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

**Meeting One**
**Tuesday, September 24, 2013**
**Cape Cod Commission, 3225 Main Street, Barnstable, MA 02653**
**8:30 am - 12:30 pm**

8:30 Welcome – *Cape Cod Commission*

8:35 Introductions, confirm working group membership and participation – *Carri Hulet (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 – *Scott Horsley (area manager)*

9:30 Review and add to chronology of work to date – *Working Group*

9:45 Discussion: drawing on past work to move forward – *Carri Hulet and Working Group*

10:00 Baseline Conditions: Understanding Your Watershed and its Water Quality Problem – *Scott Horsley (area manager)*

10:45 Break

11:00 Discussion of Baseline Conditions – *Carri Hulet (facilitator) and Working Group*

11:30 Review/Discuss Process Protocols – *Carri Hulet (facilitator) and Working Group*

12:00 Framework for Moving Forward: Preview Meetings 2 and 3 – *Scott Horsley (area manager)*

12:10 Public Comments

12:30 Adjourn

# Cape Cod Bay Group

## Baseline Conditions & Needs Assessment

# What is the 208 Plan?

# Clean Water Act Section 208

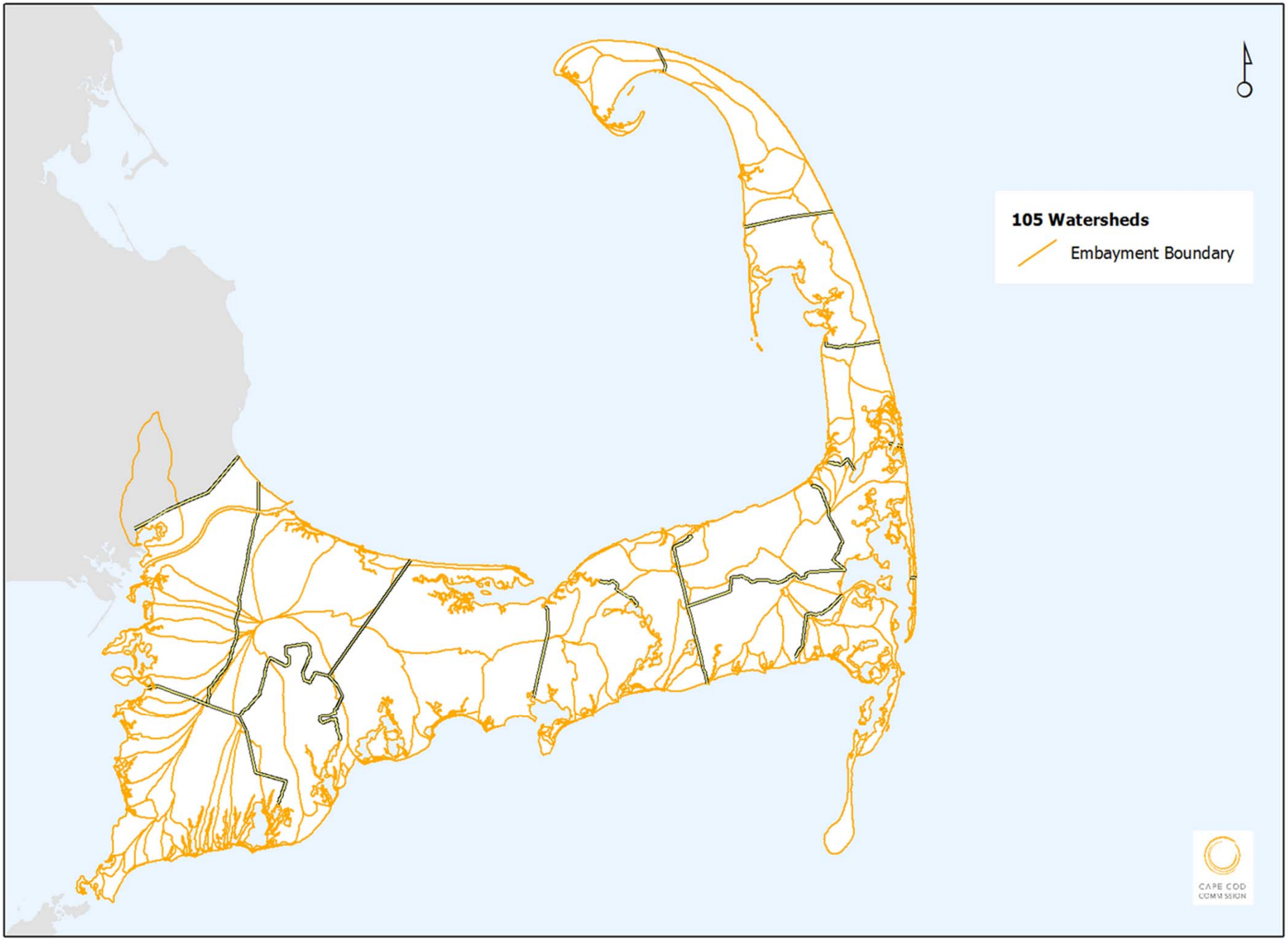
The Commission was directed to update the 1978 Plan

The Commonwealth provided $3 million to fund the project

# Focus on 21st Century Problems

- Nitrogen: Saline Waters
- Phosphorus: Fresh Waters
- Growth & Title 5 Limitations

"Watershed Working Group - CC Bay Group - Workshop 1"



