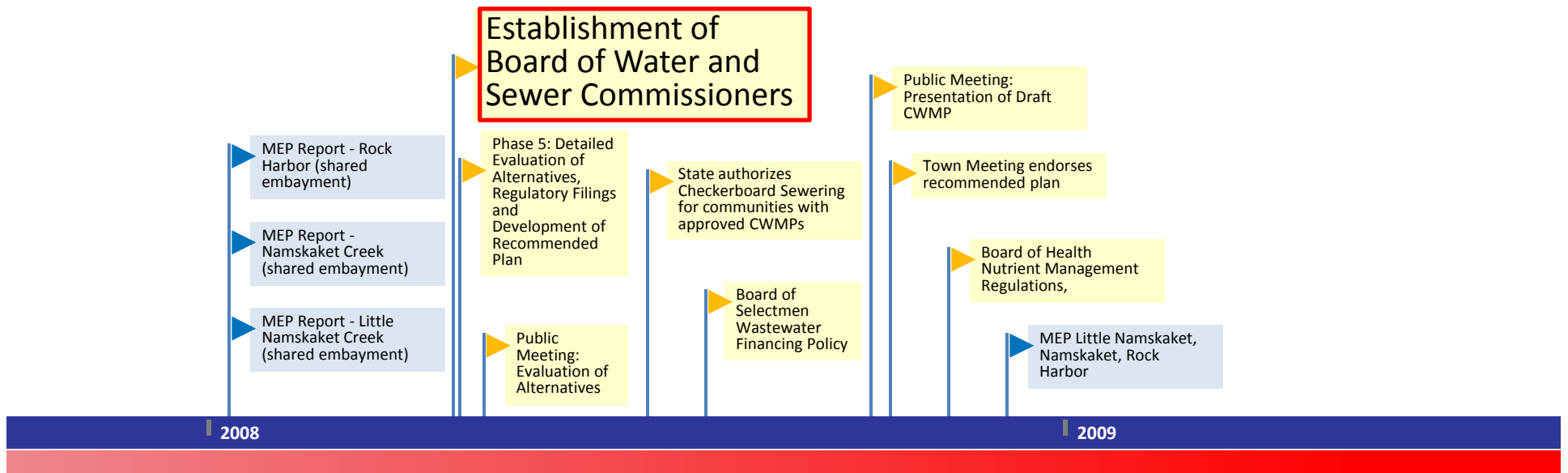
Orleans: 1970-2013



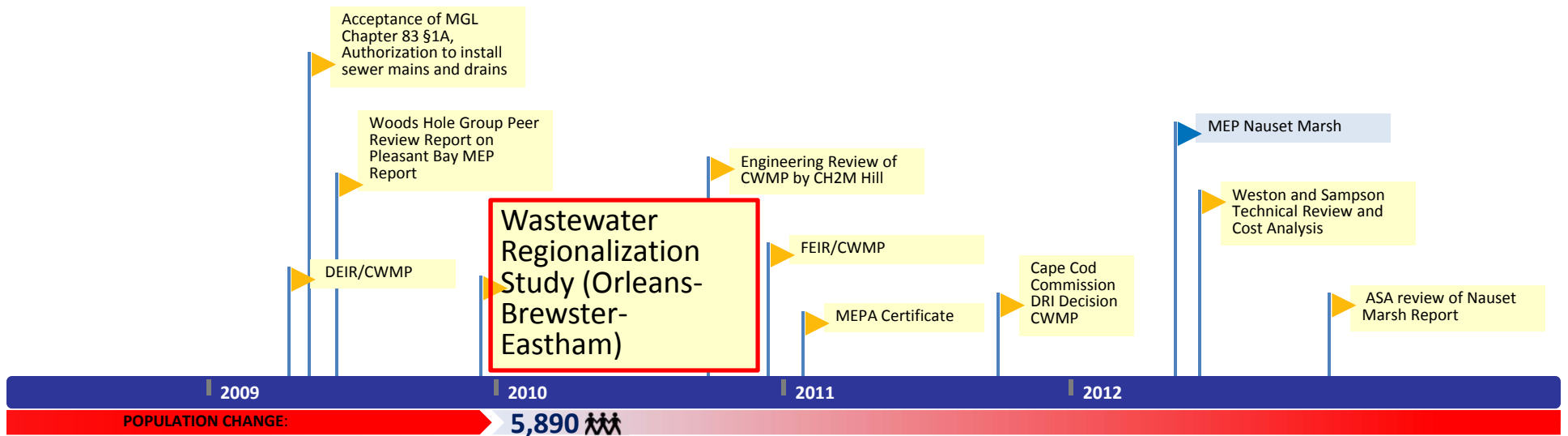
Orleans: 1970-2013



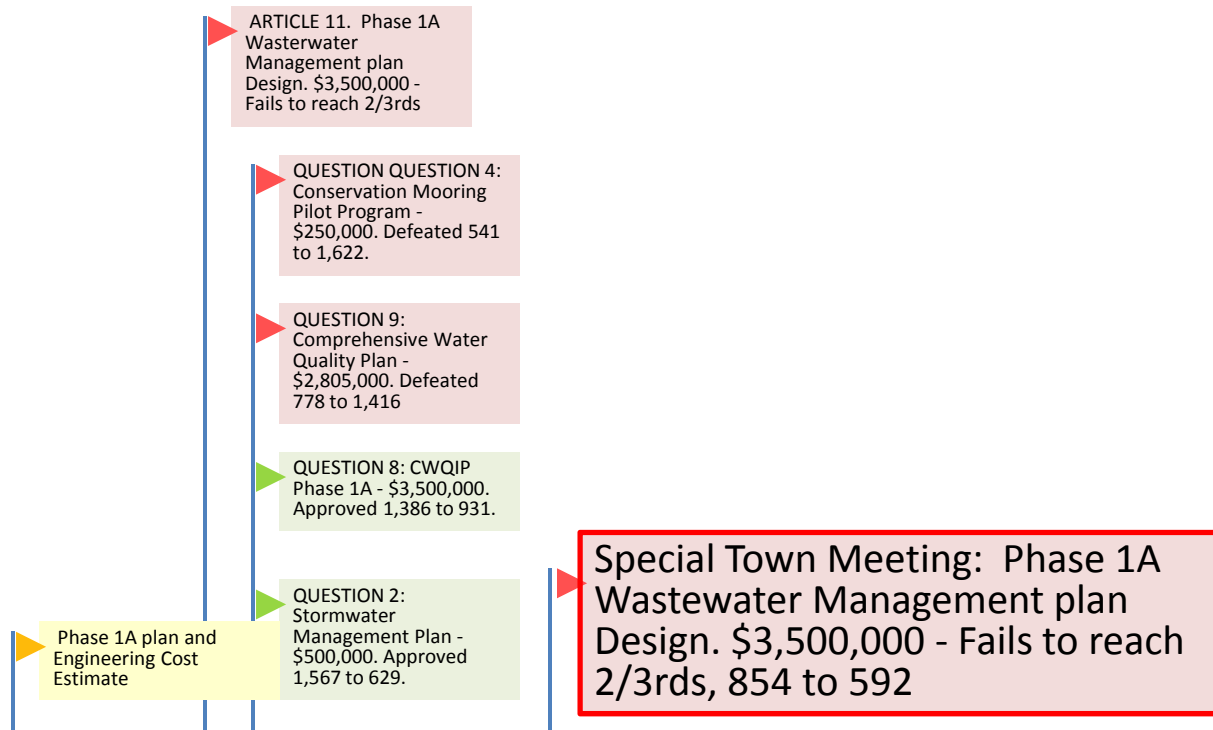
Orleans: 1970-2013



Orleans: 1970-2013



Orleans: 1970-2013



Did we miss anything?