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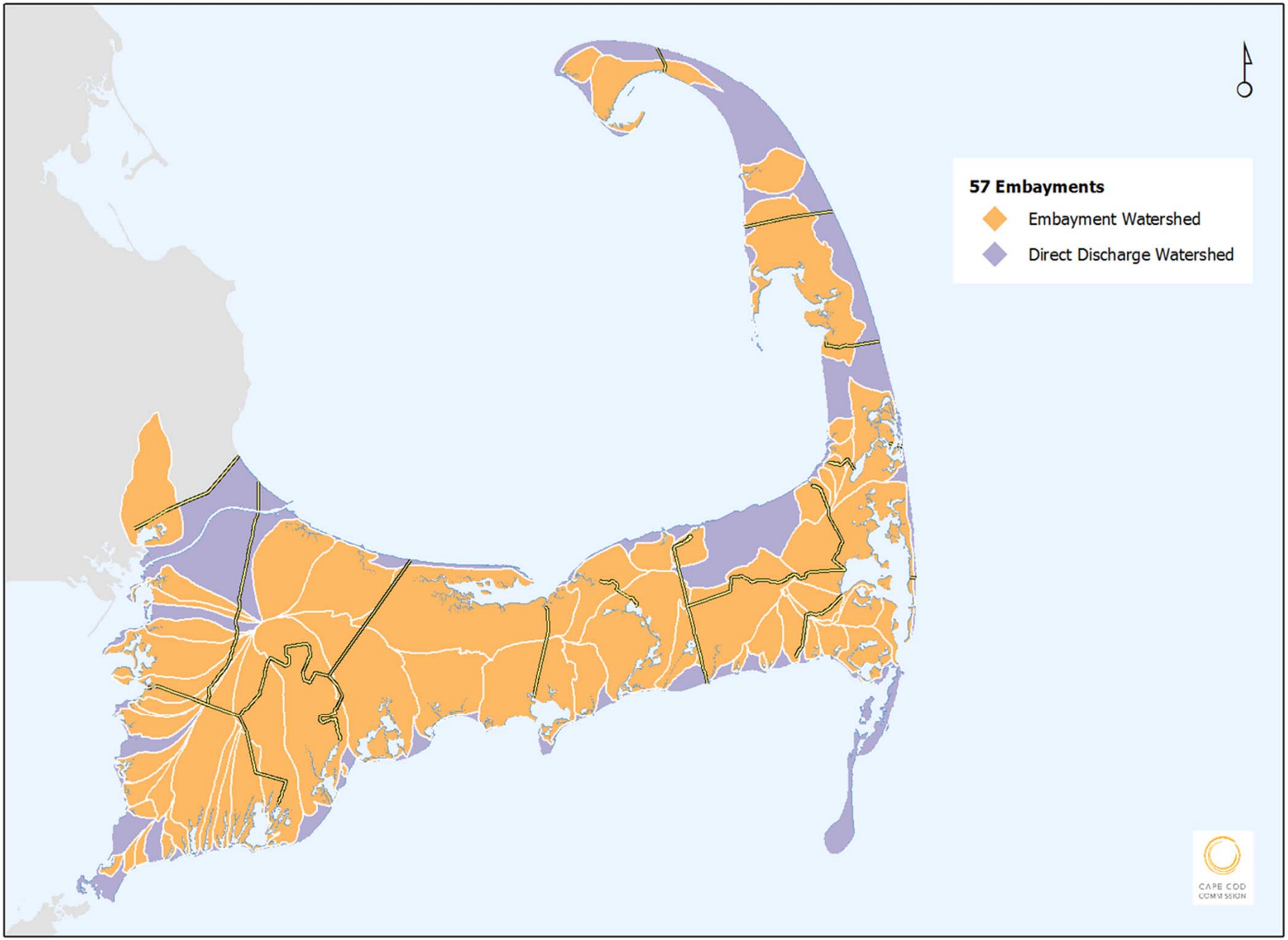
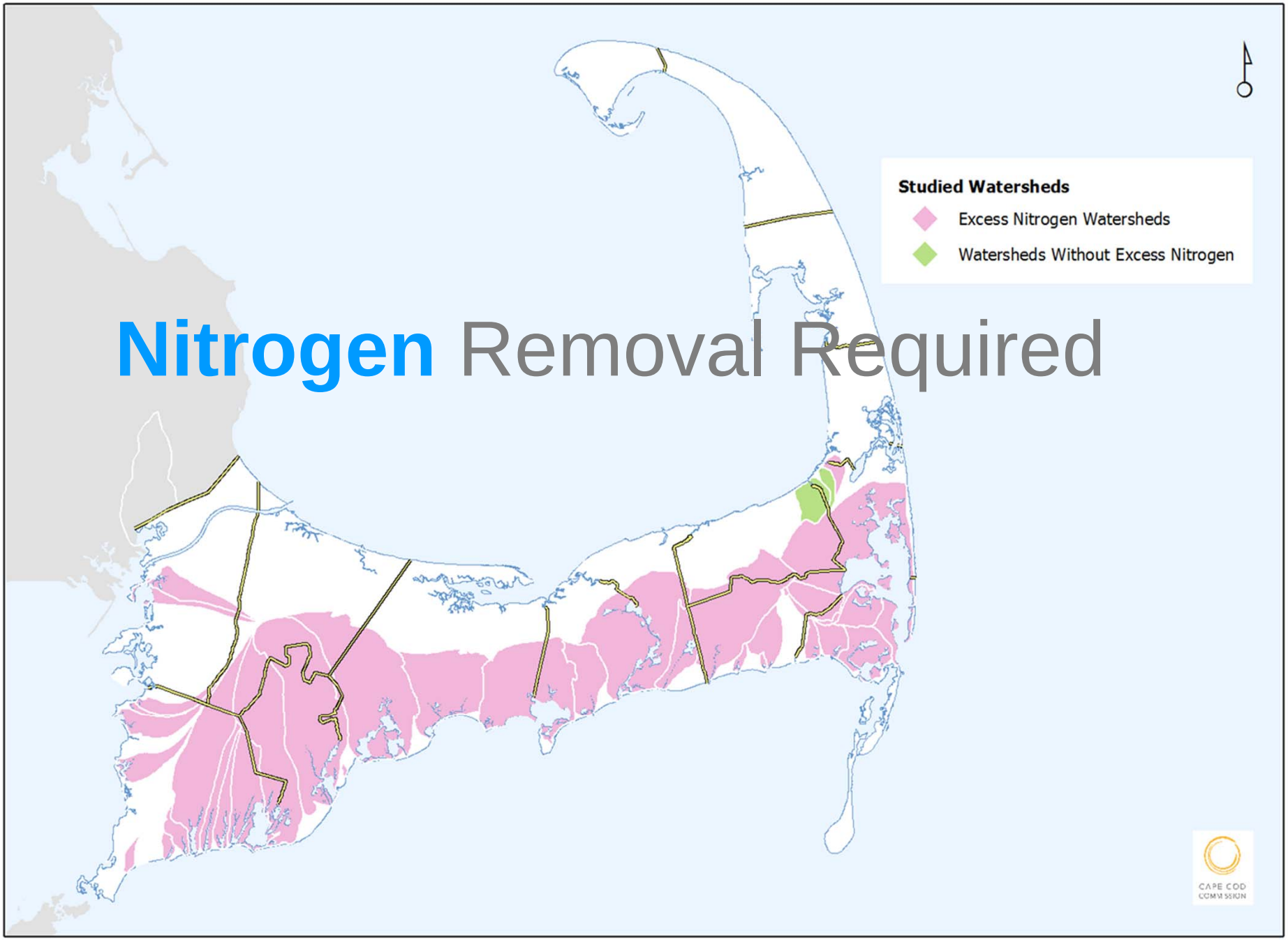
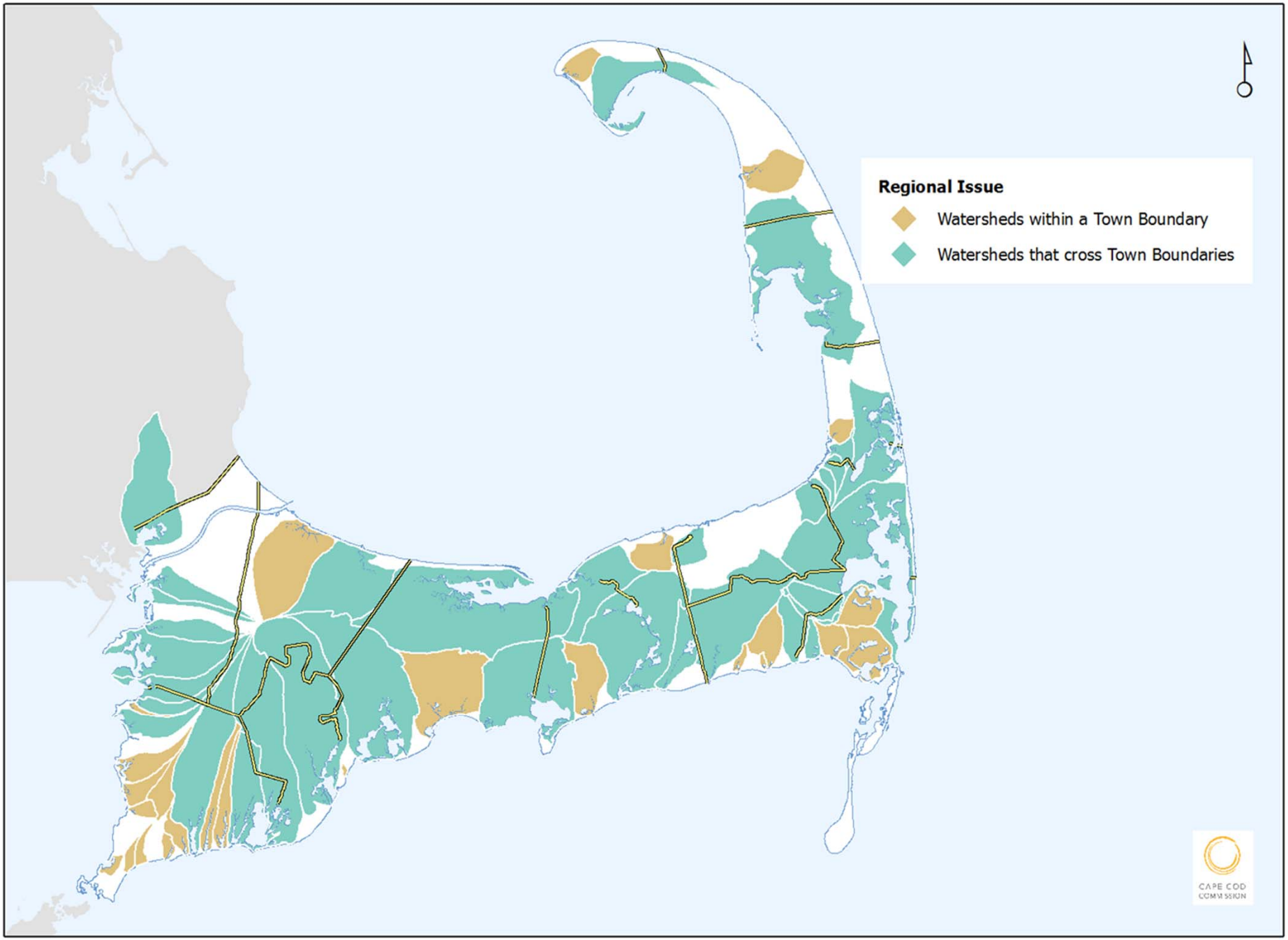



Studied Watersheds
Excess Nitrogen Watersheds
Watersheds Without Excess Nitrogen
Nitrogen Removal Required
CAPE COD COMMISSION

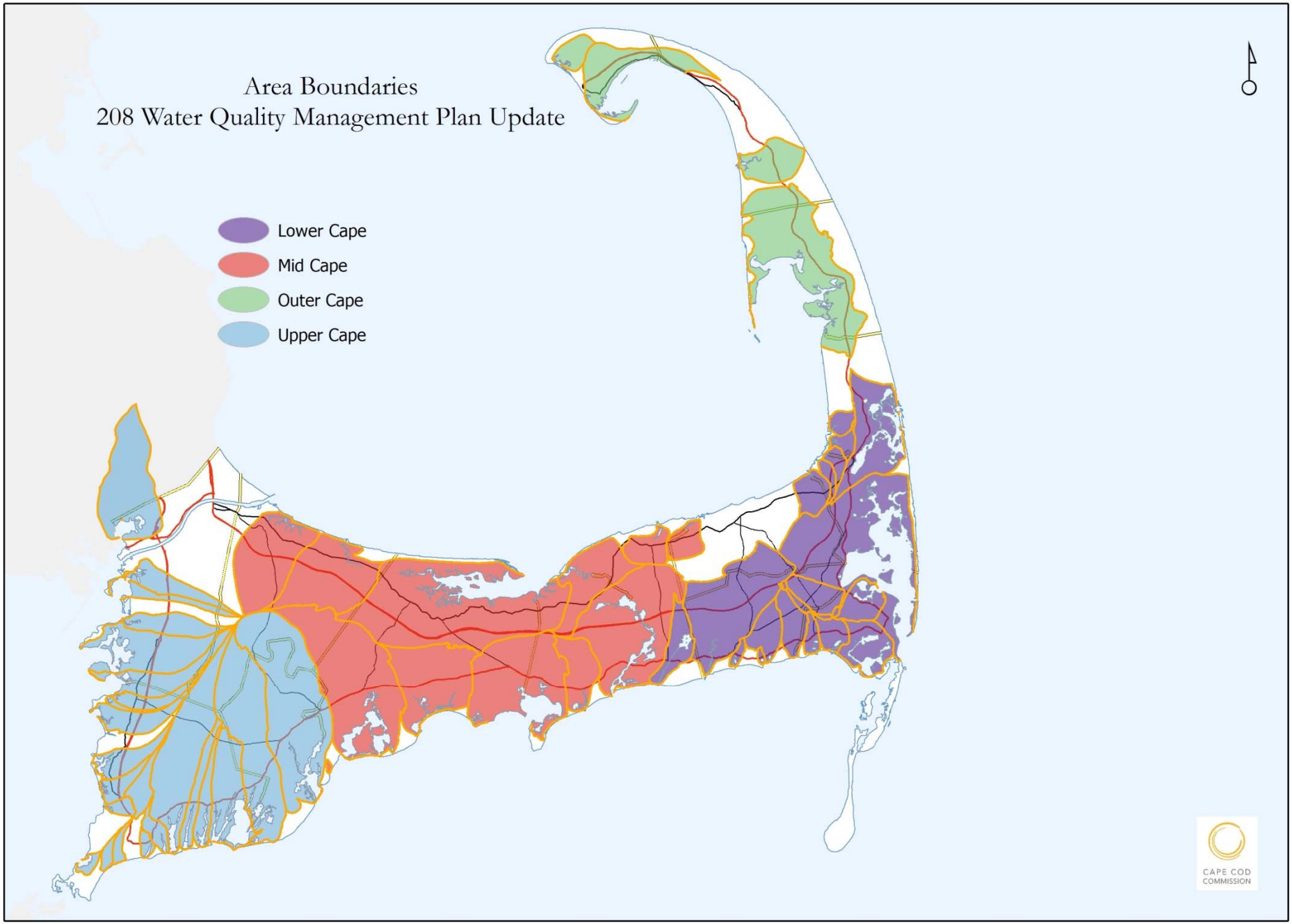
"Watershed Working Group - CC Bay Group - Workshop 1"