Your Watersheds



Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh









Natural Features


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


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


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


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

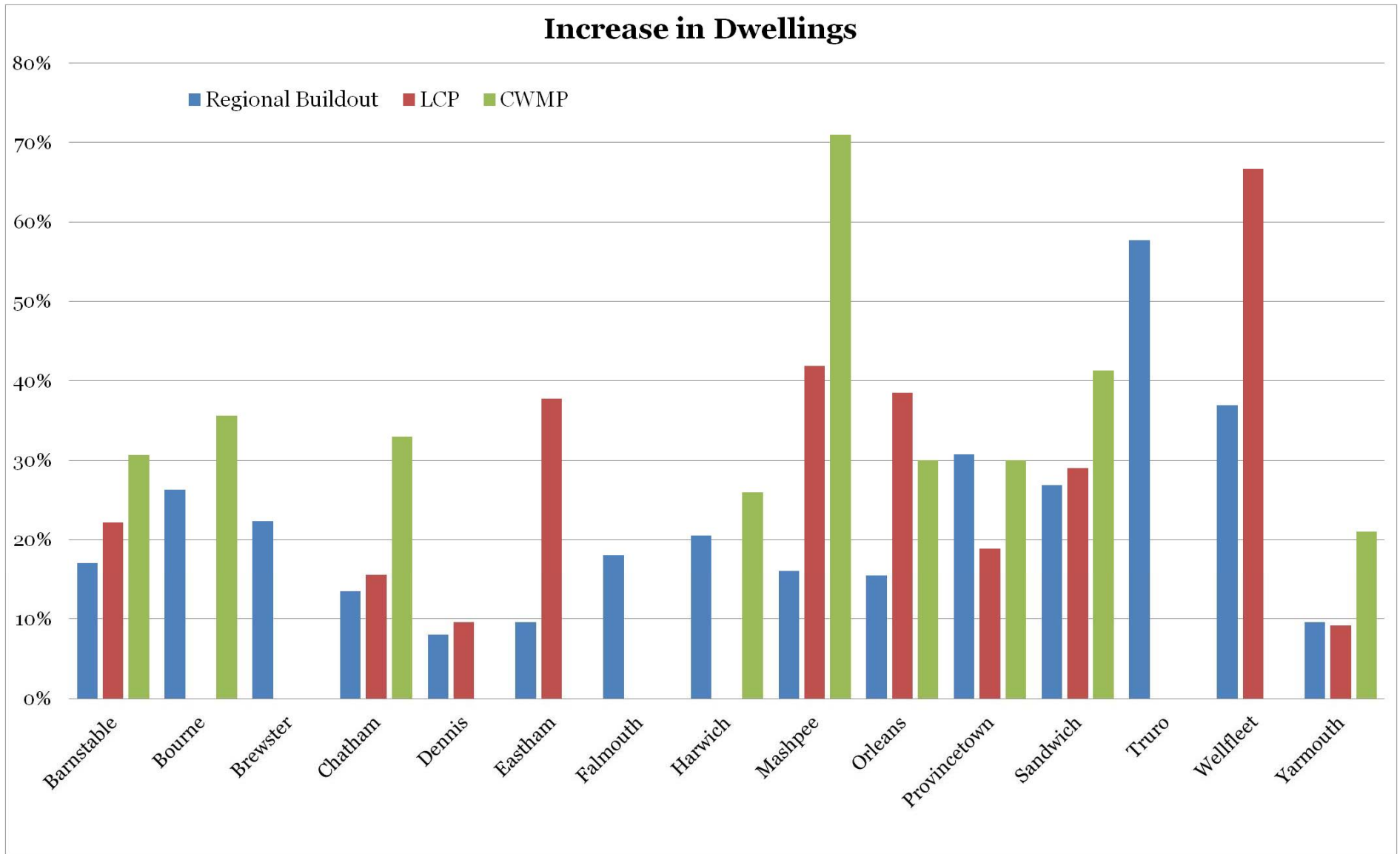
 Open - Disturbed or Managed

 Water

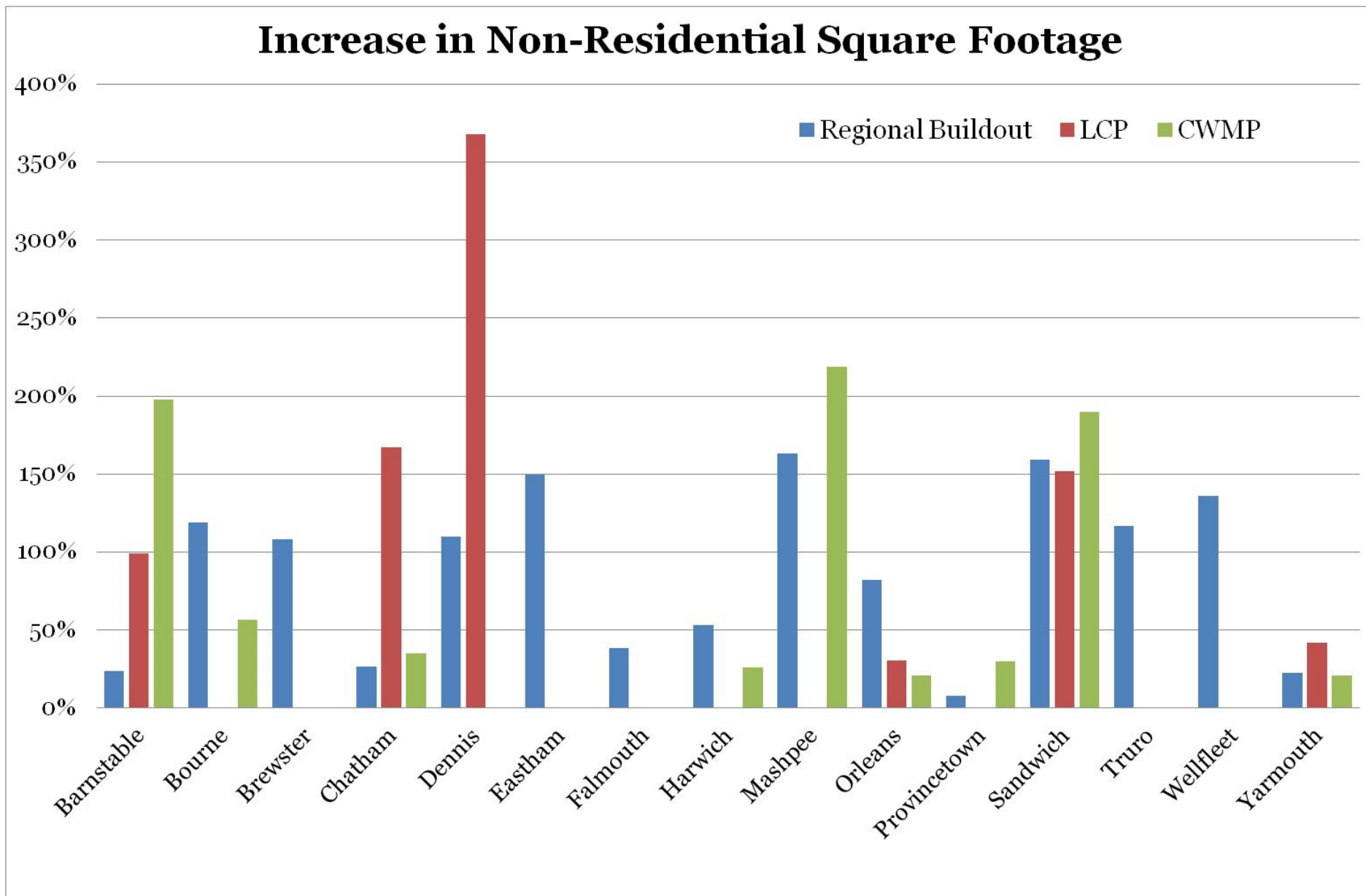
Density

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

Buildout



Buildout

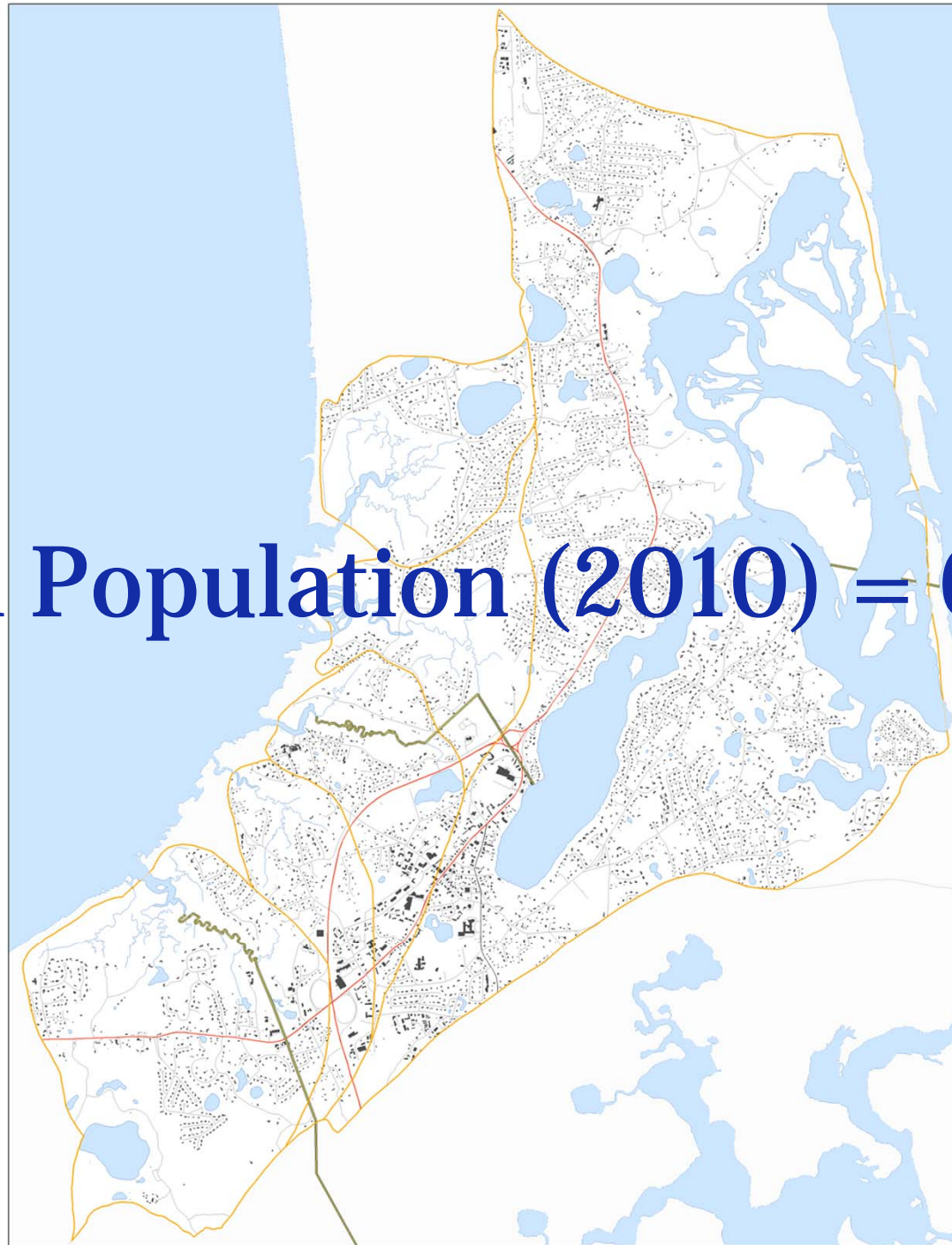


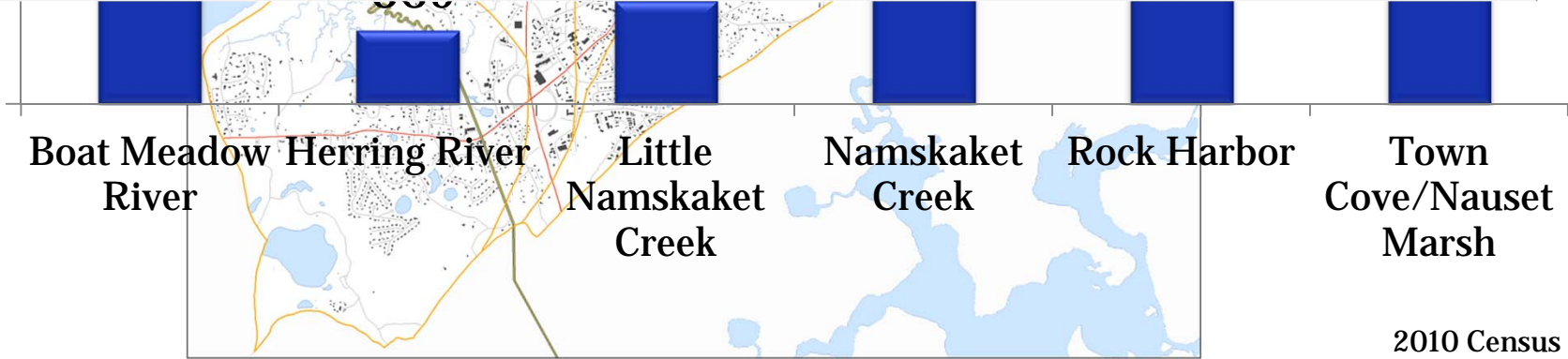
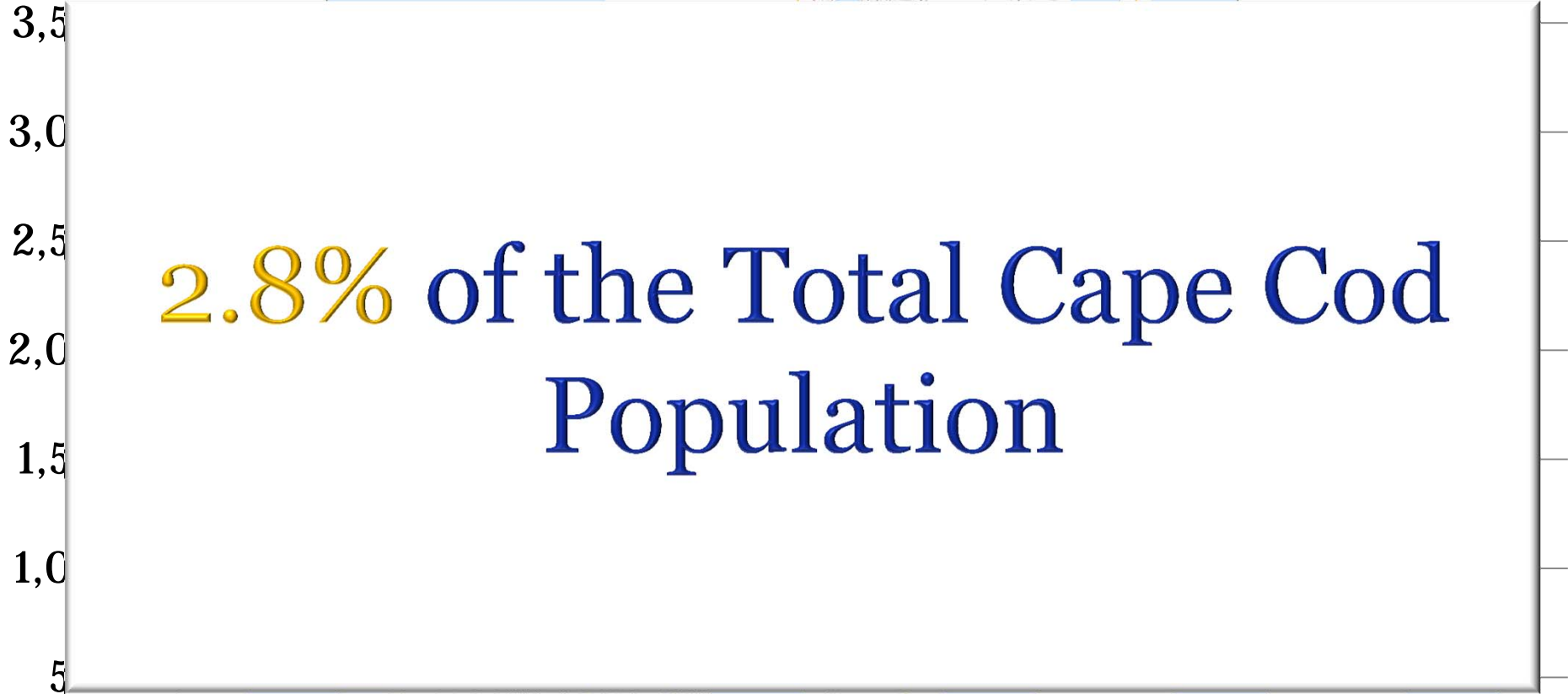
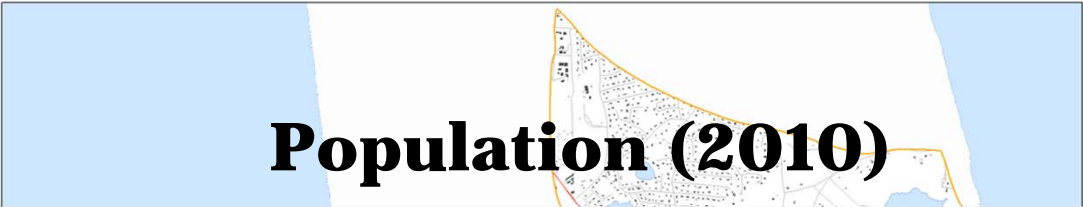
The People

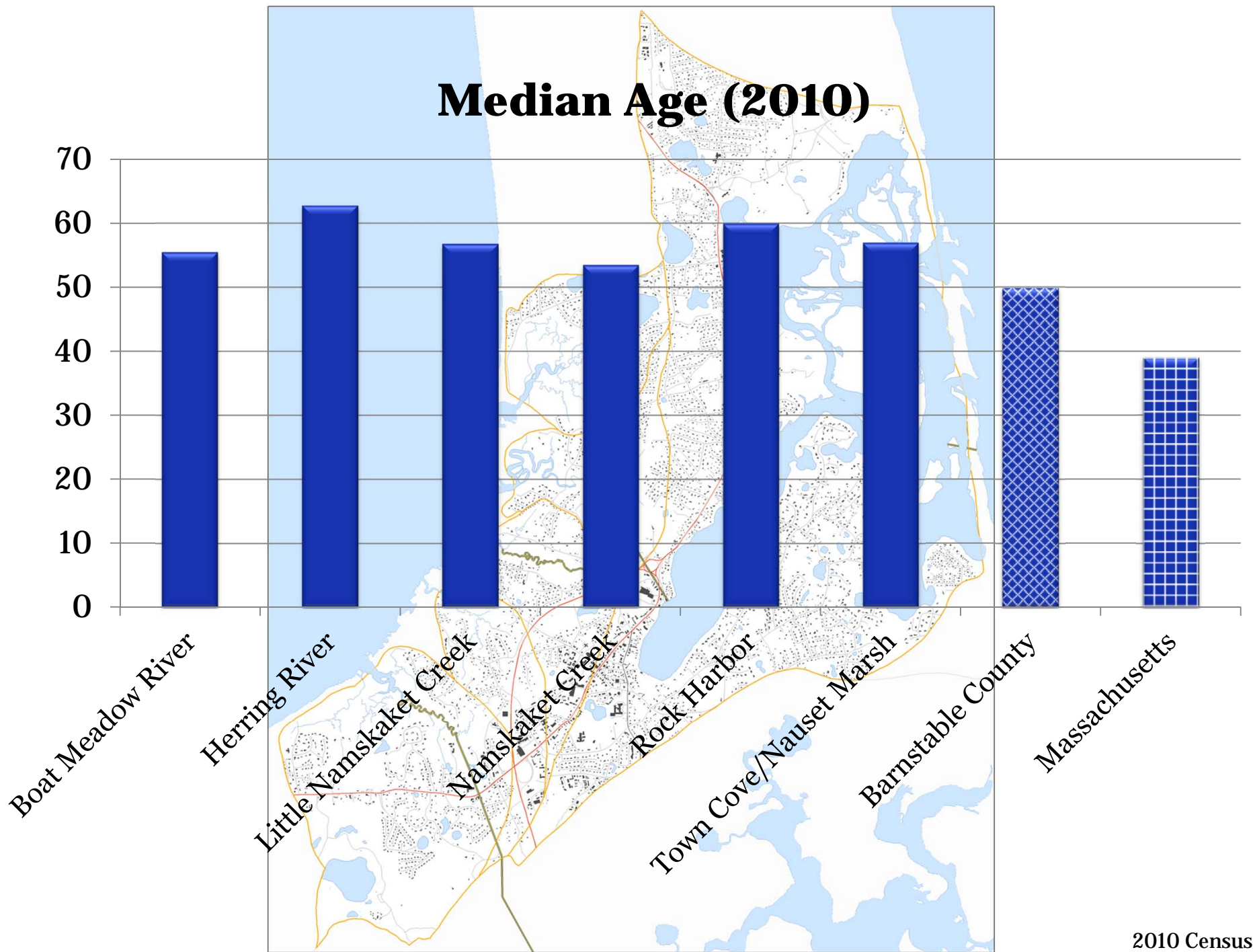


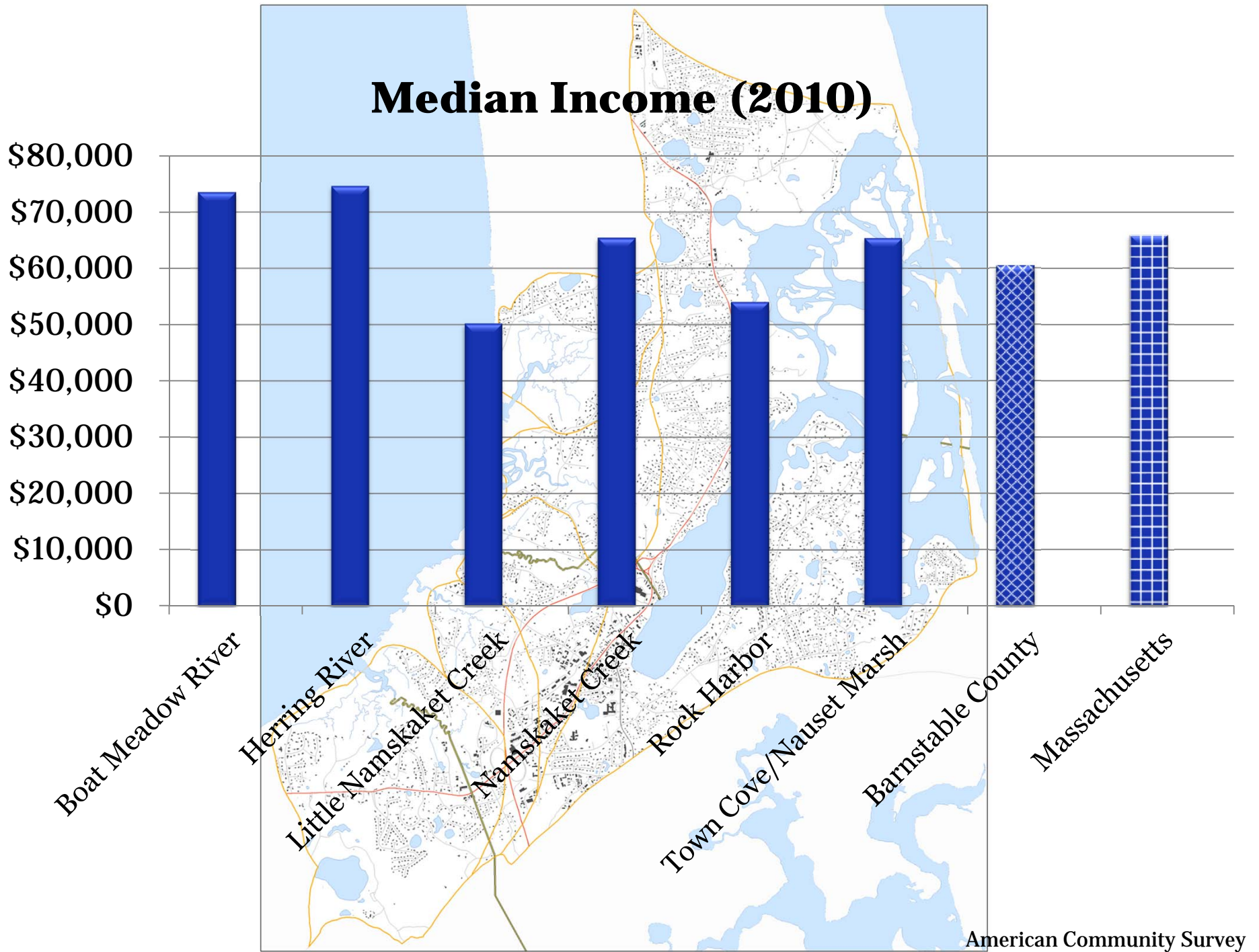
Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh