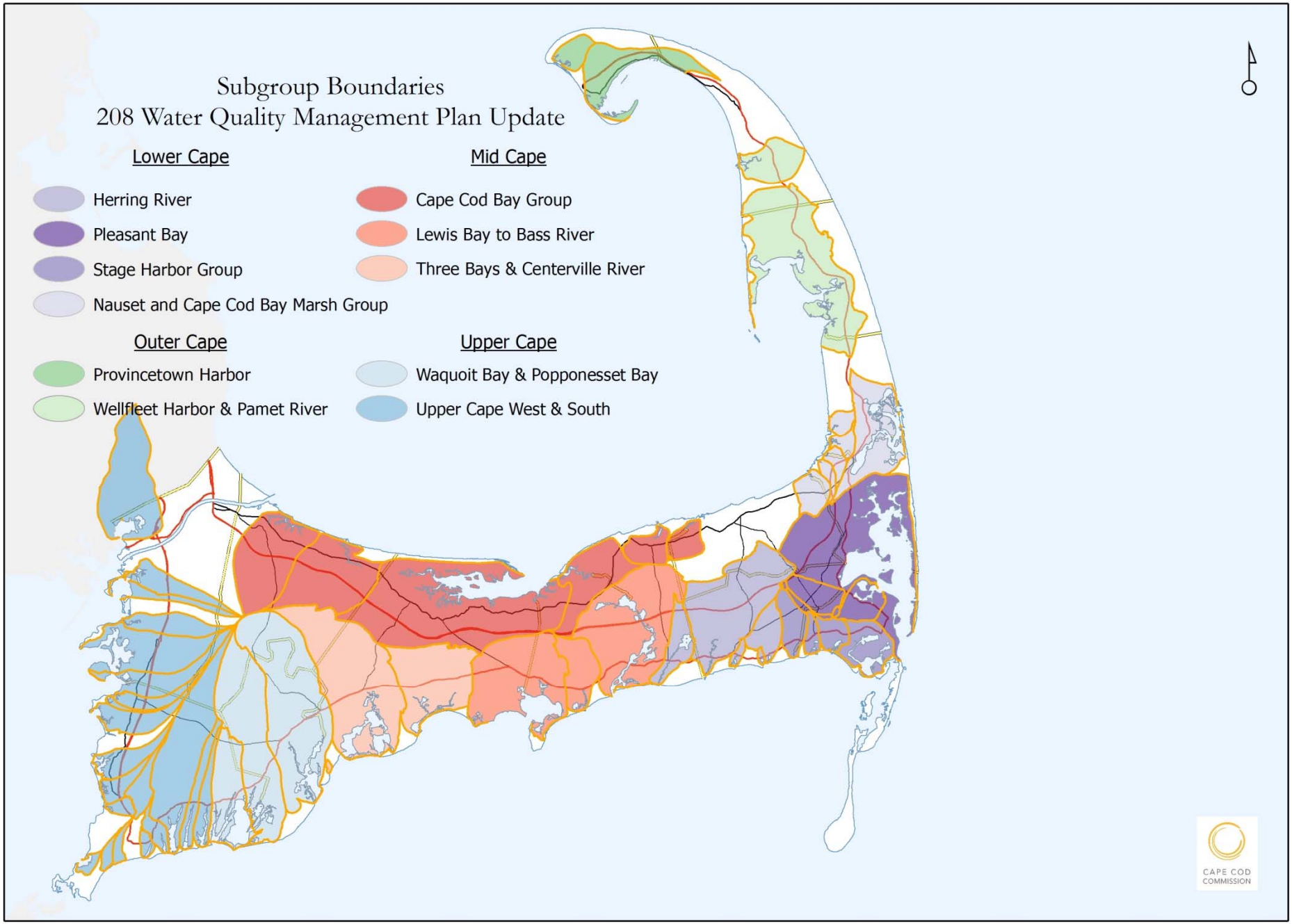


# Approach to the 208 Plan Update

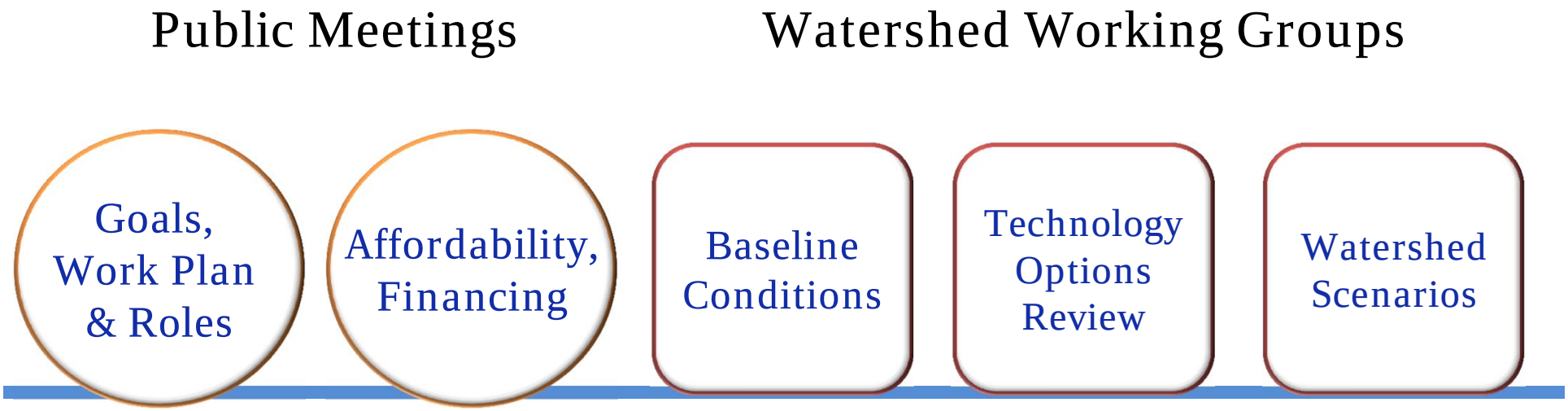
- Watershed Based
- Stakeholder Engagement
- Maximize Benefits of Local Planning
- No Optimal Solutions

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

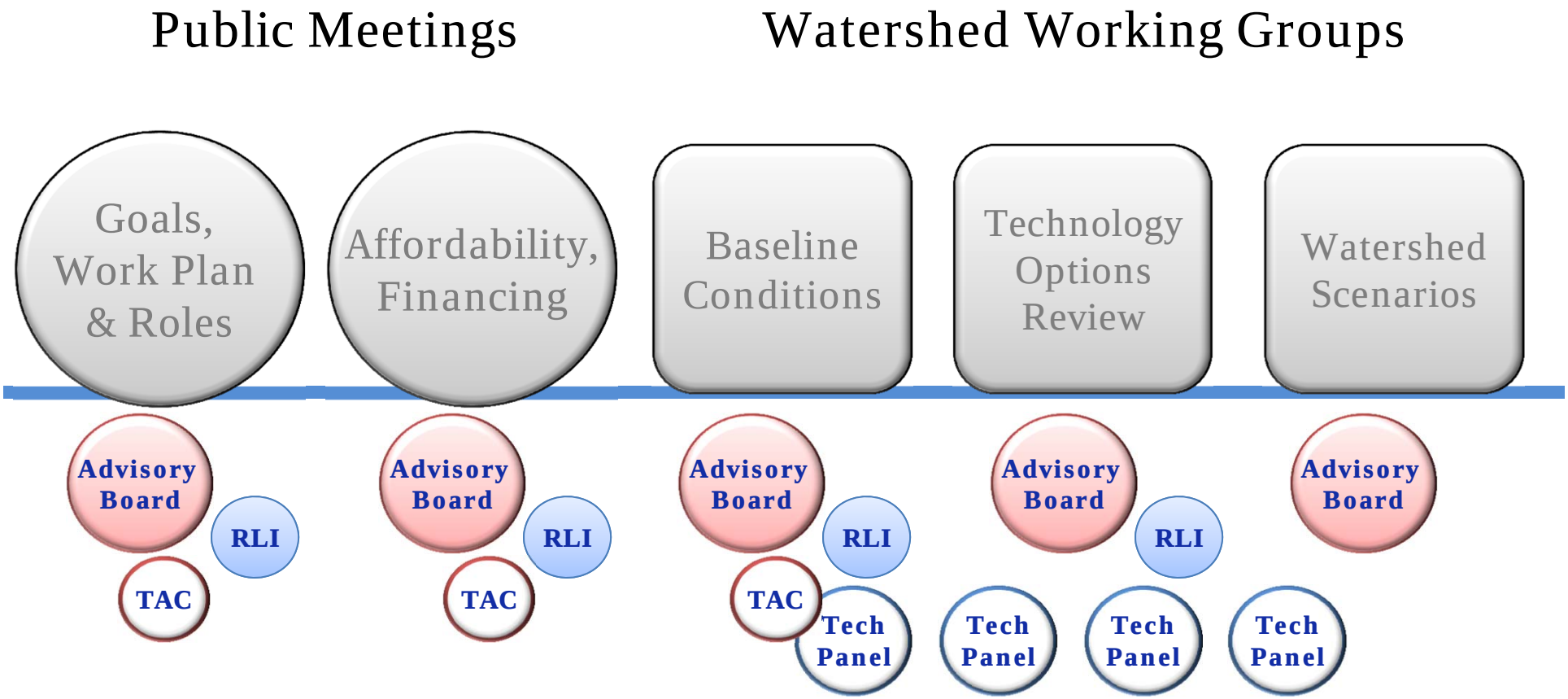

Area Boundaries
208 Water Quality Management Plan Update
Lower Cape
Mid Cape
Outer Cape
Upper Cape
CAPE COD COMMISSION


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
CAPE COD COMMISSION

# What is the stakeholder process?




# 208 Planning Process



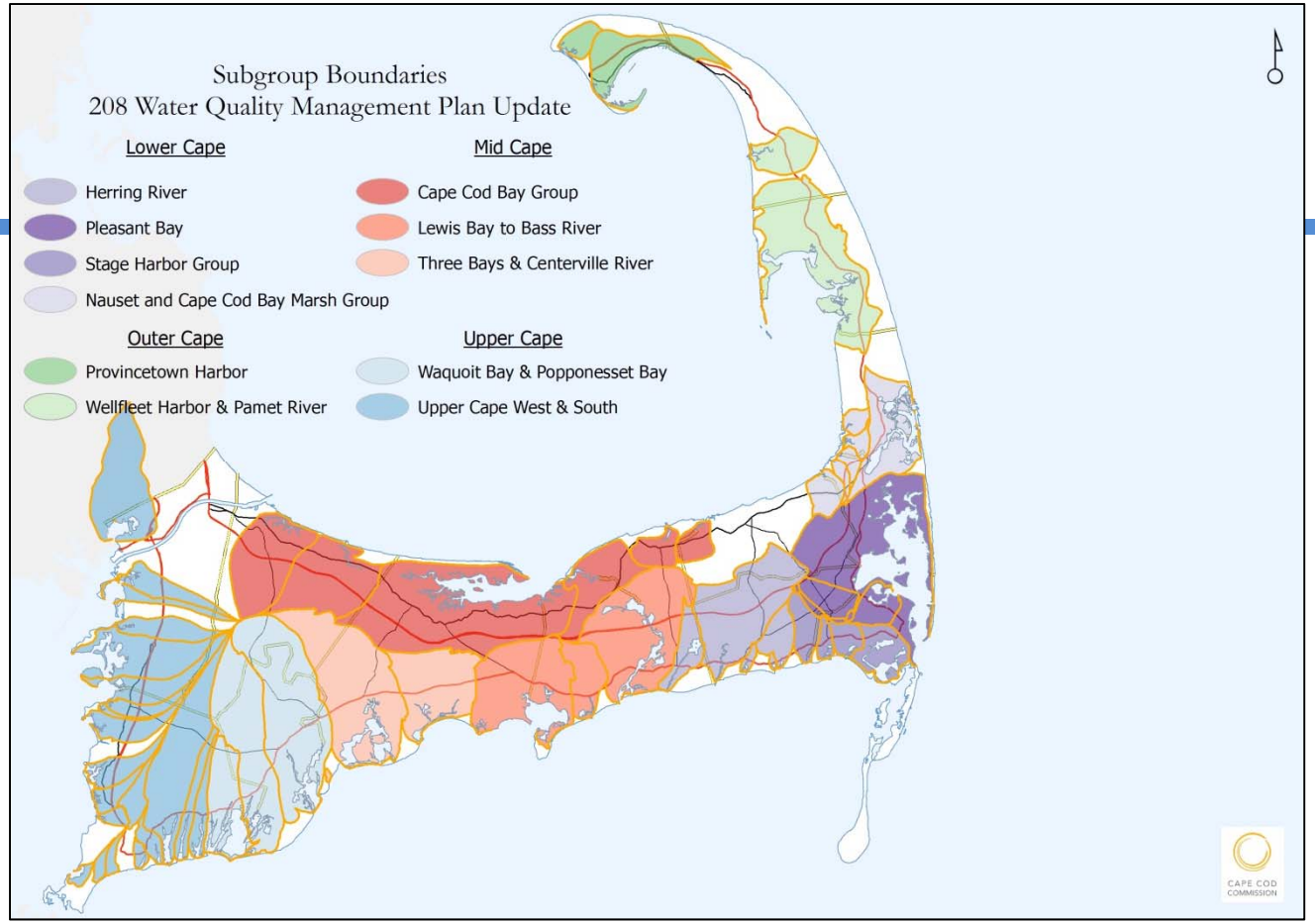

**RLI** Regulatory, Legal & Institutional Work Group

**TAC** Technical Advisory Committee of Cape Cod Water Protection Collaborative

# 208 Planning Process

Baseline Conditions

11 Working Group Meetings: Sept 18-27



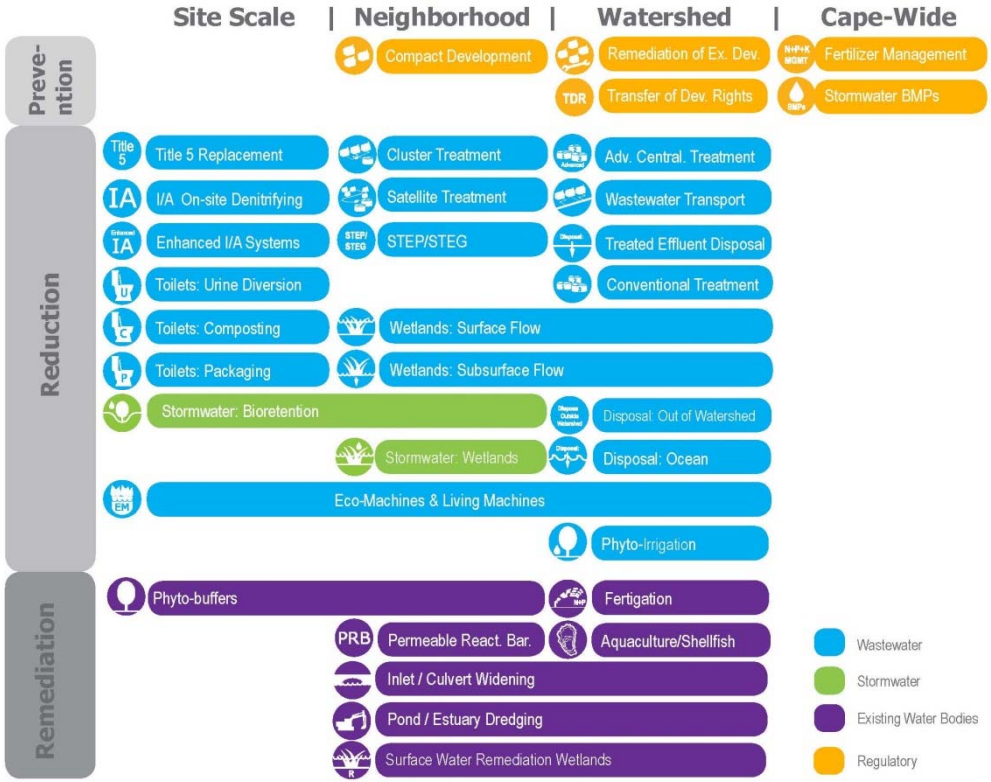

# 208 Planning Process

Baseline Conditions

11 Working Group Meetings: Sept 18-27

Technology Options Review

11 Working Group Meetings: Oct 21-Nov 5




# 208 Planning Process

**Baseline Conditions**

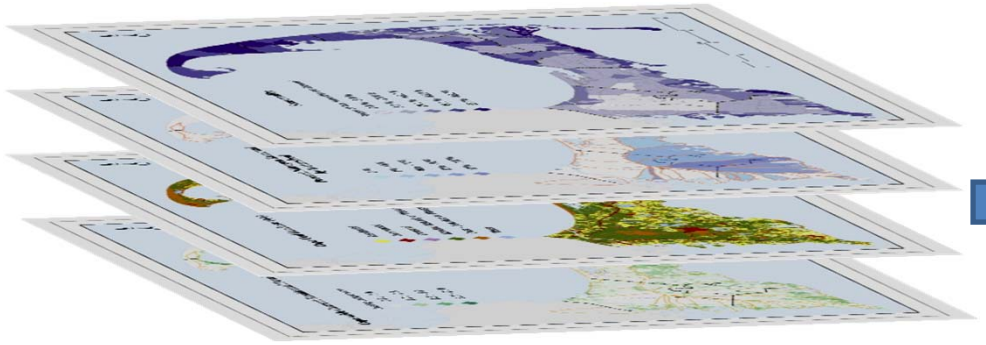
11 Working Group Meetings: Sept 18-27

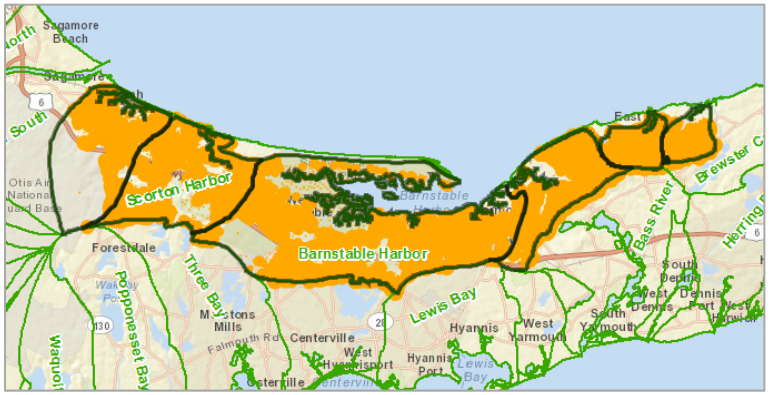
**Technology Options Review**

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:

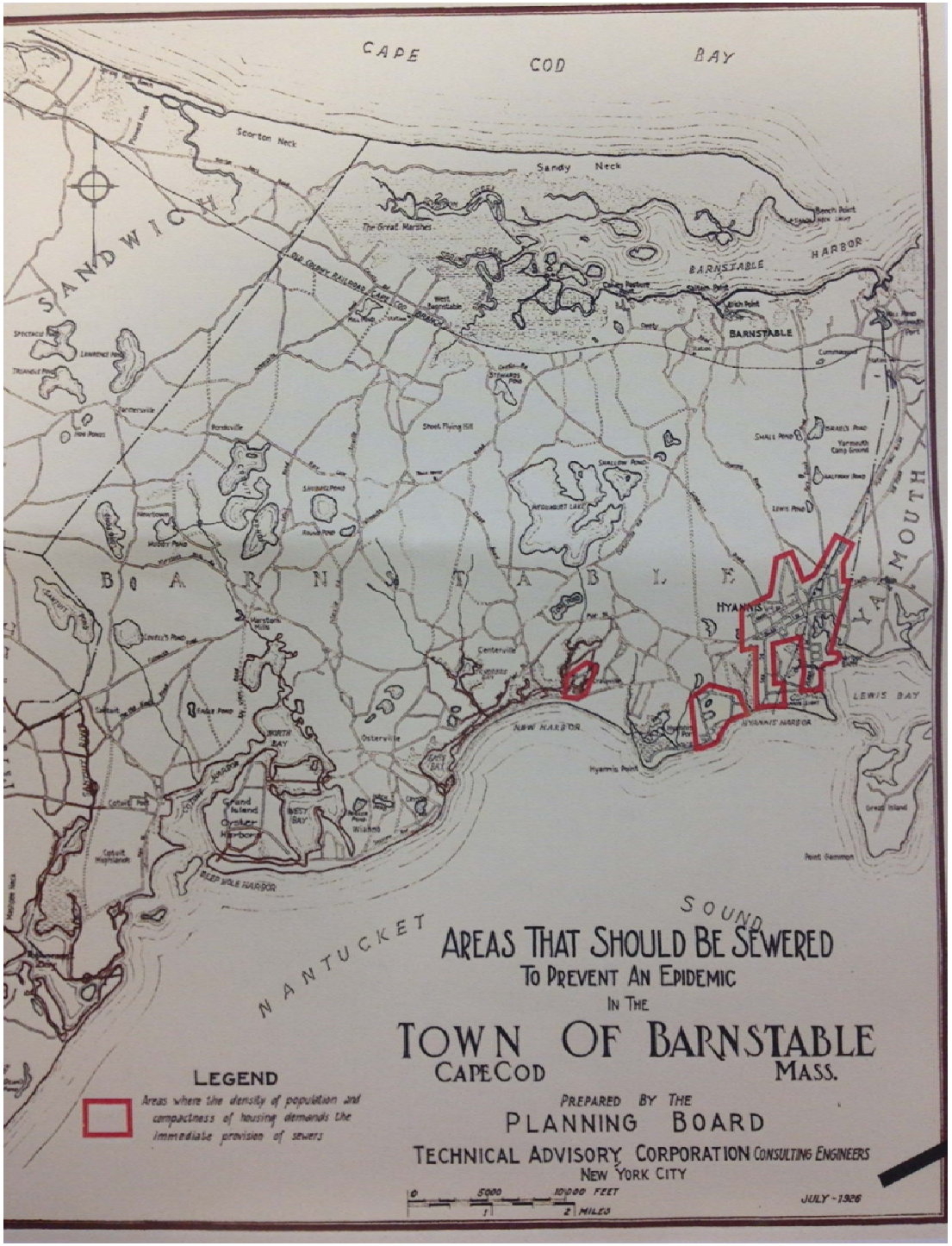
To review and develop shared understanding of the characteristics of these watersheds, the work done to date, existing data and information available, and how to apply all of this to planning for water quality improvements for these watersheds moving forward.

**208 Planning Process**

# Local Progress to Date

Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

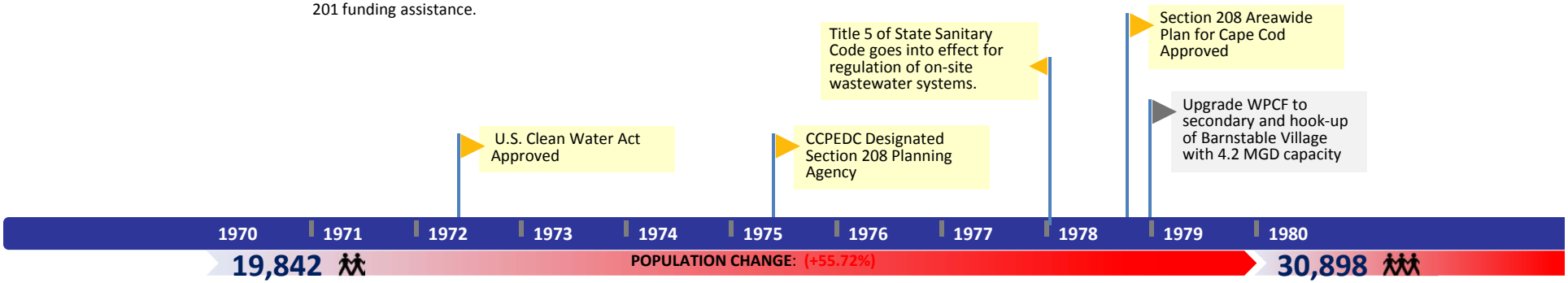
"Watershed Working Group - CC Bay Group - Workshop 1"



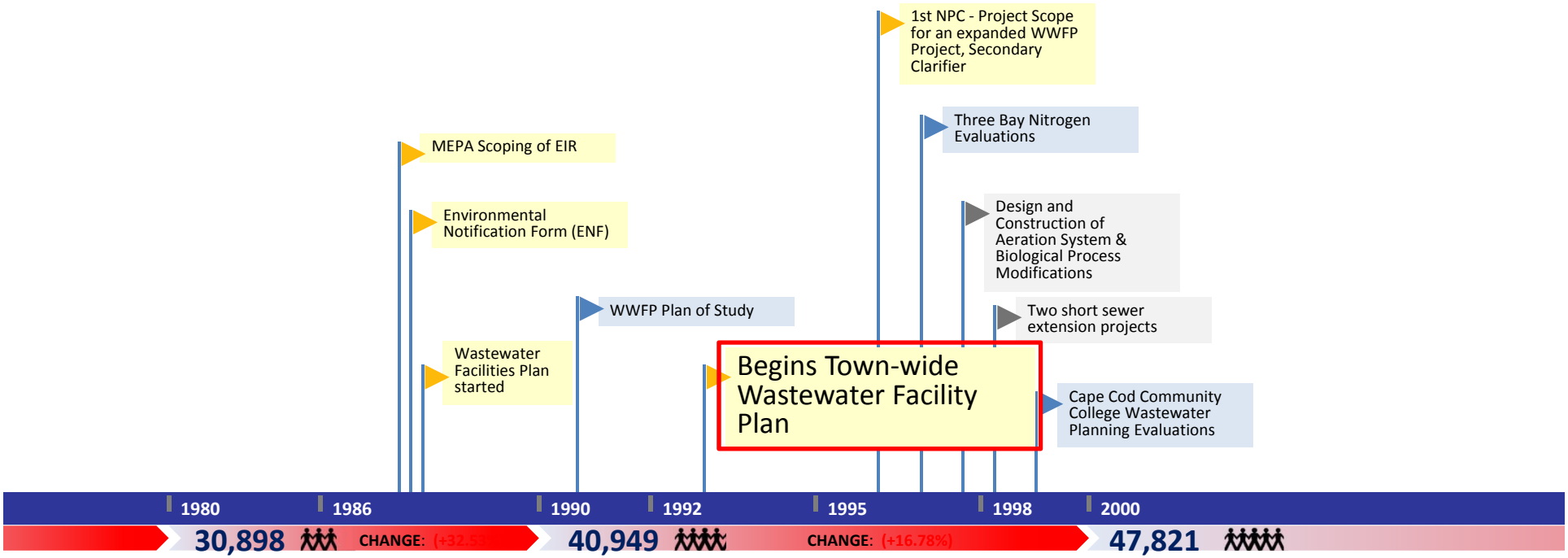
# Barnstable: 1970-2013

## From 1978 Section 208 Plan

- The major 208 concern for Barnstable is the protection of its public water supply wells.
- The Planning Board appears to be interested in water supply protection as indicated by its recent zoning proposals. The coordination of town boards and the water utilities is essential to the success of this effort in Barnstable.
- Possible consolidation of the water utilities or some formal coordinative mechanism should be seriously considered to insure efficient and effective protection of the town's water resources.
- While the town is presently constructing an expansion of the sewage treatment plant and collection system with EPA 201 funds, it has not addressed all of the wastewater management problem areas in the town. Additional 201 facilities planning must be carried out to demonstrate a sewer need exists under present EPA criteria.
- Certain problem areas are included as future phases of the sewer collection system expansion in the "Sewer Service Areas" delineated in the 208 plan and would be eligible for 201 funding assistance.
- The present Hyannis treatment plant has the necessary capacity to handle all sewer service area needs in Hyannis. Should the town want to expand the collection system beyond these sewer service areas, 201 funds will not be available for these expansions or for an additional treatment plant.
- The need for collection system expansion in the Hyannis area should be carefully considered in assessing the plant's ability to accept wastewater from Yarmouth since the Hyannis treatment plant cannot be expanded beyond its present capacity.
- The town should consider, in the near future, entering into a 201 facilities plan to resolve the present Category 2 problem areas possibly through decentralized solutions.
- The 201 study and efforts of town board should address the coastal water quality problems of the town, particularly Lewis Bay.