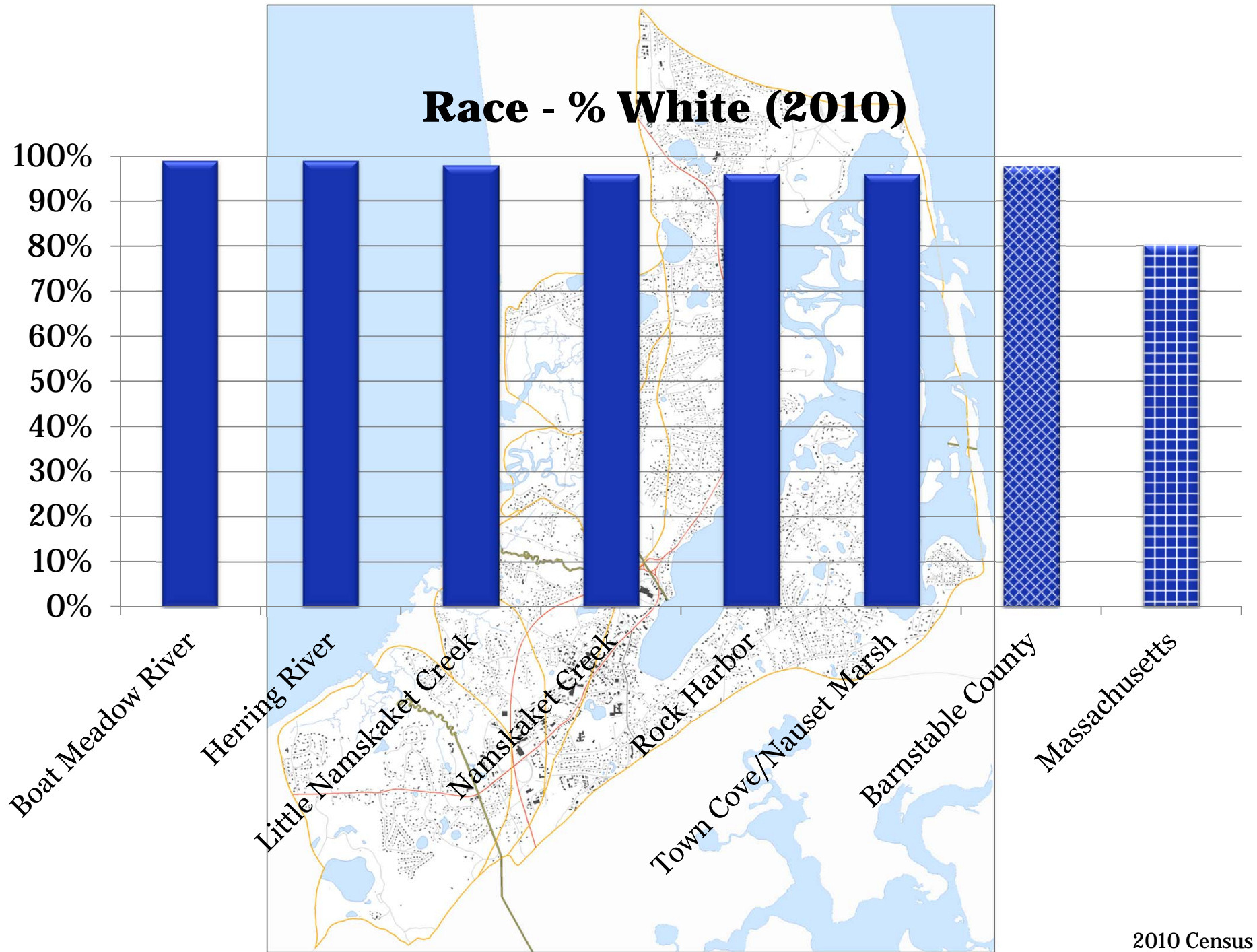
Total Population (2010) = 6,220



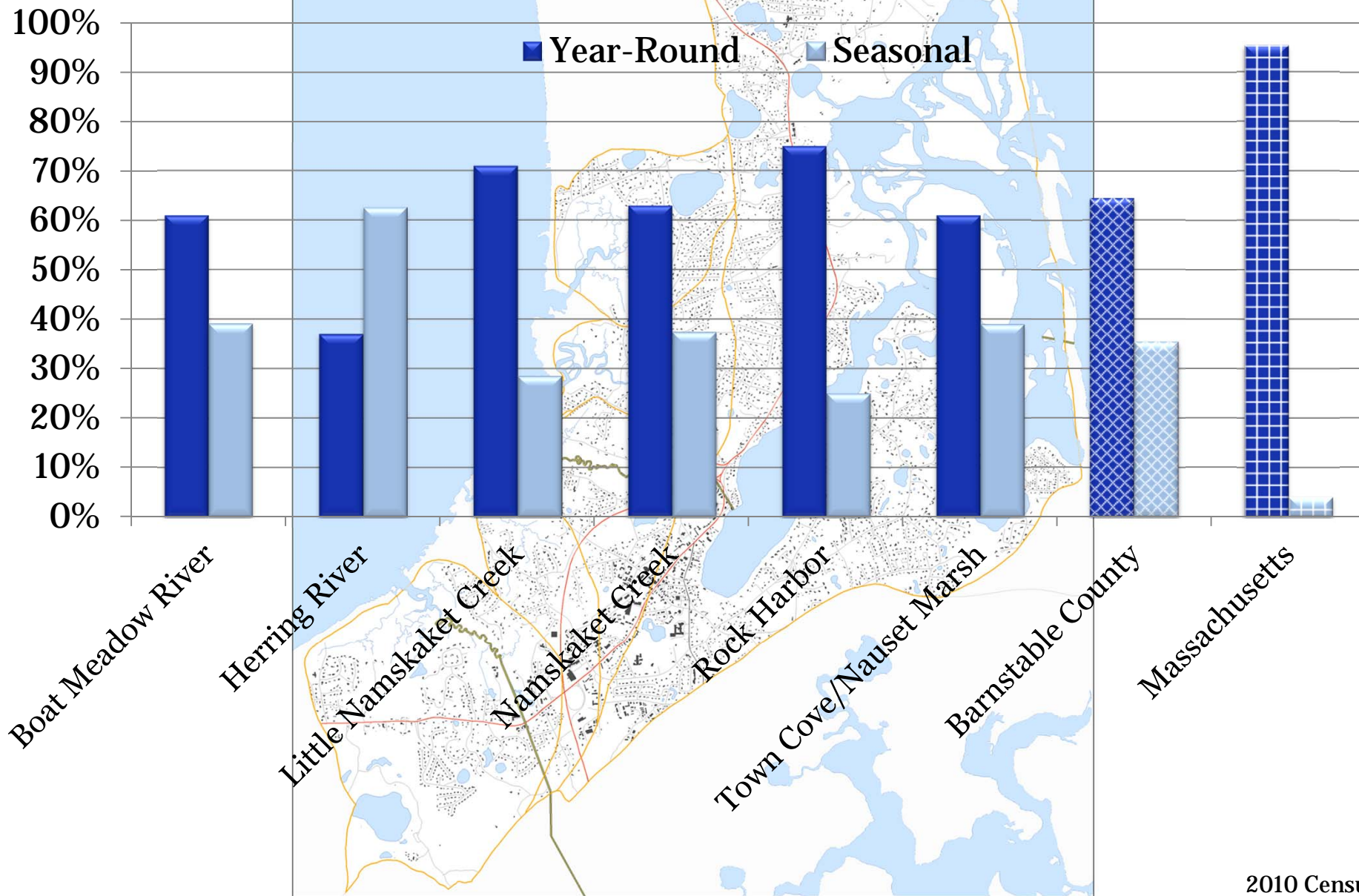




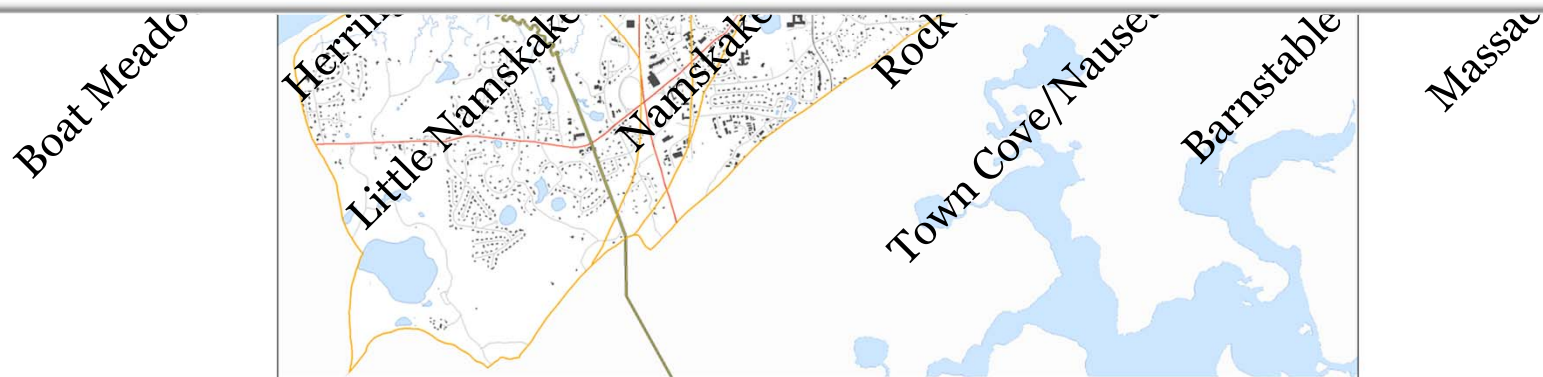




Seasonal vs. Year Round Housing (2010)



Average Assessed Home Value (2010)



Your Government & Taxes



Boat Meadow River

Herring River

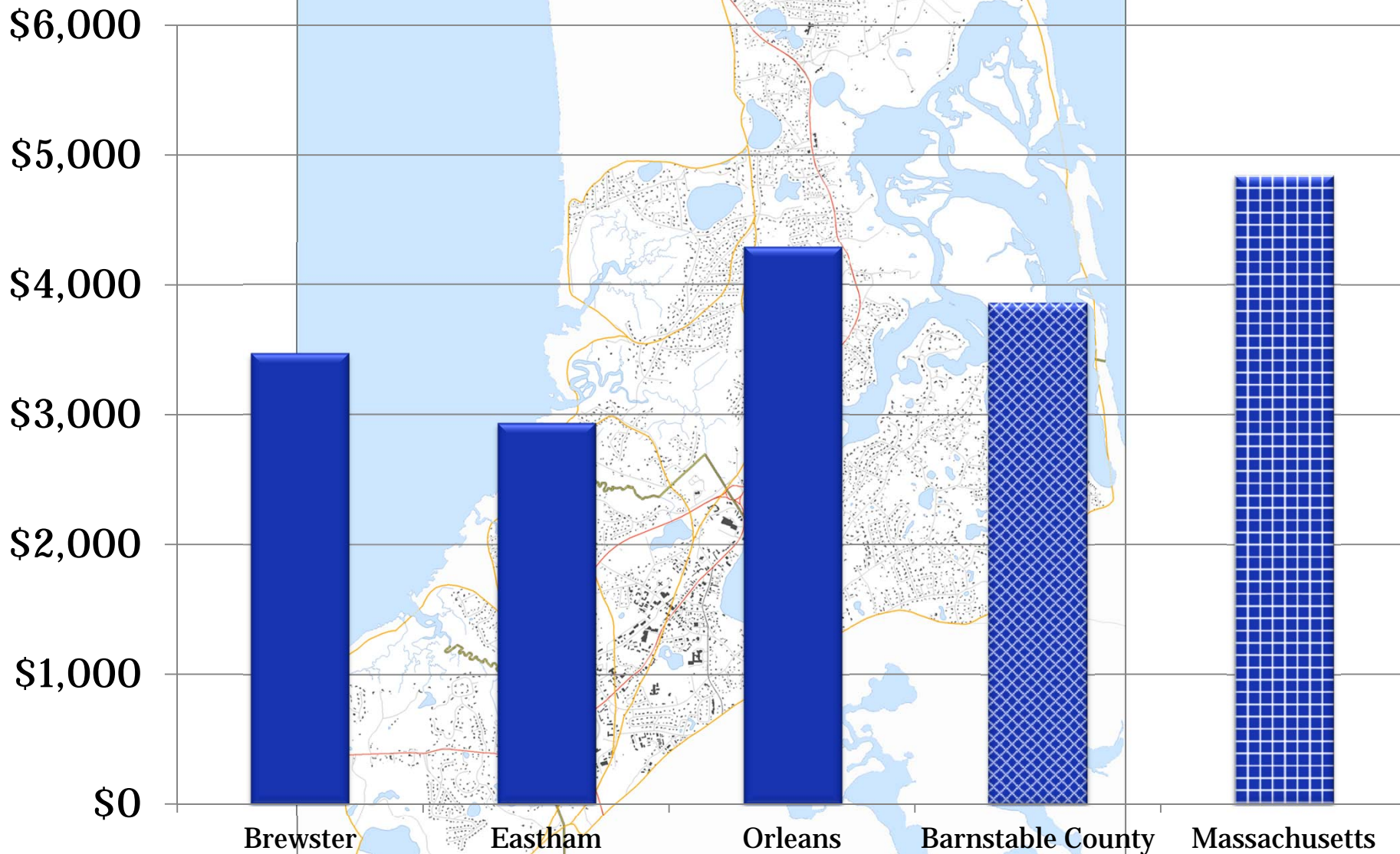
Little Namskaket Creek

Namskaket Creek

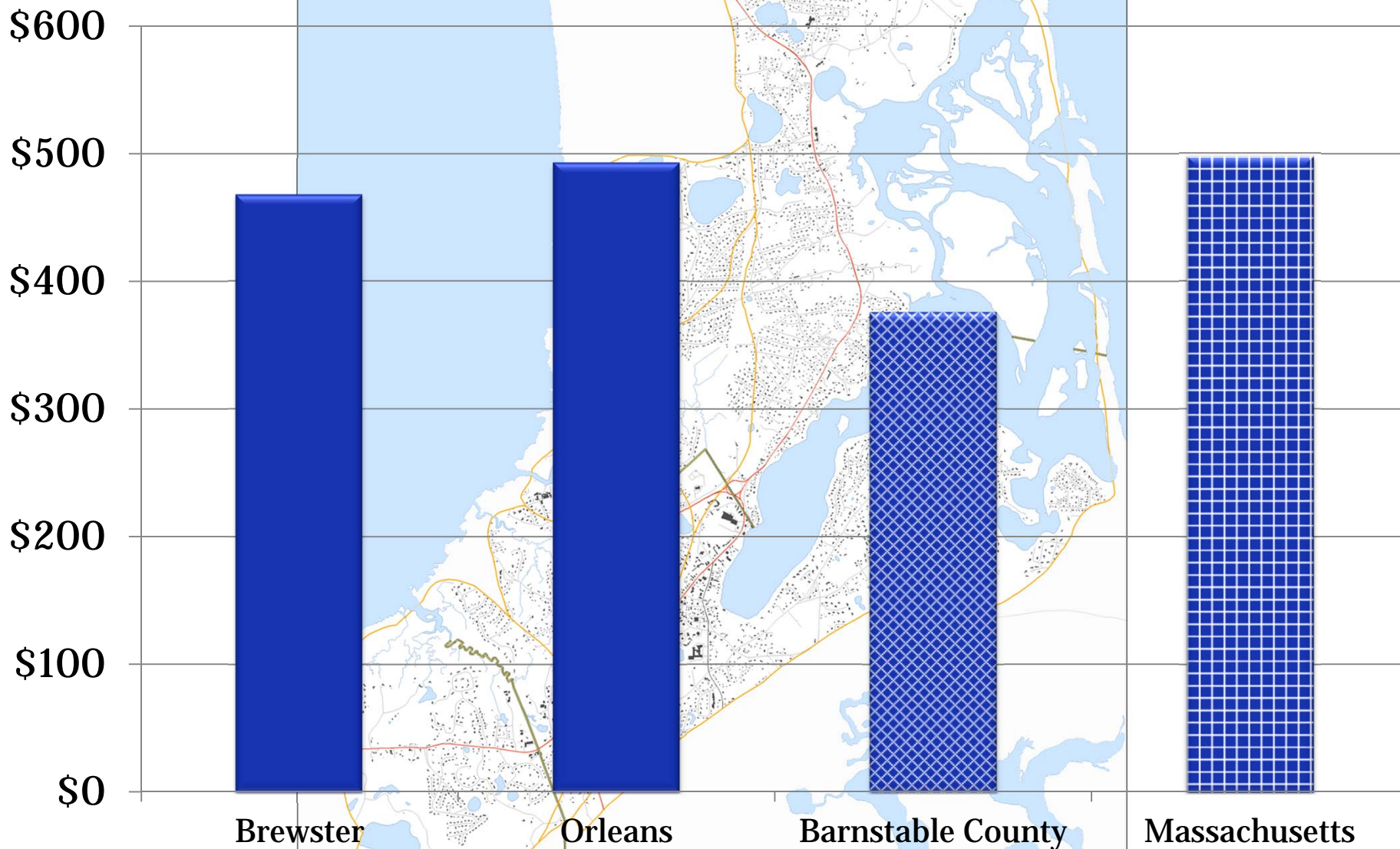
Rock Harbor

Town Cove/Nauset Marsh

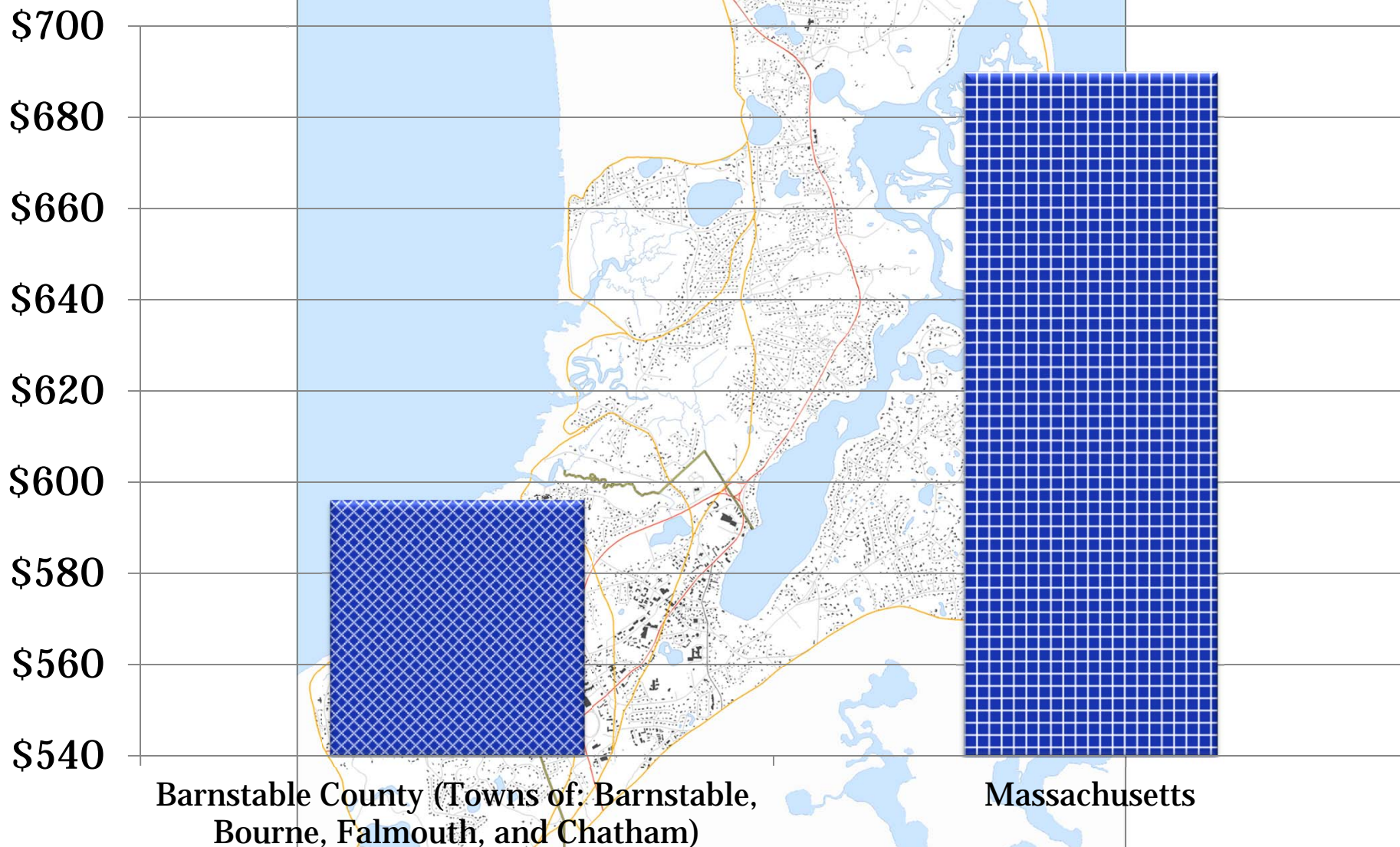
Average Single Family Property Tax Bill (2013)



Average Annual Water Bill (2012)



Average Annual Sewer Bill (2012)