# Barnstable: 1970-2013



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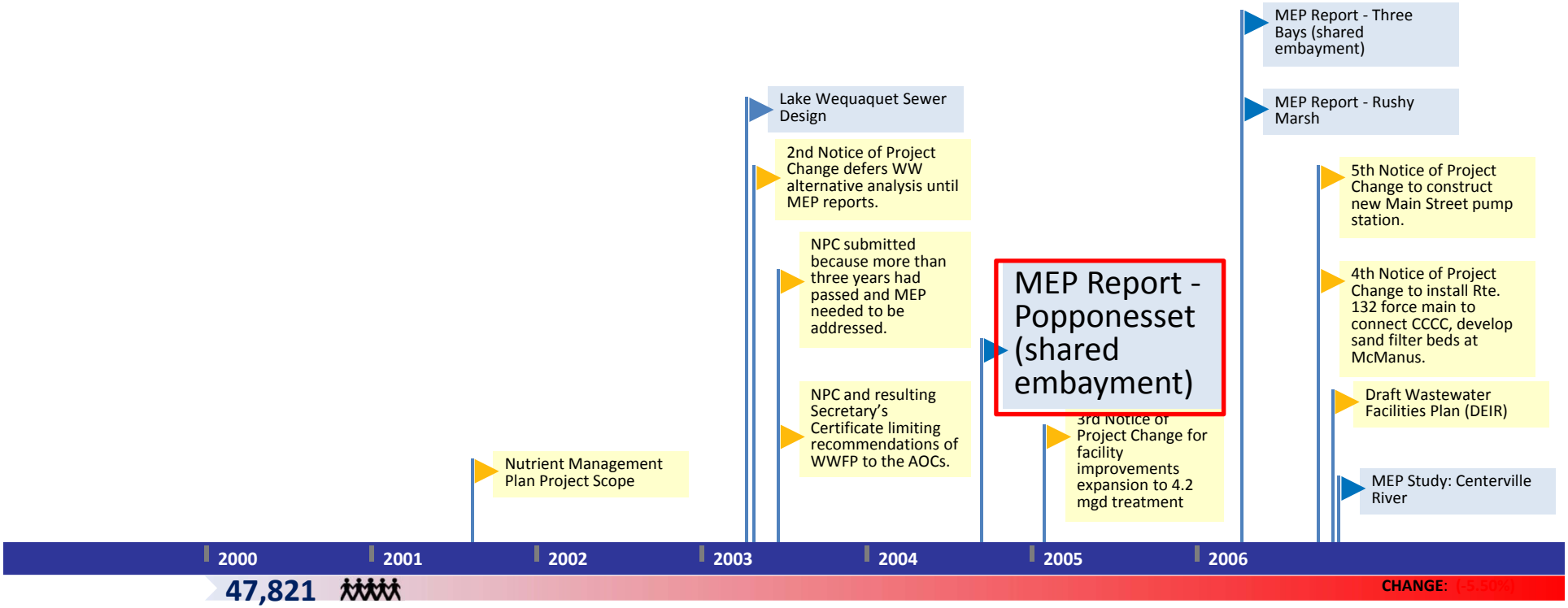

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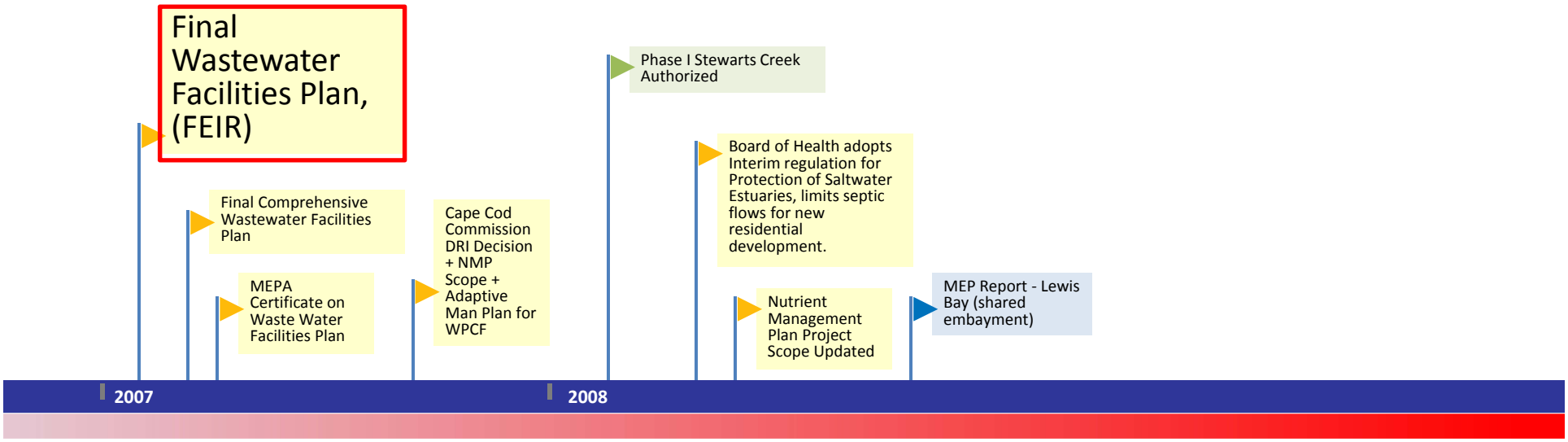

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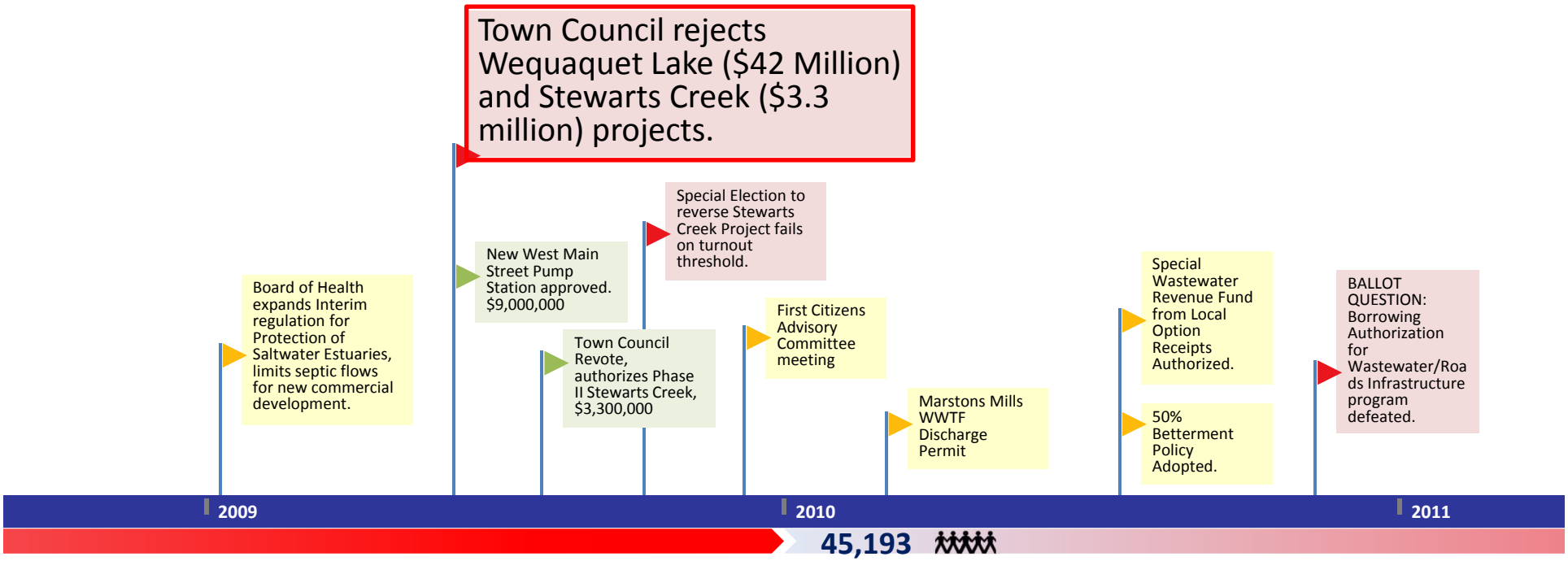

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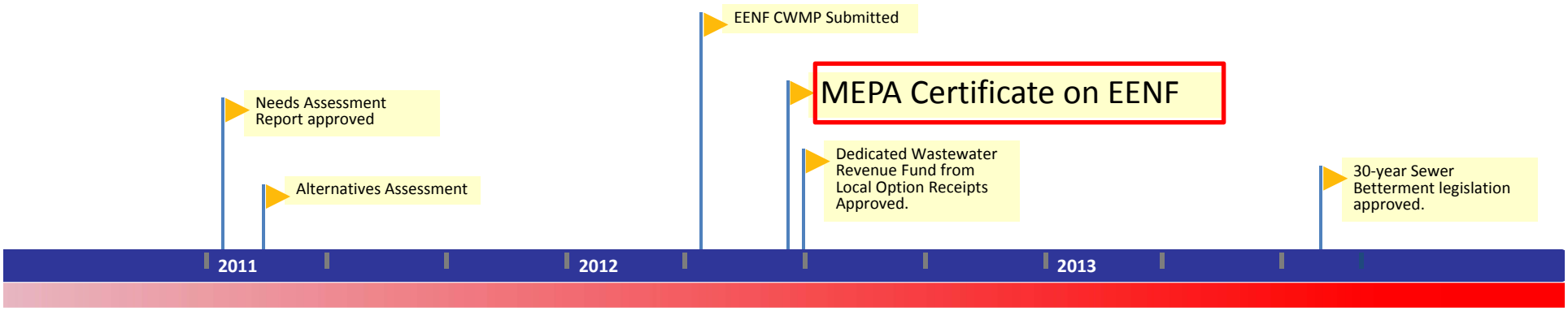
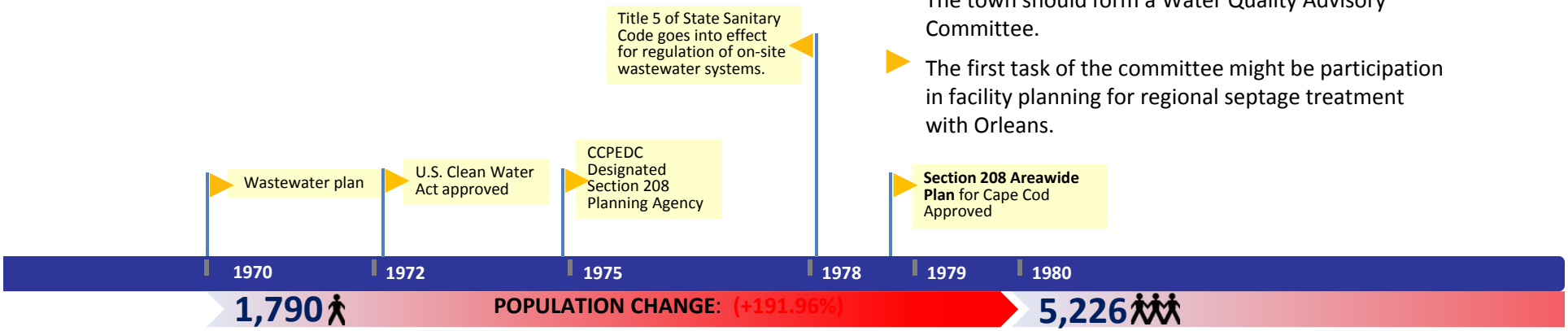


# Brewster

## 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.



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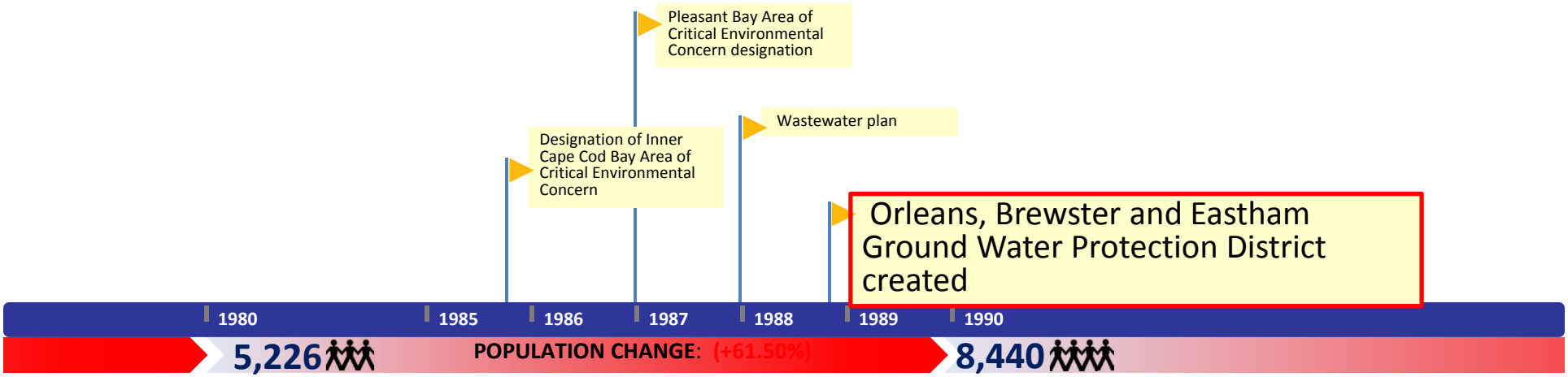

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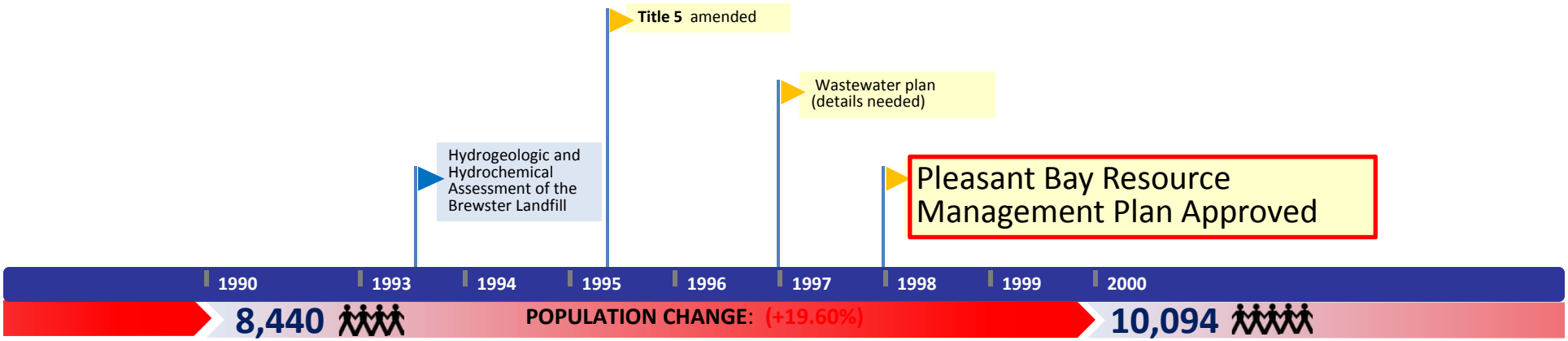

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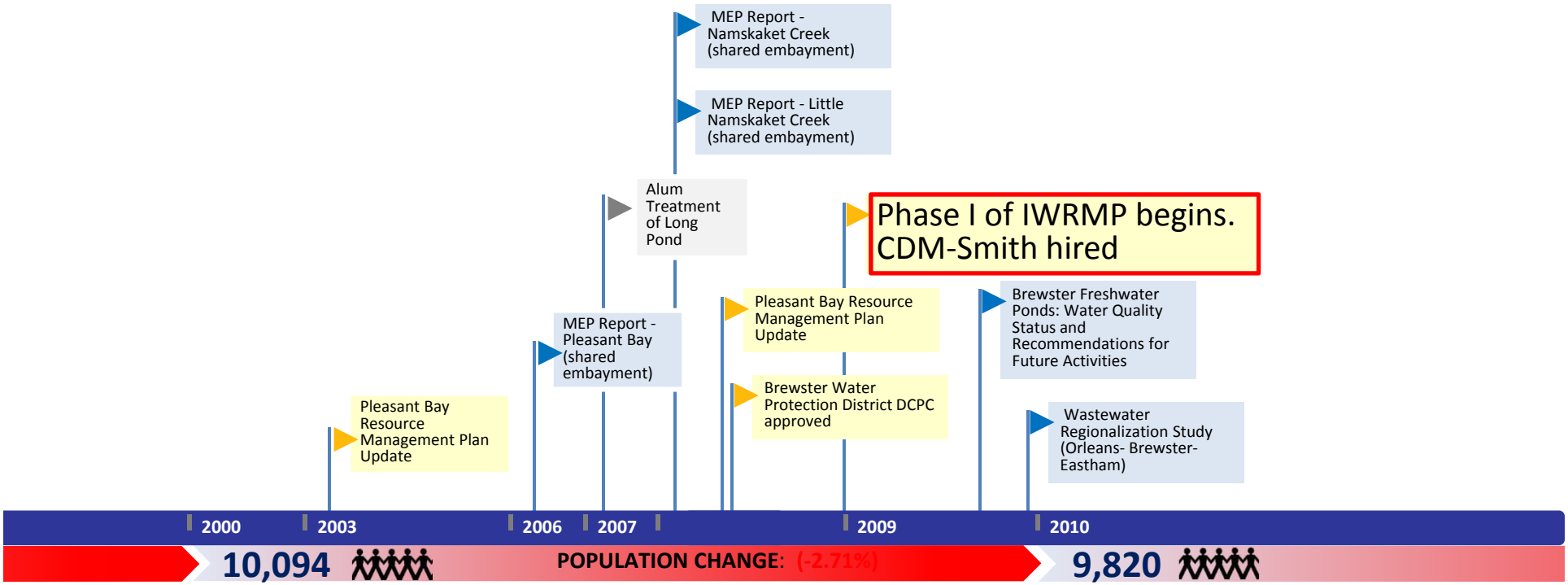