The Problem



Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh

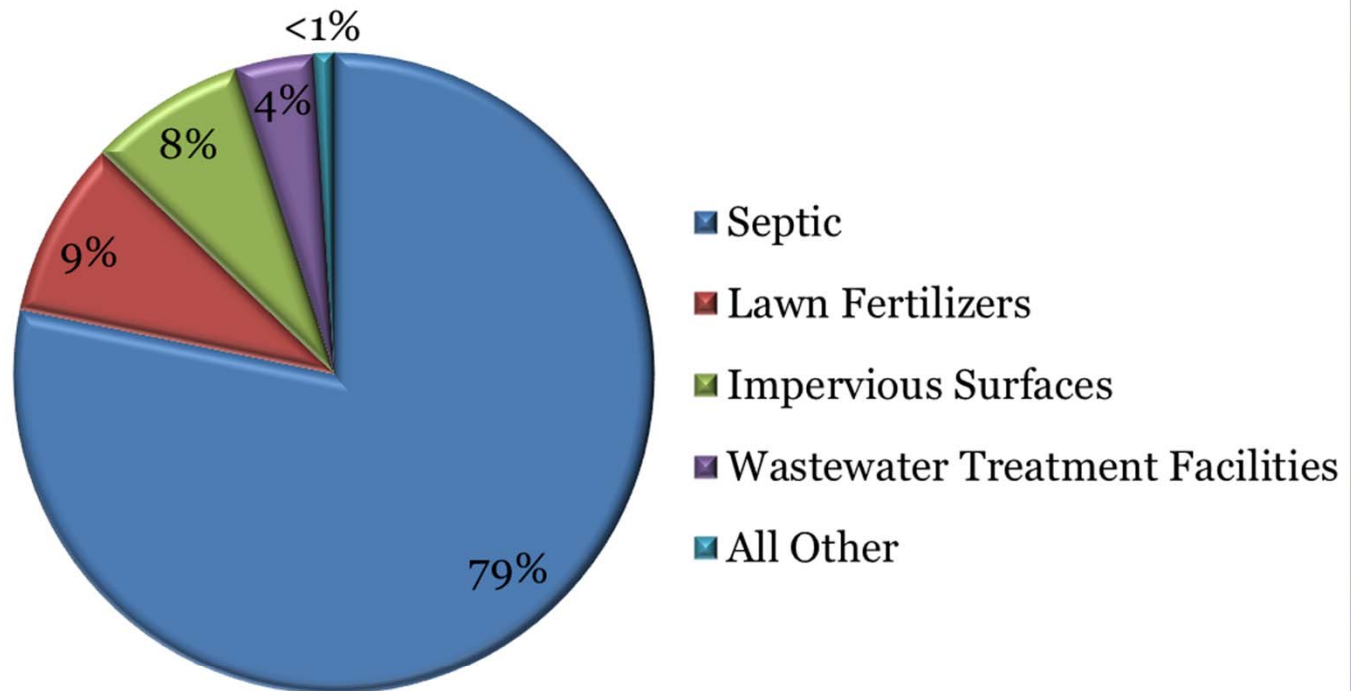


Photo credit: Commonwealth of Massachusetts

Massachusetts Estuaries Project

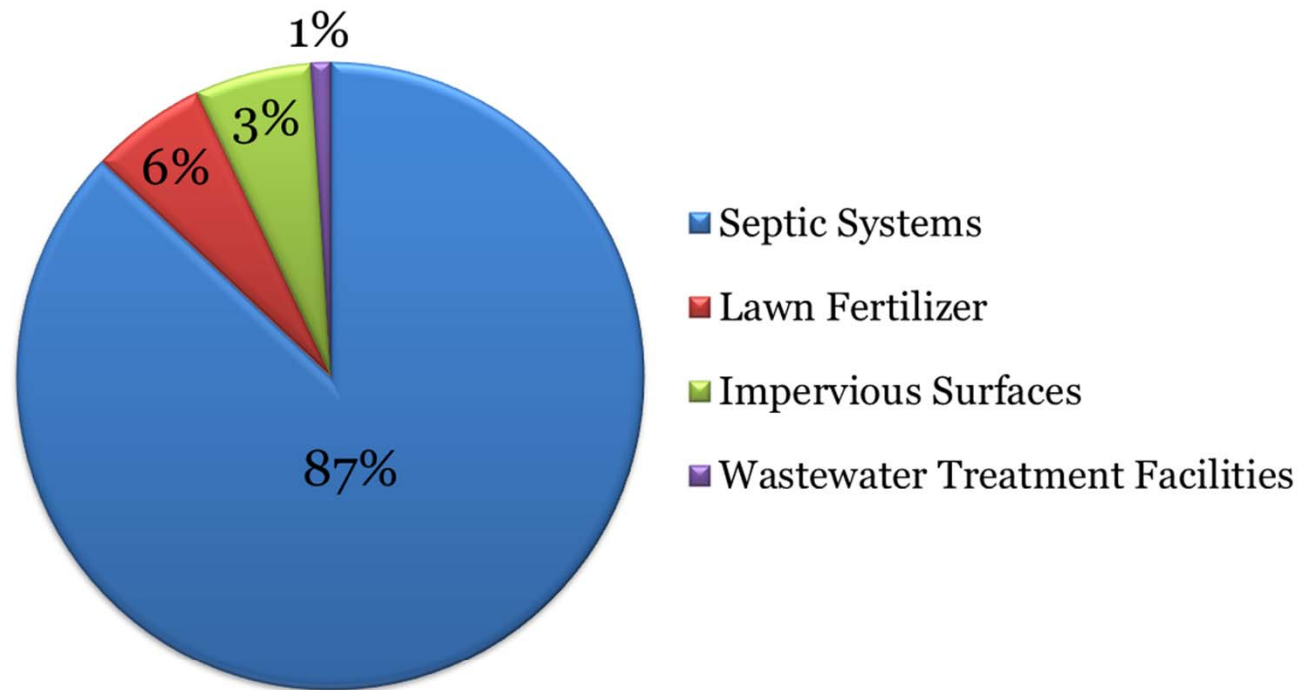
- Opportunity for towns to obtain independent analysis of nitrogen loading and its impact on water quality
- Provides water quality, nutrient loading, and hydrodynamic information
- Water quality monitoring – minimum of 3 years of data for each embayment
- Watershed model links water quality data to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

Cape-Wide Controllable Nitrogen Loads



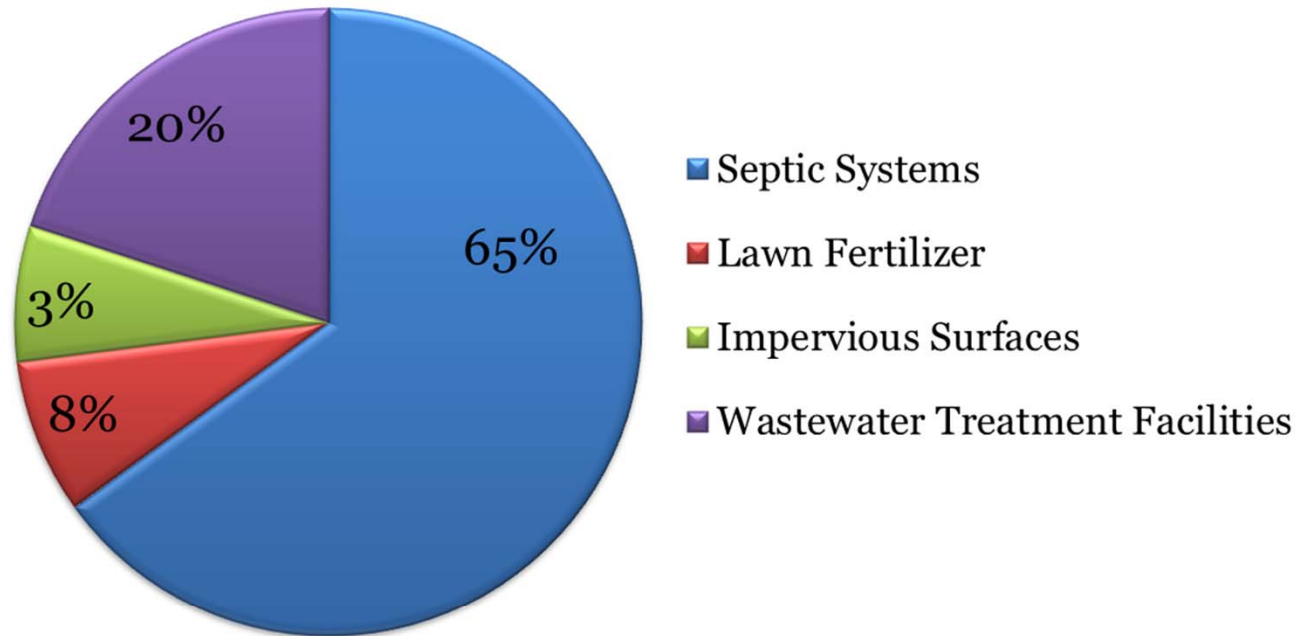
Note: Data averaged from existing Massachusetts Estuaries Project Reports

Little Namskaket Creek Controllable Nitrogen Loads



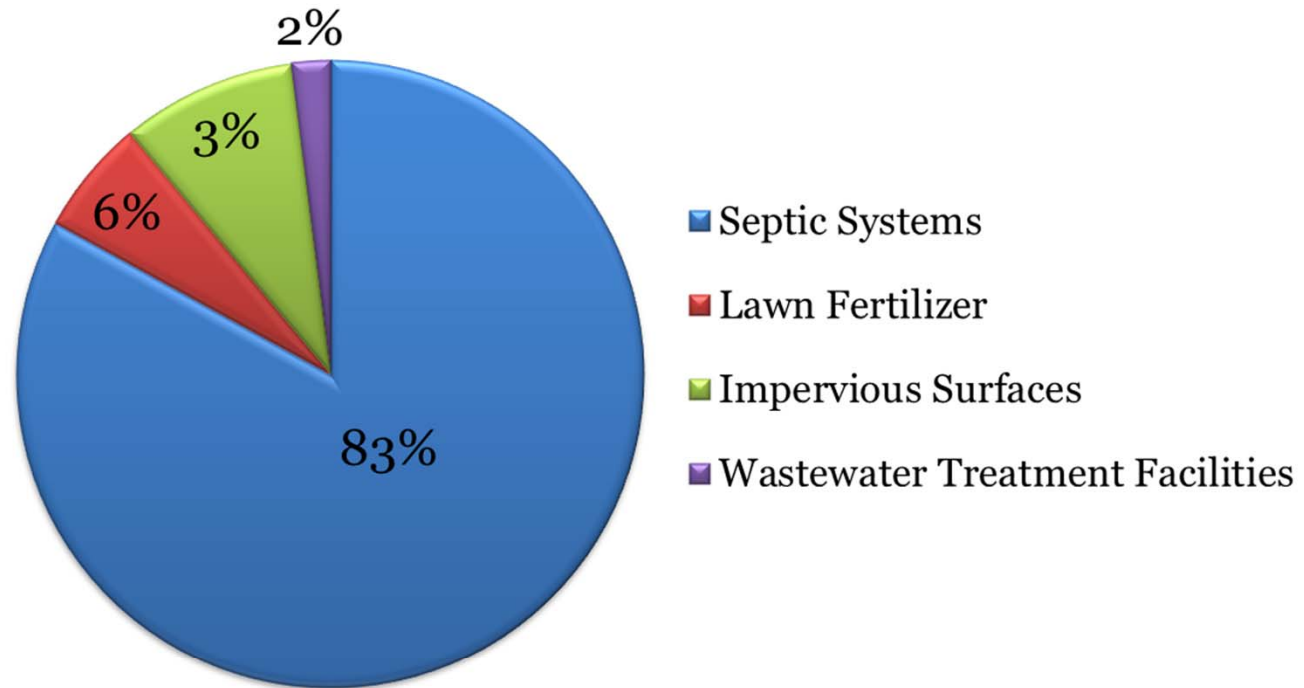
Massachusetts Estuaries Project, 2008

Namskaket Creek Controllable Nitrogen Loads



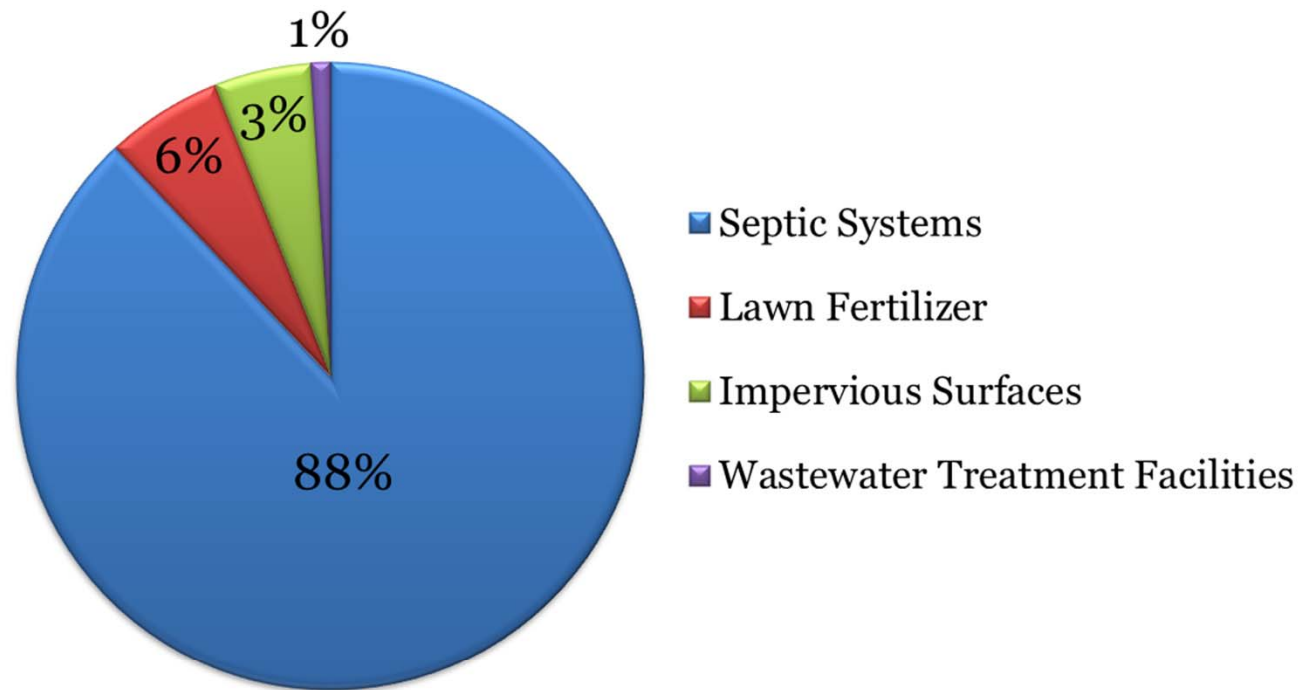
Massachusetts Estuaries Project, 2008

Nauset Marsh Controllable Nitrogen Loads



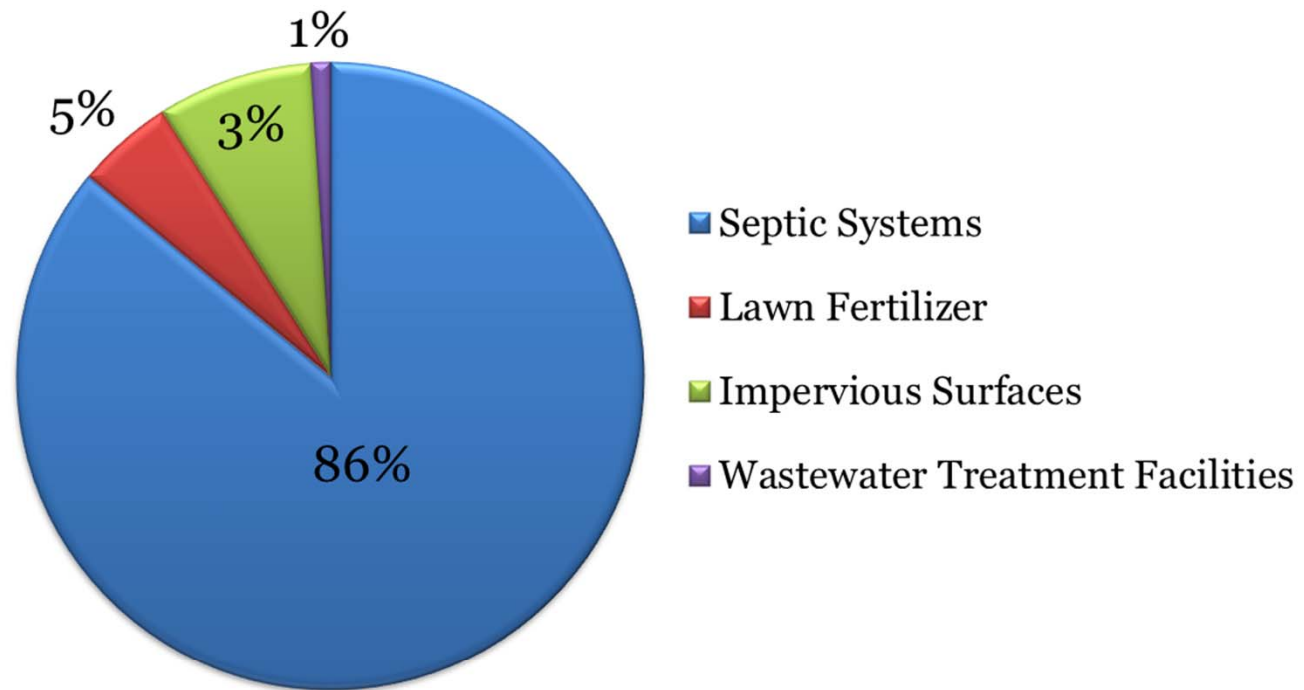
Massachusetts Estuaries Project, 2012

Rock Harbor Controllable Nitrogen Loads



Massachusetts Estuaries Project, 2008

Town Cove Controllable Nitrogen Loads



Massachusetts Estuaries Project, 2012


Nitrogen Problem


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea

Major Roads

 US Highway

 State Highway









 Roads

 Structures

 Ponds

Nitrogen

Ecological Indicators






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






Embayments with Removal Target

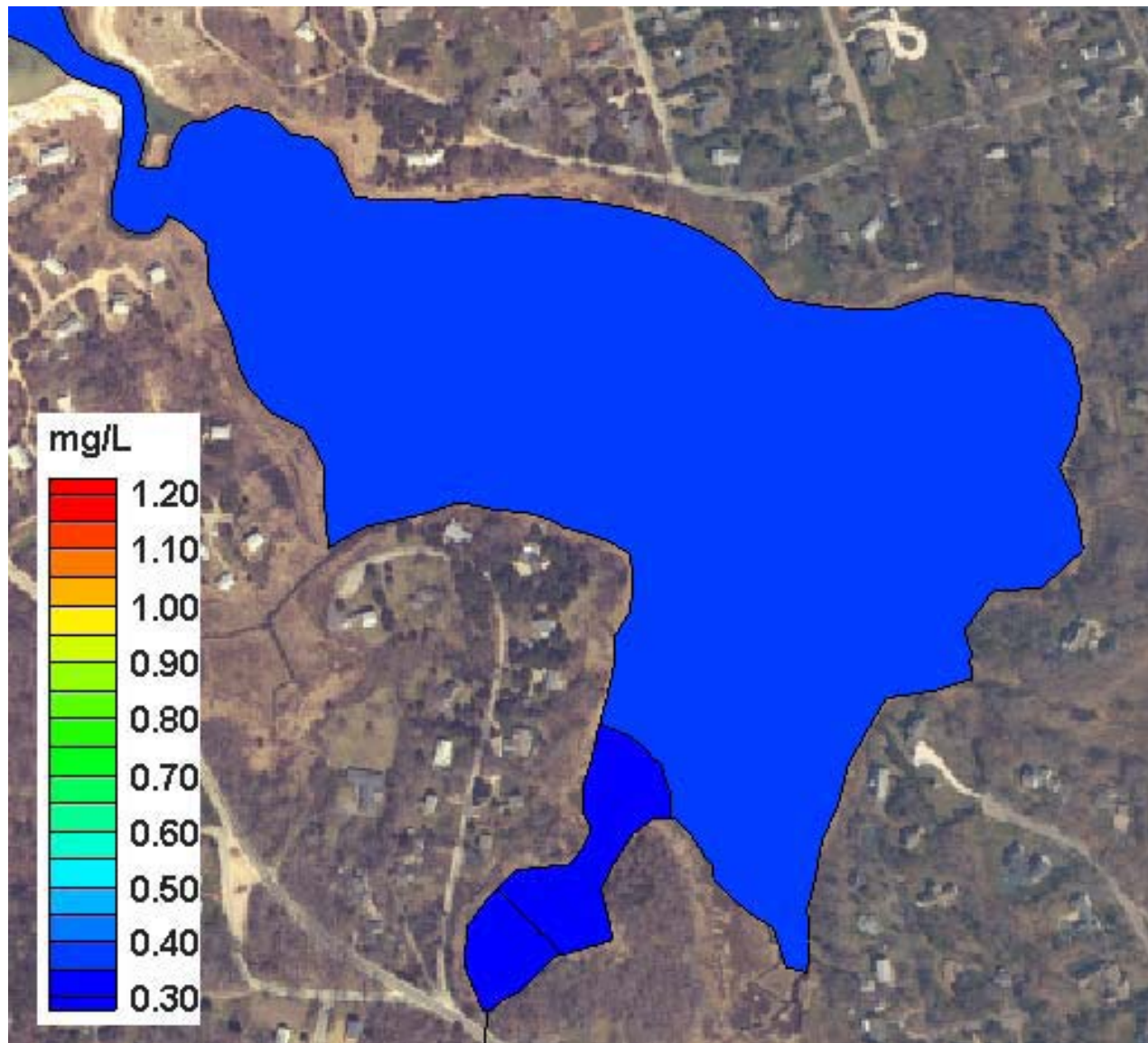
Total NLoad Percent Removal

-  0 %
-  1 - 52 %
-  53 - 72 %
-  73 - 86 %
-  87 - 100 %

Subwatersheds with Removal Target

Total NLoad Percent Removal

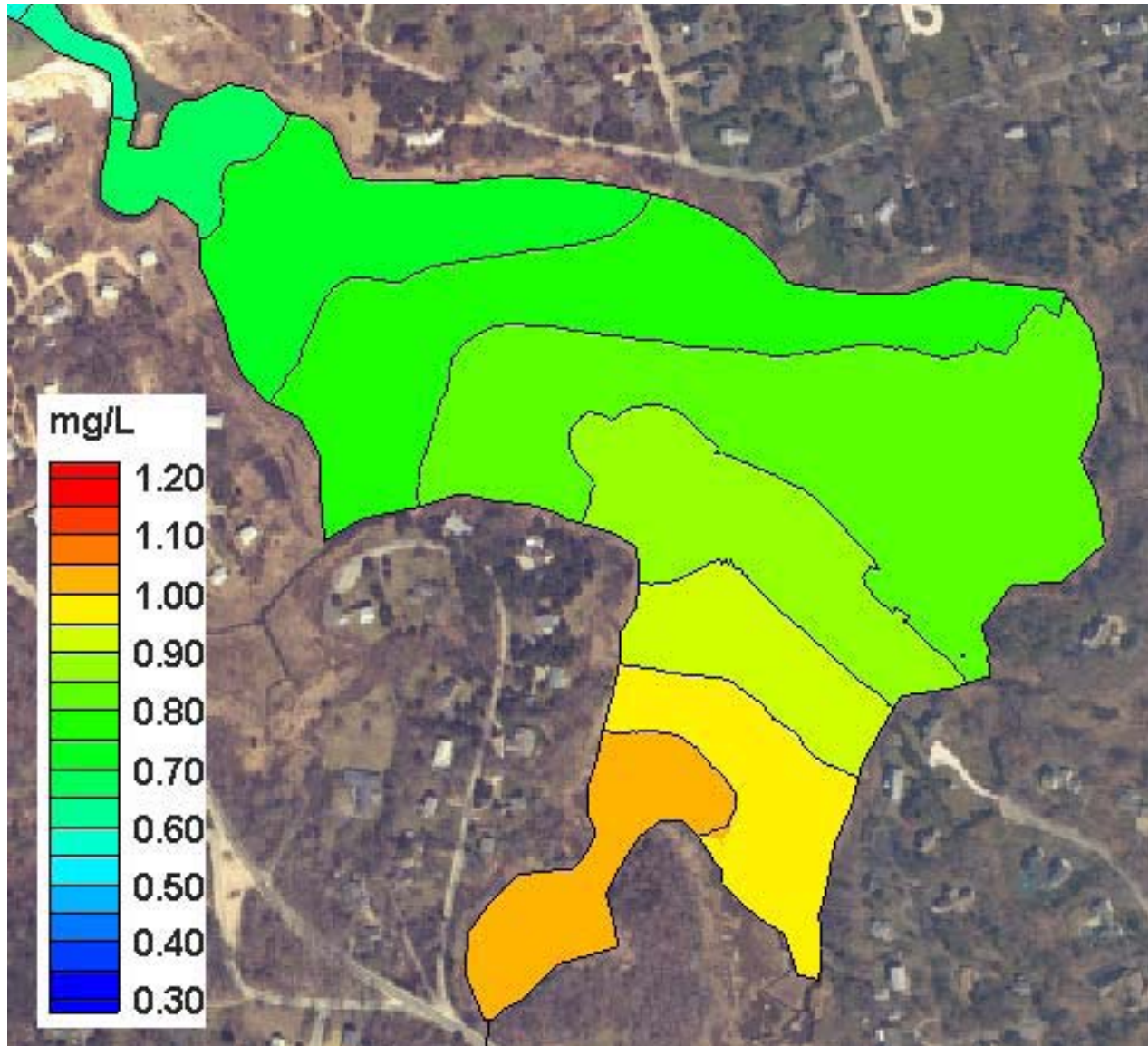
-  0.1 % - 9%
-  9.1 % - 38 %
-  38.1 % - 62 %
-  62.1 % - 86 %
-  86.1 % - 100%



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in Little Namskaket Creek for no anthropogenic loading conditions.

(Source: MEP 2008)

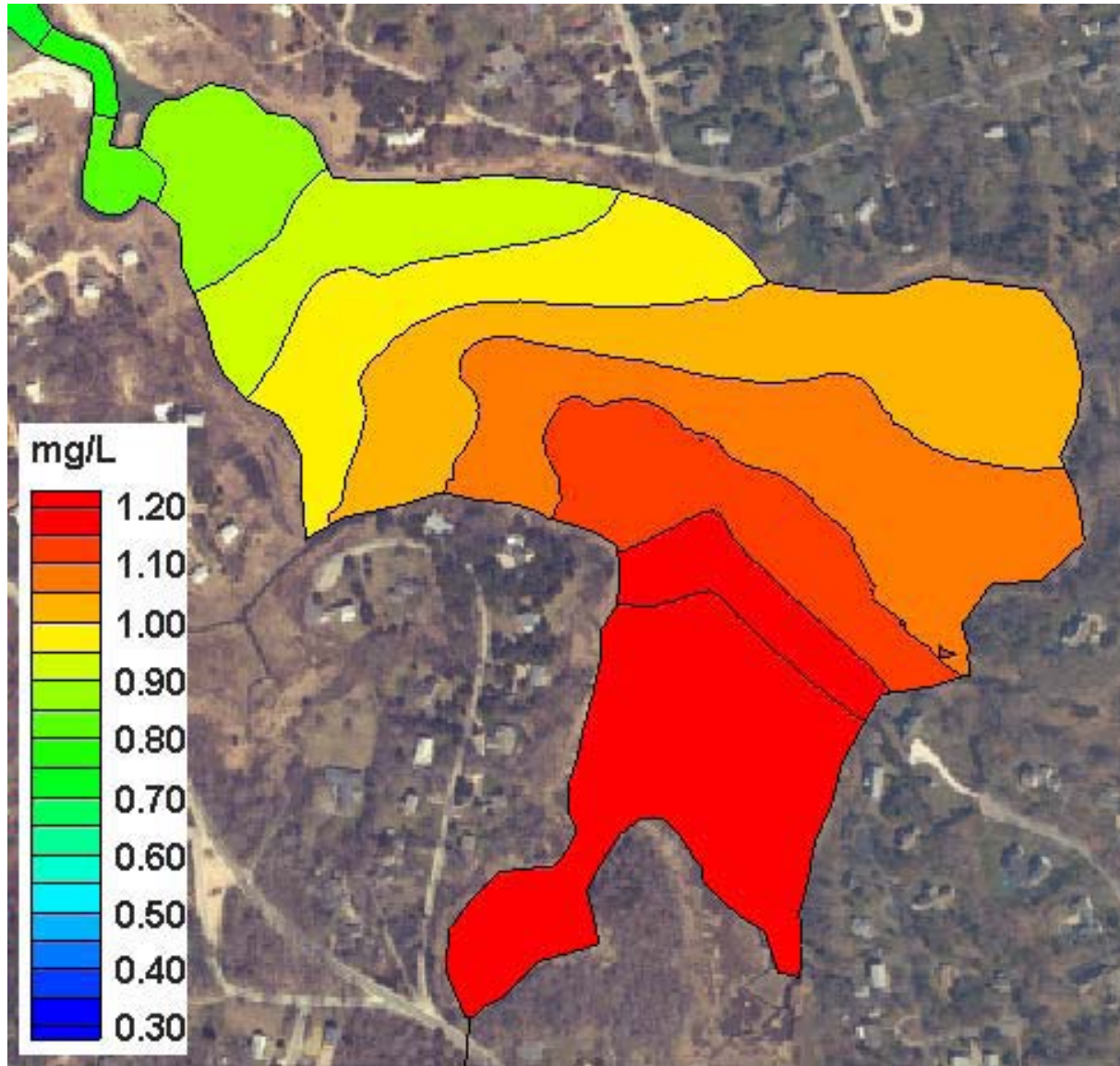
Pre-Colonial Conditions: Little Namskaket Creek



Contour Plot of **average total nitrogen concentrations** from the results of the present conditions loading scenario for the Little Namskaket Creek system.

(Source: MEP 2008)

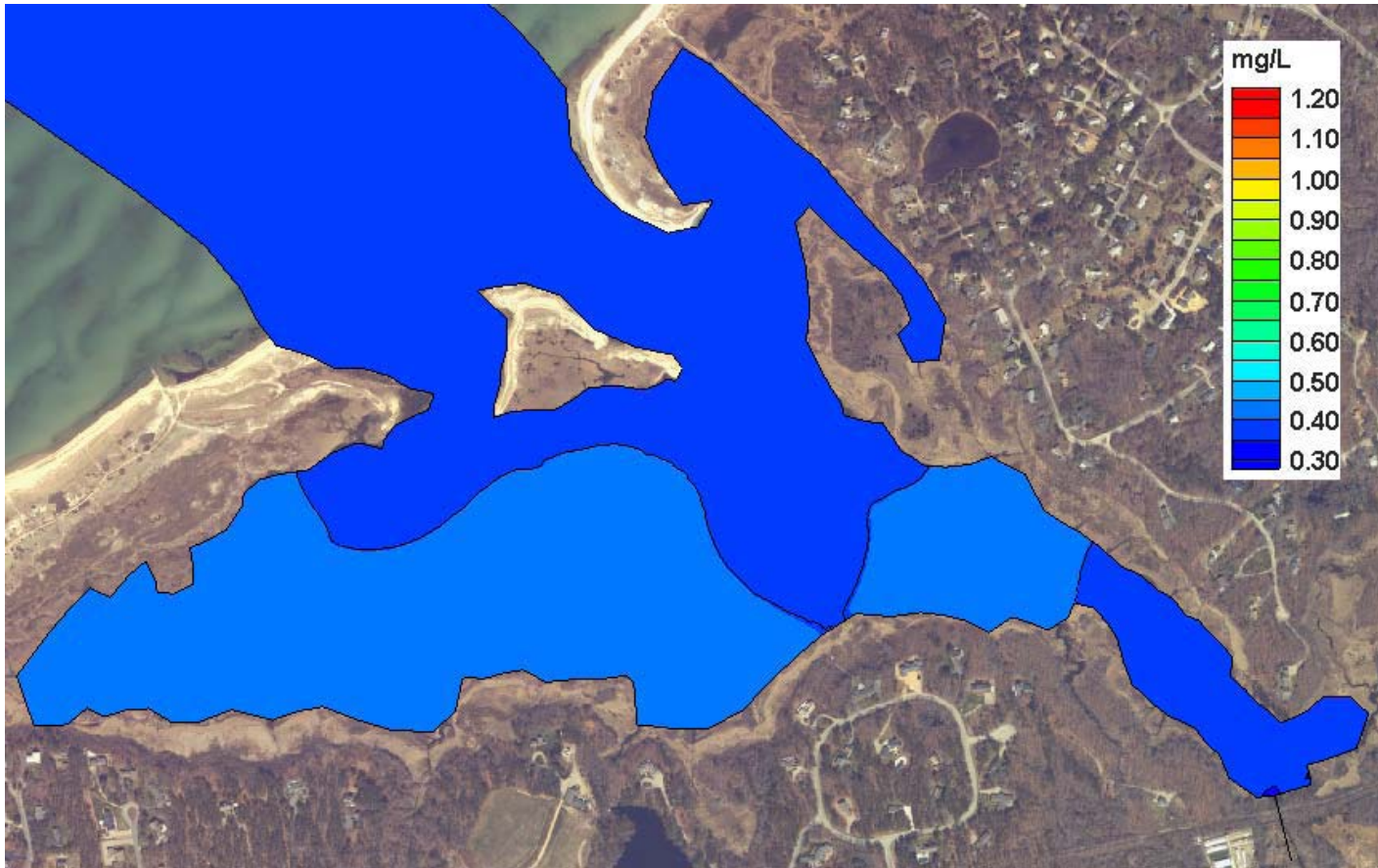
Present Conditions: Little Namskaket Creek



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in the Little Namskaket Creek system, for projected build-out loading conditions.

(Source: MEP 2008)

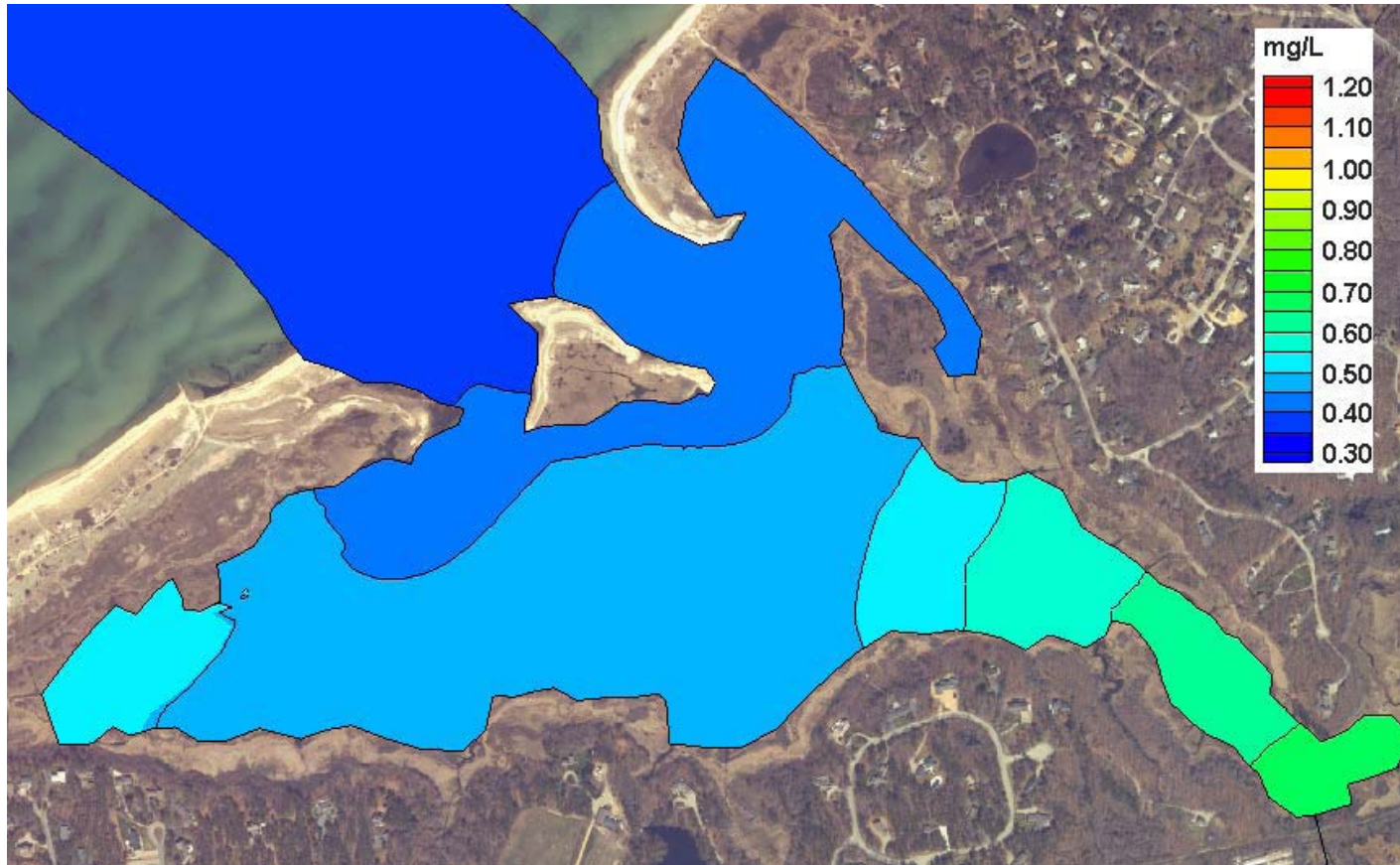
Present Conditions: Little Namskaket Creek



Contour Plot of
**modeled total
nitrogen
concentrations
(mg/L)** in
Namskaket Creek for
no anthropogenic
loading conditions.

(Source: MEP 2008)

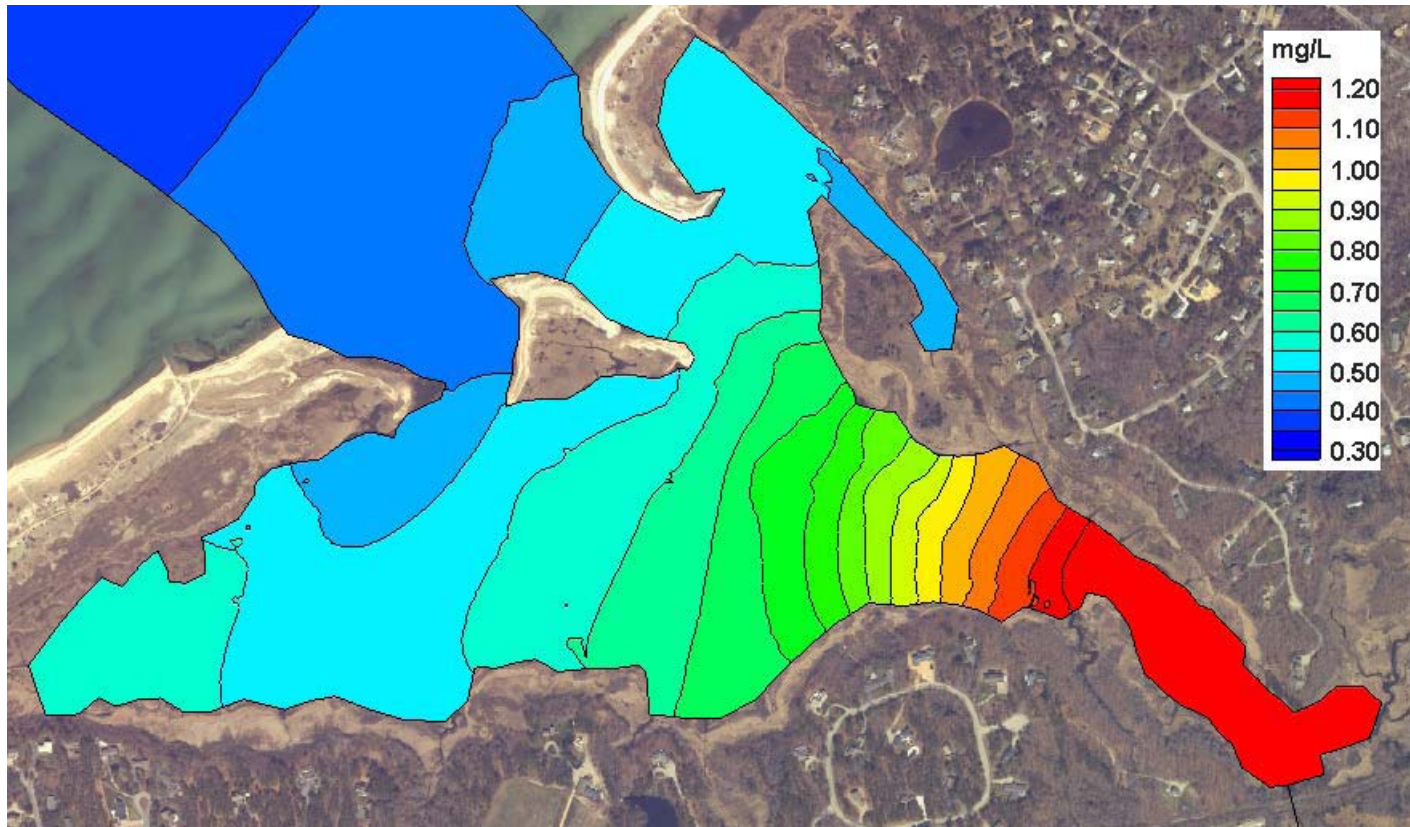
Pre-Colonial Conditions: Namskaket Creek



Contour Plot of **average total nitrogen concentrations** from the results of the present conditions loading scenario for the Namskaket Creek system.

(Source: MEP 2008)

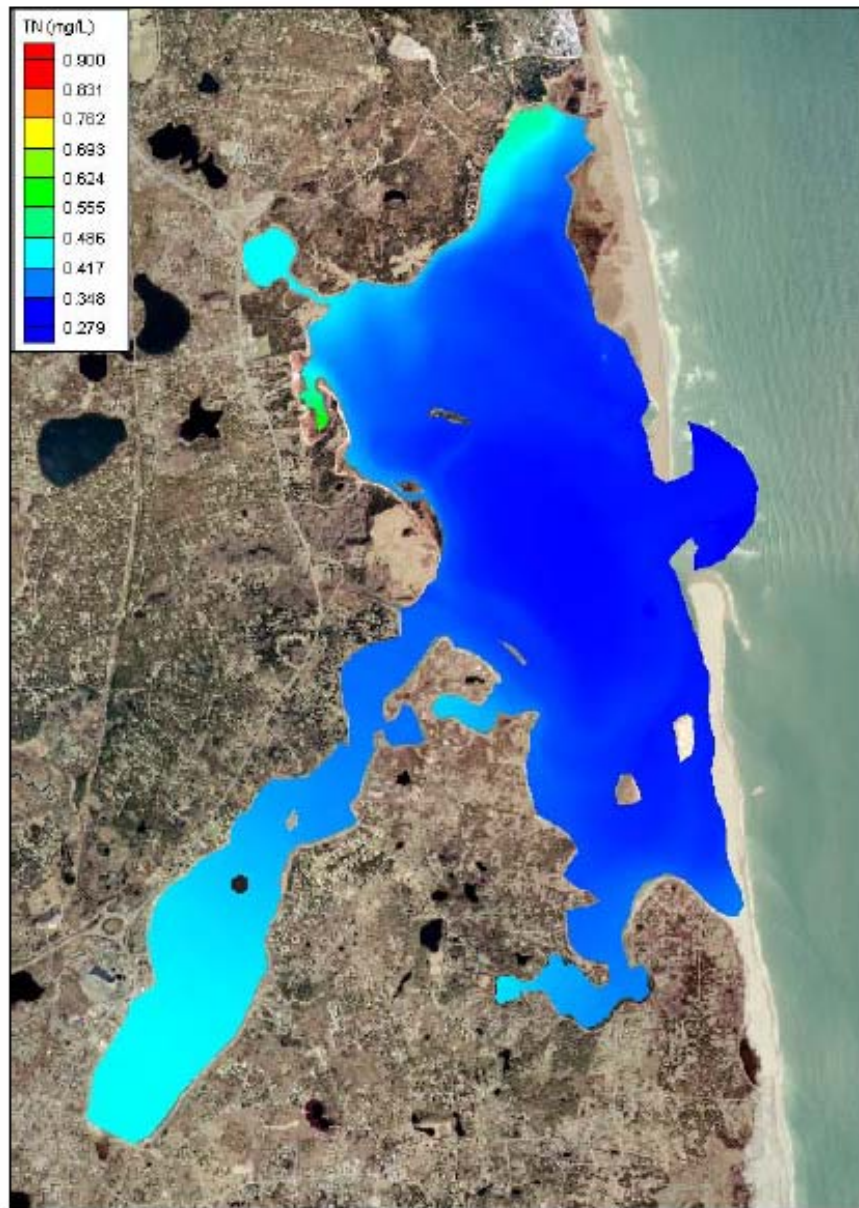
Present Conditions: Namskaket Creek



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in the Namskaket Creek system, for projected build-out loading conditions.

(Source: MEP 2008)

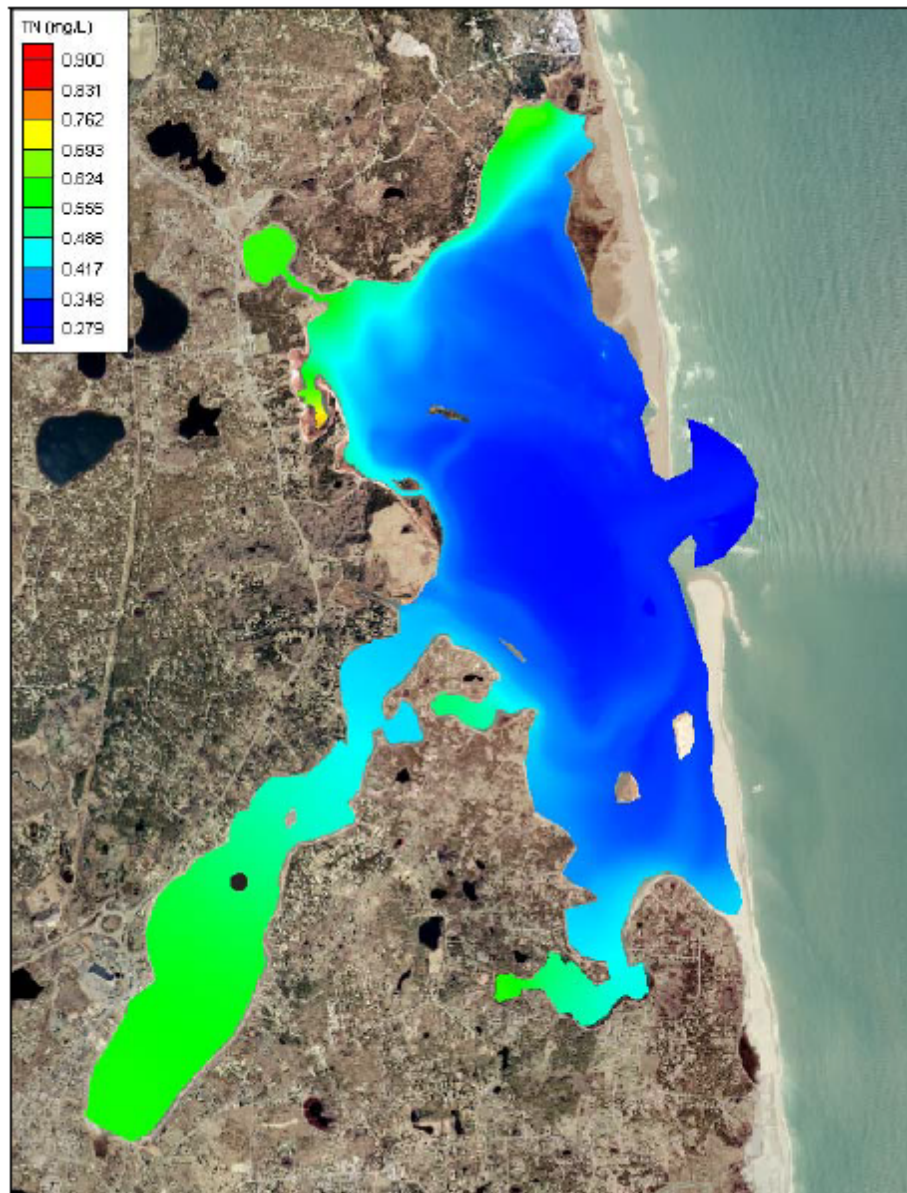
Build-out Conditions: Namskaket Creek



Contour plots of **modeled total nitrogen concentrations (mg/L)** in the Nauset Harbor estuary system under no anthropogenic loading conditions. The approximate location of the sentinel threshold station for the Nauset Harbor estuary system is shown by the black symbol (WMO-27 in Town Cove).

(Source: MEP 2012)

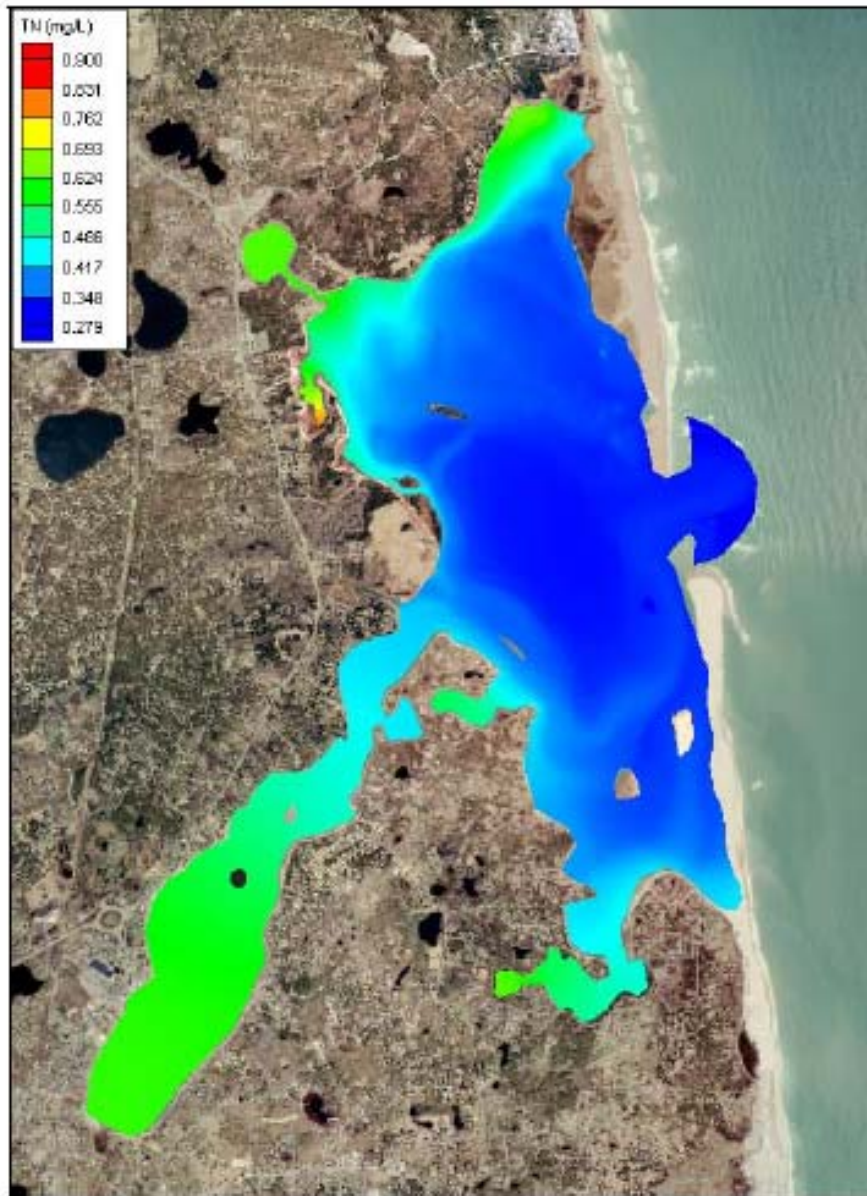
Pre-Colonial Conditions: Nauset Marsh/Town Cove



Contour plots of **average total nitrogen concentrations** from the results of the present conditions loading scenario for the Nauset Harbor estuary system. The approximate location of the sentinel threshold station for the Nauset Harbor estuary system is shown by the black symbol (WMO-27 in Town Cove).

(Source: MEP 2012)

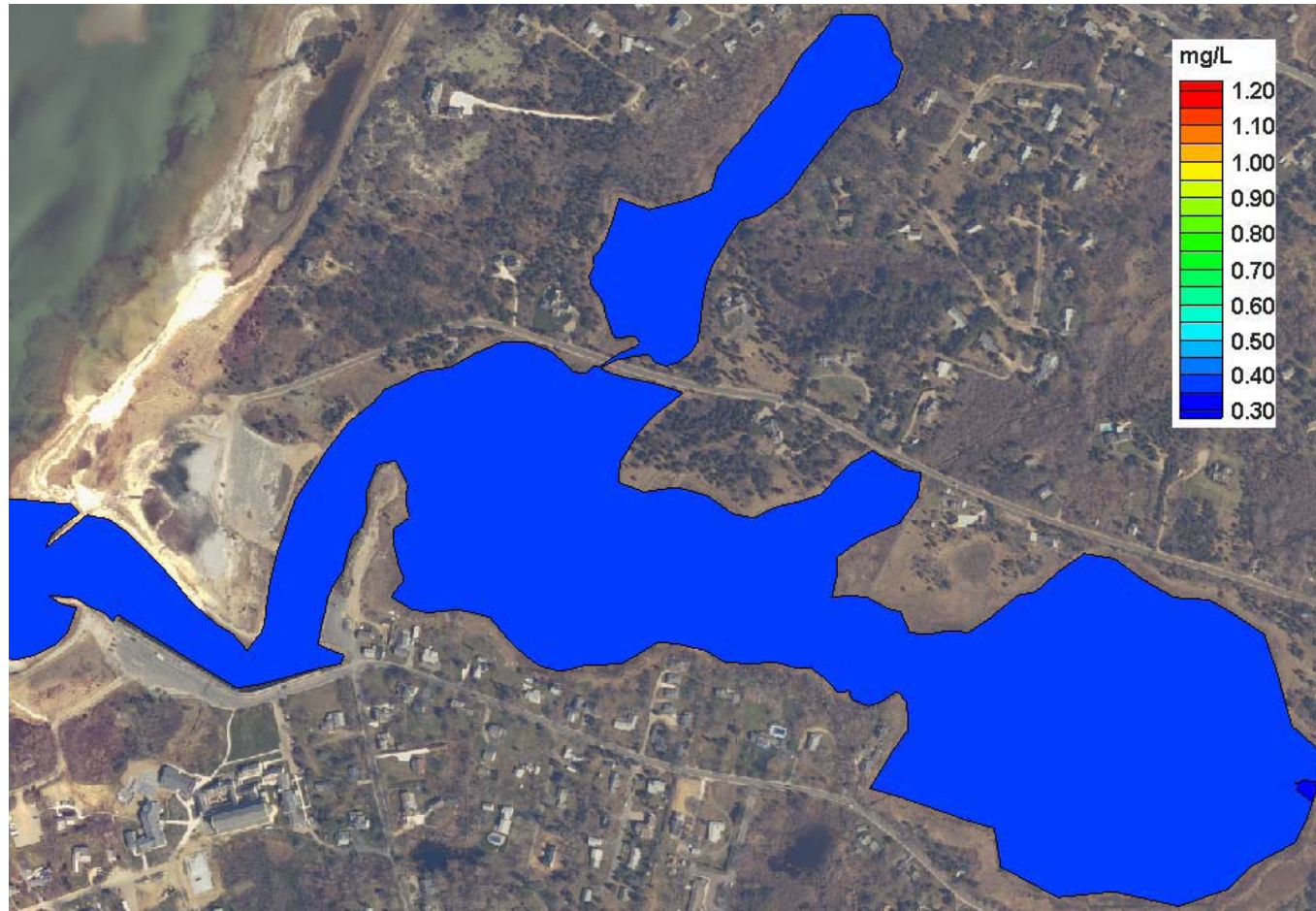
Present Conditions: Nauset Marsh/Town Cove



Contour plots of **modeled total nitrogen concentrations (mg/L)** in the Nauset Harbor estuary system under projected build-out loading conditions. The approximate location of the sentinel threshold station for the Nauset Harbor estuary system is shown by the black symbol (WMO-27 in Town Cove).

(Source: MEP 2012)

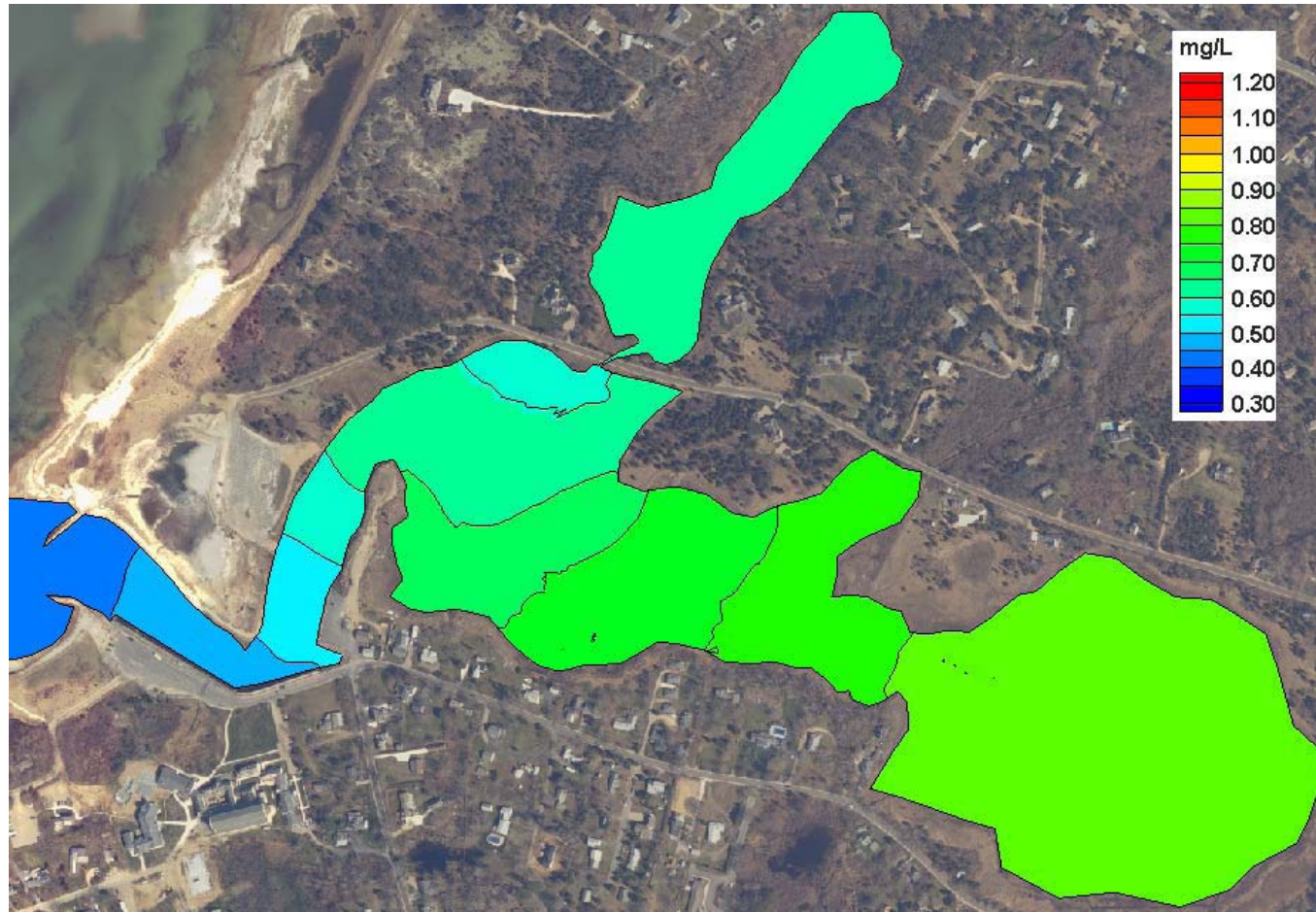
Build-out Conditions: Nauset Marsh/Town Cove



Contour Plot of **modeled total nitrogen concentrations (mg/L)** in Rock Harbor for no anthropogenic loading conditions.

(Source: MEP 2008)

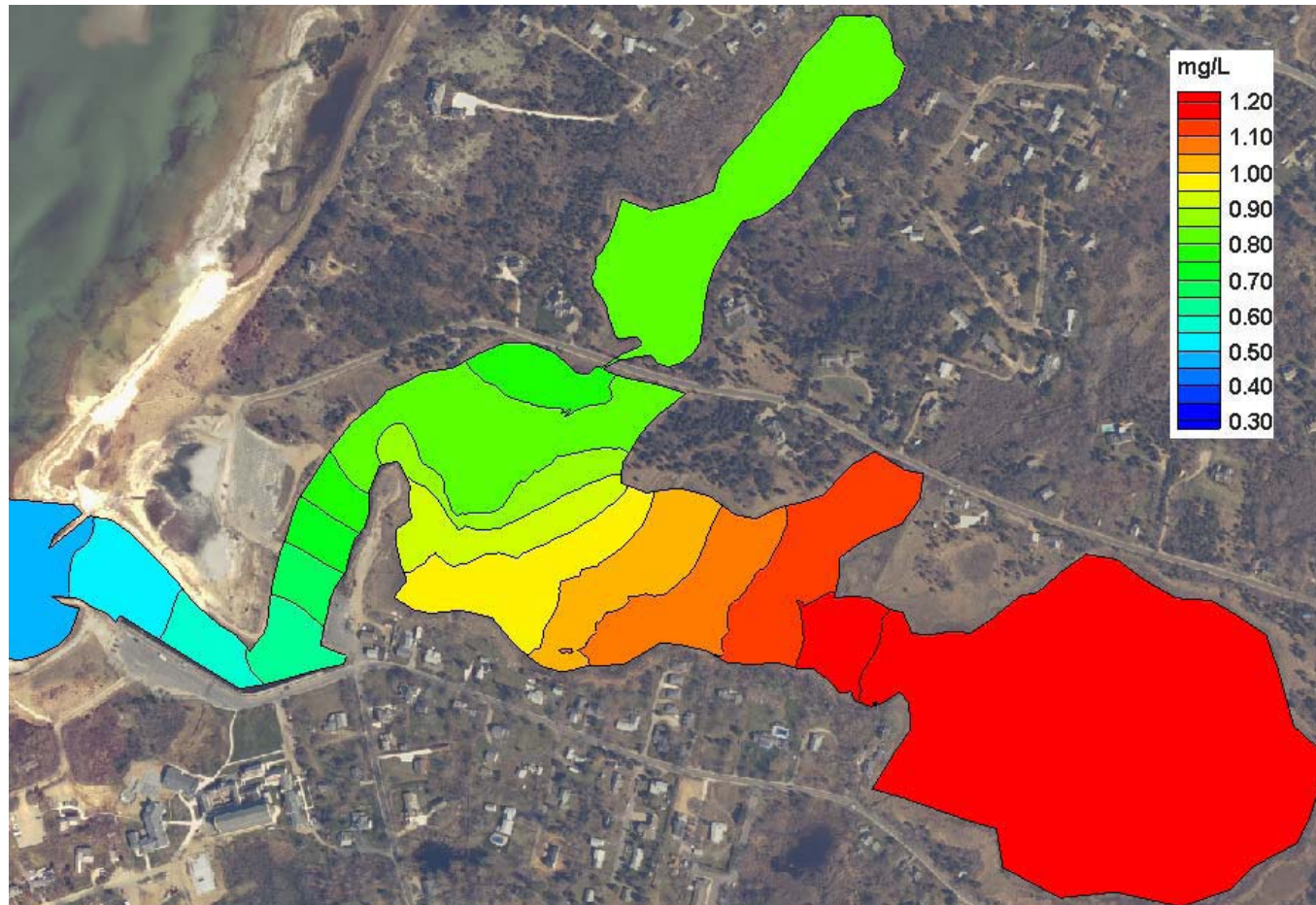
Pre-Colonial Conditions: Rock Harbor



Contour Plot of **average total nitrogen concentrations** from the results of the present conditions loading scenario for Rock Harbor.

(Source: MEP 2008)

Present Conditions: Rock Harbor




Contour Plot of **modeled total nitrogen concentrations (mg/L)** in the Namskaket Creek system, for projected build-out loading conditions.

(Source: MEP 2008)

Build-out Conditions: Rock Harbor


Nitrogen Problem


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway

 State Highway









 Roads

 Structures

 Ponds

Nitrogen

Ecological Indicators






-  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 in Public Supply Wells

-  0 - 0.5 mg/l
-  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


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


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



Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh


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


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

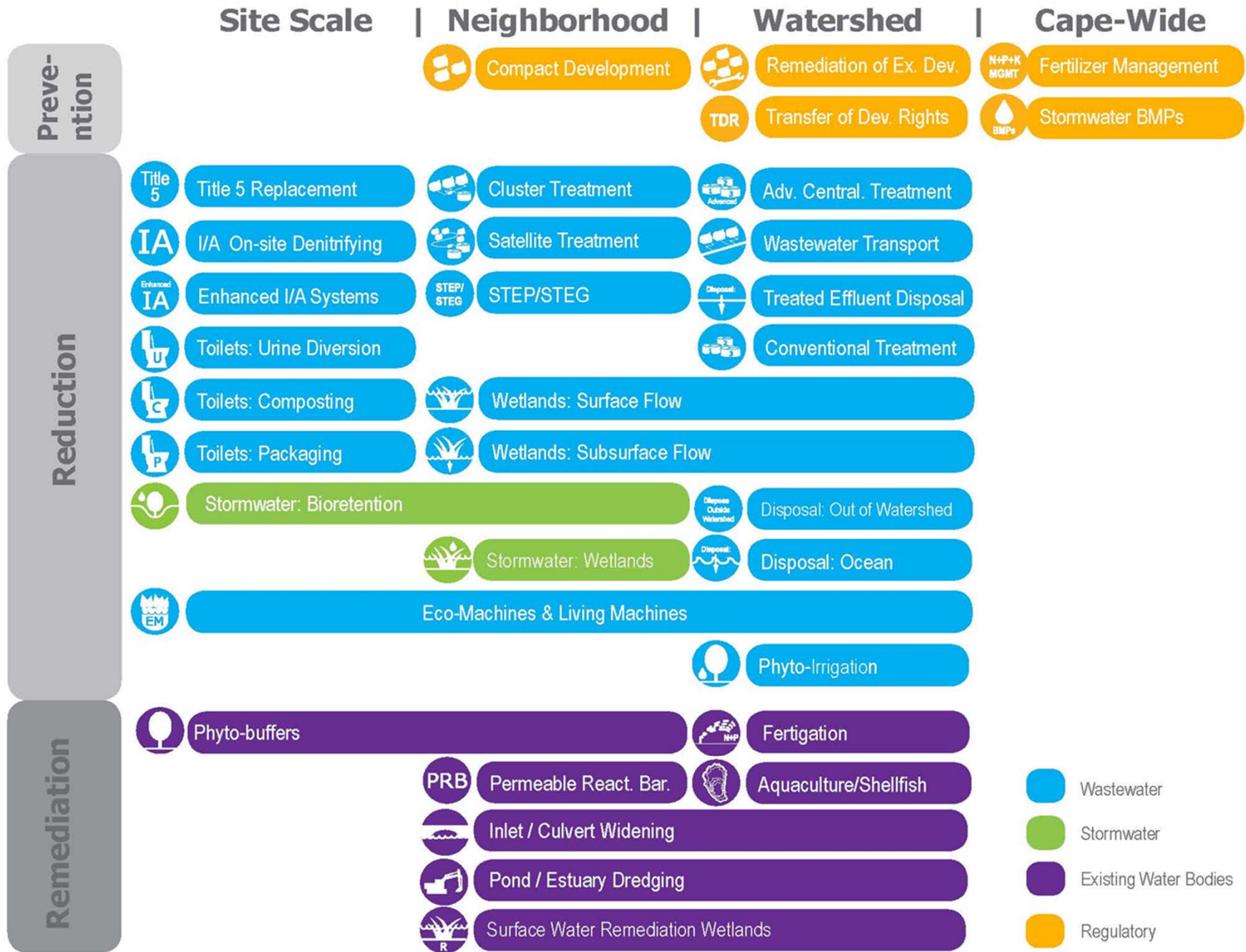
 2031 - 2040

 2041 - 2050



Framework for Addressing Solutions Moving Forward

Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh



- Wastewater
- Stormwater
- Existing Water Bodies
- Regulatory

Alternatives: Screening Method

1
2
3
4
5
6
7



Wastewater



Existing Water Bodies



Regulatory

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 Nauset and Cape
Cod Bay Marsh Group will be available on the Cape
Cod Commission website:**

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

Boat Meadow River
Herring River
Little Namskaket Creek
Namskaket Creek
Rock Harbor
Town Cove/Nauset Marsh

**Cape Cod 208 Area Water Quality Planning
Nauset and Cape Cod Bay Marsh Watershed Working Group**

**Meeting One
Thursday, September 19, 2013
Eastham Town Hall
2500 State Highway, Eastham Massachusetts 02642**

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

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

- Working Group members:
 - 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.
- Cape Cod Commission:
 - Send a copy of the PowerPoint presentation used during the Working Group meeting to Working Group members.
 - Send a link with the lists of the members of the Advisory Board; a Regulatory, Legal, and Institutional Work Group; the Technical Advisory Committee of the Cape Cod Water Protection Collaborative; and the Technology Panel to Working Group members.
 - Review Eastham density and buildout data.
 - Distribute the MEP buildout scenario that includes the Tri-Town wastewater treatment facility.
 - Clarify dates of data in the MEP report.
 - Help to contextualize and characterize the different types of data and how it could be used in the decision-making process.
- CBI
 - Distribute September meeting summary.
 - Distribute meeting materials for October meeting: fact sheets and agendas.

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 Nauset and Cape Cod Bay Watershed Working Group will be located here:

<http://watersheds.capecodcommission.org/index.php/watersheds/lower-cape/nauset-and-cape-cod-bay>

Ms. Stacie Smith, facilitator from the Consensus Building Institute (CBI), reviewed the agenda and described CBI's role and the member selection process.¹ Ms. Smith then acknowledged the disagreements in perspectives on the MEP science and data. Noting that a special meeting on October 3 would be convened to specifically address these issues, she requested working group members to simply note their disagreement with the MEP science and data during the meeting and to refrain from discussing the specifics of their disagreement until the October 3 meeting.

Ms. Smith noted that many people volunteered to be part of the Working Group, especially from Orleans. The convening process sought to ensure the full range of voices were represented, sufficiently balanced across conflicting viewpoints, while avoiding domination of one set of issues or perspectives, and also keeping the Working Group to a size that it could deliberate productively. To do this, CBI worked with civic and environmental leaders within Orleans to recommend primary representatives for those points of view, and requested that others serve as alternates. She asked if anyone felt that their perspective was not being represented by the participants at the table: a representative from the Orleans Conservation Trust stated that, as the Trust is a primary landowner on the marsh and has conservation restrictions in place on its lands, it would be appropriate for the Trust to formally be included in the Working Group. Working Group members agreed to include Orleans Conservation Trust in the Working Group.² In addition, a representative from the Golf Course Superintendents of Cape Cod introduced himself, explained the positive role that his organization and golf course constituents are playing to address wastewater issues, and offered his assistance to the Working Group.

REVIEW OF GOALS AND PROCESS

Ms. Smith explained that the goal of the first meeting was to review and develop a shared understanding of the characteristics of each watershed, 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 Nauset and Cape Cod Bay Marsh Watershed Working Group covers the watershed that encompasses the municipalities of Brewster, Eastham, and Orleans. Ms. Smith 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.

¹ CBI's role and the participant selection process are described in detail in the Draft Process Protocols located at the link mentioned on page 1 of this summary.

² After the meeting, several members of Orleans CAN contacted the facilitator to request they also have a representative.

Ms. Erin Perry, Special Projects Coordinator for the Cape Cod Commission, presented an overview of the Clean Water Act Section 208 and described the process and goals of the proposed update to the 1978 Section 208 Area-Wide Water Quality Management Plan. In January 2013, the Massachusetts Department of Environmental Protection (MassDEP) directed the Cape Cod Commission to update the 1978 Section 208 Area-Wide Water Quality Management Plan (208 Plan Update). The goal of the three-year 208 Plan Update process is to help communities collaborate and coordinate their water quality management activities to achieve compliance with Section 208 water quality standards. The 208 Plan Update will focus on reducing nitrogen in saline waters, phosphorus concentrations in fresh waters, and address challenges posed by future growth and Title 5 limitations.

Many of the 105 watersheds and 57 embayments on Cape Cod overlap the boundaries of two or more municipalities, thus making the Section 208 update a regional issue and highlighting the need for inter-municipal collaboration. A watershed-based approach will be used to update the 208 Plan and working group members from the 11 watershed working groups, with input from other stakeholders and members of the public, will jointly identify solutions appropriate for their watershed. The approach strives to maximize the benefits of previous local planning efforts by building upon those efforts whenever possible. Ultimately, each watershed working group will generate a series of approaches recommended for their specific watershed, each of which may incorporate a different set of technologies, to meet water quality standards.

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. In July, public meetings were held across the Cape to present the 208 Plan Update goals, work plan, and participant roles in July. Public meetings were also held in August to present information on the affordability and financing of the updated comprehensive 208 Plan. Since few people attended the August meetings, the Cape Cod Commission will present this information to interested groups upon request.³ 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.

In addition to the aforementioned stakeholder engagement meetings, an advisory board; a Regulatory, Legal, and Institutional (RLI) working group; a Technical Advisory Committee (TAC), and; a Technology Panel will provide guidance to the 208 Plan Update process. 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, regional, national, and international experts on water quality

³ Contact Erin Perry (eperry@capecodcommission.org) if you would like to schedule an Affordability and Financing presentation.

management technologies comprise the Technology Panel. The TAC, which is a committee of the Cape Cod Water Protection Collaborative, will provide a local, municipal perspective on the technologies under consideration.

The efforts of each Working Group will be supported by an Advisory Board; a Regulatory, Legal, and Institutional Work Group; the Technical Advisory Committee of the Cape Cod Water Protection Collaborative; and a Technology Panel – membership of these committees is posted on the Watersheds website. Ms. Perry explained that while Working Group members are welcome to attend meetings of the Technical Advisory Committee, input on different technologies will be solicited from Working Group members at the October meeting. She then explained that the 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.”

LOCAL PROGRESS TO DATE

Ms. Patty Daley, Cape Cod Commission, provided an overview of efforts made across the Cape, and in the municipalities of Brewster, Eastham, and Orleans, 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 and the Section 208 Area-wide Plan for Cape Cod was approved, both 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.

On four separate chronologies, Ms. Daley highlighted past actions that had been taken in Harwich, Chatham, Orleans, and Brewster that would either protect or inhibit water quality in the watersheds of the Nauset and Cape Cod Bay Marsh Working Group. Working group members and the public then reviewed the chronologies and, using sticky notes, added missing events or corrected the information to help create a more accurate view of past actions. The Cape Cod Commission will update the chronologies with the information provided by working group members. During discussion after the activity, group members reflected on lessons learned from reviewing the chronologies. Member offered the following general lessons and comments:

- The towns have been working on wastewater issues for many years, with much effort from lots of people, and a credible, strong basis to build on.
- There are a significant number of water and wastewater projects that have been turned down by voters. We need to understand why these projects are being rejected and what we can do about it.
- Many voters are confused by the competing facts being offered and we need to work with average citizens to educate them and get them involved.
- The elephant in the room for Orleans is the wastewater treatment facility. This is the issue where everything fell apart.
- All three communities need to work together to achieve a shared approach.

- There have been noteworthy grassroots volunteer efforts such as the establishment of freshwater lake and pond monitoring programs and the Pond and Lake Stewardship Project (PALS) at the county level.

Participants also made the following comments about additions and changes to the timelines:

- Brewster has made some changes around zoning that should be included in the timeline.
- Collaboration between the towns should be included in the timelines.
- More information should be included about public outreach and public education on the timelines.
- All three towns should include information about additional elements that play a role in wastewater management, such as land protection efforts, land acquisition efforts, and efforts to protect drinking water supplies.

BASELINE CONDITIONS

Ms. Daley and Mr. Jay Detjens, Cape Cod Commission GIS Analyst, presented GIS data layers, demographic data, and water quality data both Cape-wide and specific to the watersheds in the Pleasant Bay Watershed Working Group. Working group members and members of the public are encouraged to view the layers on the Cape Cod Commission website.⁴ To ensure the accuracy of the data that will be analyzed for the 208 Plan Update, working group members were asked to identify anything they believed was missing from the data and to voice any differences of opinion they had with the Commissions' analysis or approach. However, Ms. Smith reiterated the request that working group members simply note their disagreement with the MEP science and data and refrain from discussing the specifics of their disagreement until the October 3 meeting.

GIS Data Layers

The Cape Cod Commission presented the following GIS data layers:

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.

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. There are no golf courses in this watershed.

Regulatory Layer – The regulatory layer illustrates Areas of Critical Environmental Concern, MassDEP Approved Wellhead Protection Areas, and Growth Incentive Zones. OpenSpace data is

⁴ Data used for modeling and analysis is available through the link on page 1 of this summary.

displayed in three levels of land protection: land protected in perpetuity, limited protection, and no protection. The Pleasant Bay study area contains a large Area of Critical Environmental Concern. Landuse Vision Map data delineates economic centers; industrial and service trade areas, village boundaries, resource protection areas, other designations, and undesignated lands. Brewster and Orleans have Landuse Vision Maps. No Growth Incentive Zones are present in the study area.

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 1995 data layer is also available, but was not displayed since the collection methodology was different than the 1951, 1971, and 1999 data.

Density and Buildout Layers – The density layer shows the current per acre density of existing dwelling units in quarter square mile grids. The regional buildout layer shows the maximum potential buildout over a 20-25 year time horizon using the towns' existing zoning regulations and normalizing that data by applying state designated zoning categories. Ms. Daley emphasized that buildout scenarios are an art, not a science, and that there are many ways to conduct a buildout analysis. She illustrated this point by showing a slide that depicted differences between the Regional buildout, the Comprehensive Wastewater Management Plan (CWMP) buildout, and the Local Comprehensive Planning buildout for towns across the Cape. She explained that each of these buildouts use different assumptions, different time spans, different geographies, and could not be compared to each other. The Cape Cod Commission's regional approach to the buildout analysis enables comparison of potential buildout across the entire Cape, but loses some detail on the local level. Ms. Daley noted that density is a critical component to the 208 Update Plan, illustrated by the prediction that a hypothetical 30% growth would increase capital costs by 40% (based on an analysis of traditional sewerage costs.)

She explained the proximity of homes to each other also 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 living 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.

Nauset and Cape Cod Bay Marsh Watershed Working Group members had the following comments and questions about the GIS data layers. *Responses from the Cape Cod Commission are italicized.*

- Does the Commission have additional layers showing forests and other natural features? *Yes, the Commission does have those layers but they were not presented here to simplify the layer.*

- Does the Commission have data to show increases in the number of dwellings? *The Commission does have this data at the town-level, but that sort of data may be presented in finer grain in the buildout report.*
- Wouldn't greater buildout lead to greater efficiency in terms of providing services, and therefore lower cost? *After addressing the wastewater and nutrient flows from current developments, every new development would likely need to have 100% of its wastewater treated or otherwise mitigated in order to maintain compliance with water quality standards. As a result, additional buildout that is diffuse will likely be much more expensive than compact development.*
- How are the different projections for future population growth and buildout reconciled and taken into account? *These different projections were done at different times and for different purposes. The CWMP buildout projection is a 20-30 year buildout because that is the planning horizon. LCPs are done town-wide for theoretical buildout dates. The regional buildout scenario was created for baseline, standardized buildout.*
- How are the population declines of the past few years factored into the buildout scenarios? *The Commission is aware of the population declines, but it is important to remember that even with a recent decline in population, the built infrastructure (including buildings) remains in place.*
- The figures for Eastham do not add up. *The Commission will review the Eastham data.*

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. Data includes population estimates, median age, average income, race, average home value, total home value, average annual water bill, average annual sewer bill, seasonal vs. year round housing, and average annual single-family property tax bill. After reviewing this data, the group members made the following comments and questions. *Responses from the Cape Cod Commission are italicized.*

- Are cesspools combined with the figures for Title 5 systems? Yes, this particular data set characterizes Title 5 systems and cesspools as the same. *The Commission is currently in the process of hiring a consultant to contact municipalities to locate properties that have cesspools, and Title 5 failures and/or variances.*

THE PROBLEM

Ms. Daley explained that eutrophication from nitrogen loading in coastal estuaries and phosphorous loading in ponds and lakes is the primary problem to solve. In many areas of the Cape, the Massachusetts Estuary Project (MEP) provides three years of nutrient loading, water quality monitoring data, and hydrodynamic information to link water quality data to nitrogen loads.

Ms. Daley next reviewed the Cape-wide MEP data, which shows that septic systems account for 79% of the controllable nitrogen loads, 9% results from lawn fertilizers, and 8% from impervious surfaces. Four percent of the controllable nitrogen is the result of wastewater

treatment facility effluent and natural sources comprise the remaining one percent. Ms. Daley then reviewed the MEP data for the Nauset and Cape Cod Bay Marsh Watershed area. Septic systems are the main contributors of controllable nitrogen in the MEP study of this watershed area. She noted that the MEP date on the slide is the date of publication of the MEP technical report, not necessarily the date of the data collected.

Ms. Daley proceeded to present a series of maps and diagrams illustrating contour plots of modeled past, current, and anticipated future nitrogen concentrations in the embayment sub-watersheds, which showed increasing concentrations and growing percentages of the watersheds showing unhealthy nitrogen concentrations. She then showed maps of eelgrass distribution, from 1951, 1995, and 2001, noting that eelgrass is an indicator species for water health.

Ponds and lake data is available from the Pond and Lake Stewardship Project (PALS). PALS provides a snapshot of the physical water quality parameters of 200 inland water bodies and connects this data to trophic status. The term 'priority' used on the GIS layer description slide does not imply a measure of importance; rather, the ponds data included to in the layer represent ponds that have been sampled and where the trophic status has been concluded.

To identify areas where Title 5 compliance issues might be concentrated, the Cape Cod Commission mapped the approximate locations of the Title 5 loan applications. Mr. Detjens clarified that this layer does not tell us anything definitive: loan applications do not signify failure, and systems that were updated without acquiring loans will not be on the layer. The Potential Title 5 Compliance Issues layer attempts to identify geographic areas that could be more likely to exhibit compliance issues according to a set of criteria, including: small size of the land parcels, shallow depth to groundwater at the parcel locations, soils, the quantity of water used on the parcel, and presence of loan applications. This layer is based on the assumption that all parcels are on Title 5 systems. The Commission recently contracted a consultant to collect Title 5 failure and variance information from local health agents. Once the information is compiled, it will be incorporated into the analysis.

Working group members had the following questions and comments about the presentation of the problem (*responses from the Cape Cod Commission are italicized*):

- It seems that nitrogen loads from lawn fertilizers and from impervious surfaces would overlap. How did the Commission differentiate between these? *Impervious surfaces are things like roofs, highways, roads, etc. The Commission counted impervious surfaces as an area and counted contribution of nitrogen from those surfaces. Lawn area conversions are centered on lawns and calculating nitrogen loading from lawns involves assumptions such as a 5000 square foot lawn would require 3 pounds of nitrogen and would have 20% runoff.*
- An assumption built into the MEP analysis and methodology is that by controlling nitrogen you can bring water quality into compliance with EPA and state regulations. Rock Harbor demonstrates that this is not necessarily true, however. As such, it is not

obvious that removing septic nitrogen will necessarily equate with reaching nitrogen goals for water quality.

- Does the Commission's presentation account for the tri-town wastewater treatment facility? *This presentation does not include changes from Comprehensive Wastewater Management Plans (CWMPs), but Massachusetts Estuary Project (MEP) did create a scenario showing this. Can we see this scenario? The Commission will follow up on this request.*
- The information about Title 5 loan applications also implicates the economic standing of the person applying for a loan. *Yes, that is correct. There could be many places where Title 5 infrastructure was repaired or upgraded without a loan.*

EXISTING AND PROPOSED SOLUTIONS

Ms. Daley next presented the existing and proposed infrastructure data layers. The existing infrastructure layer includes attribute data for existing conditions, enhanced attenuation sites, and public supply wells. The proposed infrastructure layer illustrates the locations of natural attenuation sites, existing permitted water treatment facilities, and CWMP sewer-shed phasing, if applicable. They requested group members provide additional information on planned stormwater upgrades and remediation sites. Group members made the following comments and asked the following questions (*responses from the Cape Cod Commission are italicized*):

- There are a number of storm water remediation sites in Orleans that are missing.

WORKING GROUP FEEDBACK

Based on the information they saw, Ms. Smith then asked group members to list the priority actions, priority areas, or issues of greatest concern. Group members made the following comments and asked the following questions (*responses from the Cape Cod Commission are italicized*):

- Why are we including sub-watersheds that do not have MEP data? *The Section 208 Update Plan must include all embayments. Although we do not have full data for these watersheds, we do have data about ponds. The Center for Coastal Studies also has data about these watersheds that the Commission can access.*
- If the Regional plan uses only regional build-outs, how will this be reconciled with town planning drawing on community-level buildouts? I am uncomfortable not using our town's buildouts, which were worked on extensively. *The Commission created a parcel-by-parcel buildout model based on local zoning regulations and these models are useful for citizens to understand what their zoning allows, and to have a standardized view of the entire Cape. The Commission will avail itself of the local buildout work because the Commission understands that its model is theoretical. Nevertheless, the regional buildout is helpful for regional solutions. The Commission recognizes that in the specific watersheds, the Section 208 Update process will need to use watershed-based buildouts for recommending local treatment solutions.*
- Buildout models should account for both supply and demand, not just zoning potential. Also demographics and trends about population, and should be consistent with the time horizon of any infrastructure.

- The Working Group needs to account for three towns in different points in their data collection. The area cannot have one town push forward too fast while the others are held back.
- Having several buildout scenarios is valuable as it allows for sensitivity testing that would not be possible with only one buildout scenario.
- The data is somewhat overwhelming. I have no way of assessing its accuracy, importance, priority, or sufficiency. *The Commission can help to contextualize and characterize the different types of data and how it could be used in the decision-making process.*
- Buildout should account for possible reuse of lots, the demolition of old homes, and the construction of large homes. *The Commission has discussed redevelopment and thinks that there is significant amount of development that can occur this way.*
- Wastewater presents an inherent incentive for the three communities to work together, as there are financial incentives to collaborate. Even if imperfect in its details, the data shows that there is a problem.
- Disagreement is about the cause of the problem, and the most economical ways of dealing with the solutions. We need to look at all the sources of stress, all the possible solutions, and the unintended consequences of any decision we make. Affordability is a very important factor. We also need to think about how we define and measure success.
- We should include the Silent Spring study that found contaminant of emerging concern.
- As we collaborate, we need to think about how we allocate use of Namskaket, as the only watershed with additional nitrogen assimilative capacity.
- In addition to a planning horizon, we need to adopt a treatment horizon and a regulatory horizon. How will we anticipate changing regulatory requirements, including those for contaminants of emerging concern.

OPERATING PROTOCOLS

Ms. Smith briefly reviewed the draft protocols and requested the group members suggest changes to the groundrules within one week. She reiterated the primary role of the group members is to provide guidance on the development of solutions to address the water quality issues specific to their watershed. Ms. Smith also reiterated that CBI works on behalf of all the participants at the table and that CBI will try to balance their needs for the process as fairly and transparently as possible. She noted that high level meeting summaries will be produced for each meeting and that working group members will have a chance to suggest corrections and edits to the summary before they are finalized for public distribution.

NEXT STEPS

Ms. Daley presented the technologies matrix and described the upcoming meetings. The technologies matrix organizes a mixture of remediation, reduction and prevention techniques that can be deployed at the site level, neighborhood level, watershed level, or Cape wide. In response to a question about number of alternatives, she noted that it was meant to be comprehensive, but that not all technologies would be seen as appropriate in all the Watershed

Working Groups. In the coming weeks, the Cape Cod Commission will distribute 1-2 page fact sheets about each technology. During the October meeting, group members will be expected to be prepared to discuss the merits of the technologies and begin to assess which technologies would be most appropriate to address the issues in their watershed.

Ms. Daley explained that workshop three would center around an alternatives screening method. The Commission is taking a two-pronged approach to the examination of alternatives, including looking at more traditional methods, but also looking at all greener, alternative options to sewerage and how these might fit into the overall solution.

The 7-part process was as follows:

- 1) Establish targets and articulate project goals.
- 2) Identify priority geographic areas
- 3) Determine which management activities should definitely be implemented. These might be the easiest and least costly management activities that should be undertaken regardless of other management actions.
- 4) Assess alternative options to implement at the watershed or embayment scale
- 5) Assess options to implement at the site-level
- 6) Examine priority collection/high density areas
- 7) Consider traditional sewerage or other grey infrastructure management options

PUBLIC COMMENTS

The facilitator opened the floor for public comments. The following statement was made:

- The discussion today focused on the loss of population, but we are also gaining. NGOs are very important in terms of educational exercises that they are conducting to get us to this point. For the next discussion, all of the issues need to be put out on the table first before getting into the discussion.

**Appendix A
Attendance**

Paul Amman
Kenneth Ainsworth
Donald Arthur
Sandy Bayne
Judith Bruce
Lynn Bruneau
Amy Costa
Jane Crowley
Joy Cuming
Tom Daley
Ed Daly
Karin Delaney
Ed DeWitt
Lisa Dillon
Bob Donath
Jeff Eagles
Cheryl Eisner
David Farquhar
Gary Furst
Kevin Galligan
Charles Harris
Carl Harris
Steven Hertz
John Hodgson
Pat Hughes
Charles Ketchuck
Martin McDonald
Sandy McFarlane
Sims McGrath
Dan Milz
Ed Nash
Ginia Pati
Lori Roueche
Judy Scanlon
Len Short
Sid Snow
Bruce Taub