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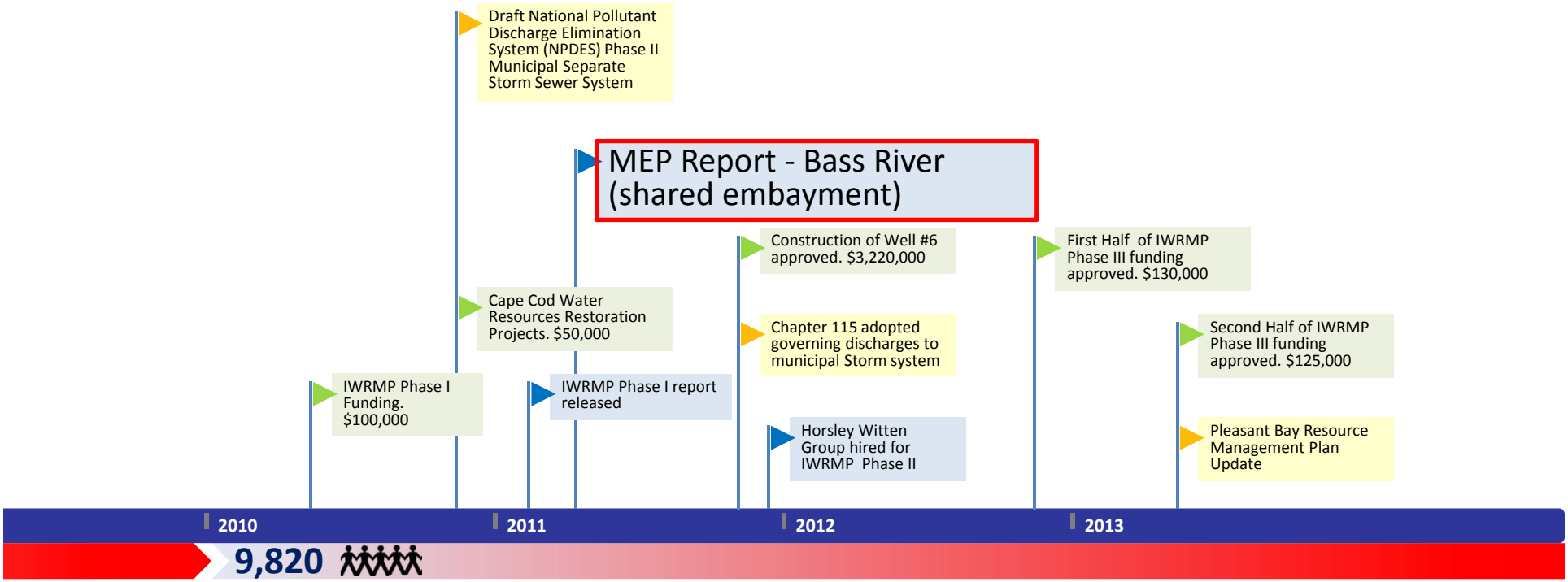
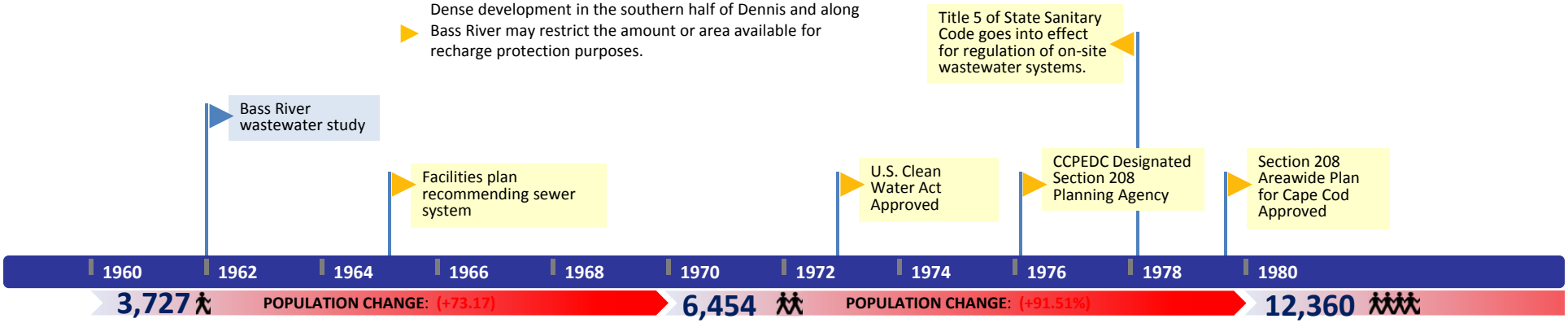


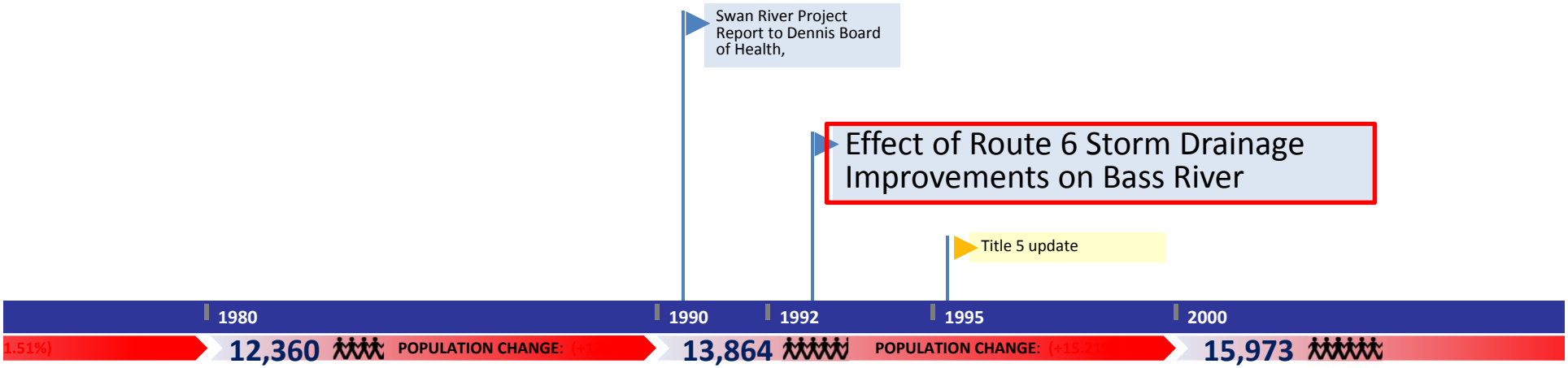
# Dennis

## From 1978 Section 208 Plan

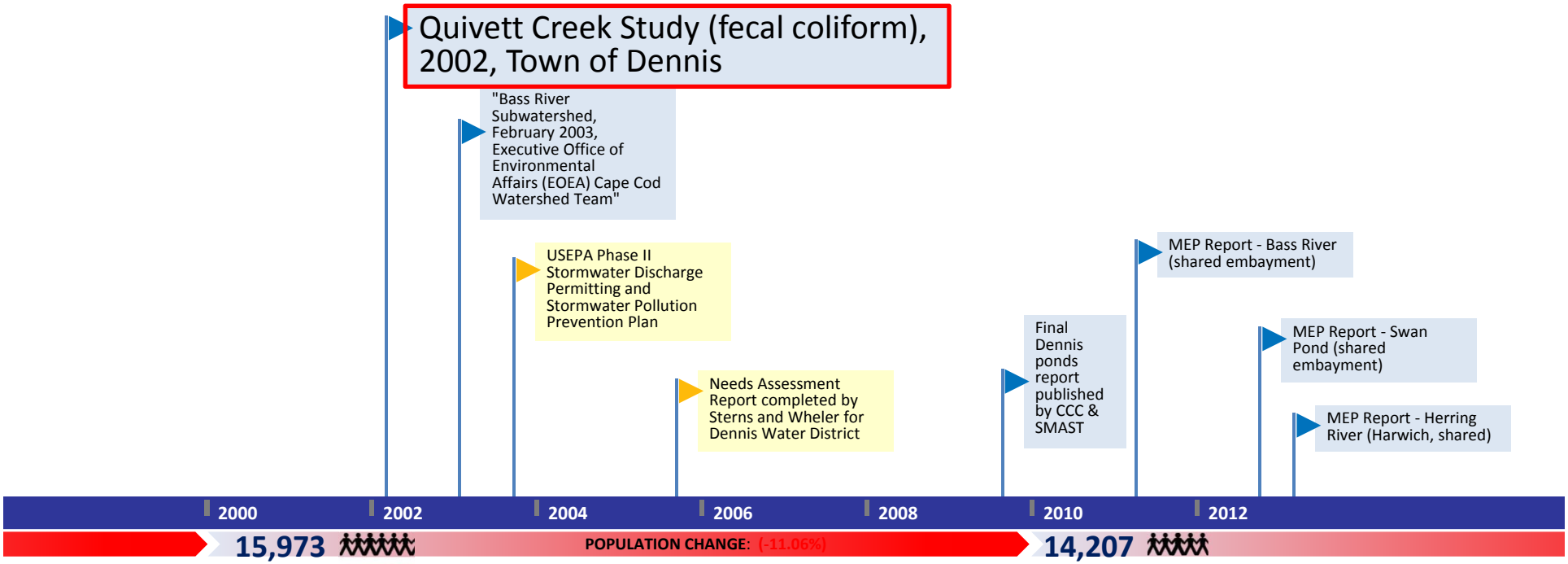
- Dennis has a professional health agent and the town's health regulations already implement many of the 208 plan recommendations.
- It is recommended that the town consider creating a "Seasonal Residential District" in the area south of Lower County Road and carefully control the conversion of seasonal 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.



# Dennis: 1970-2013



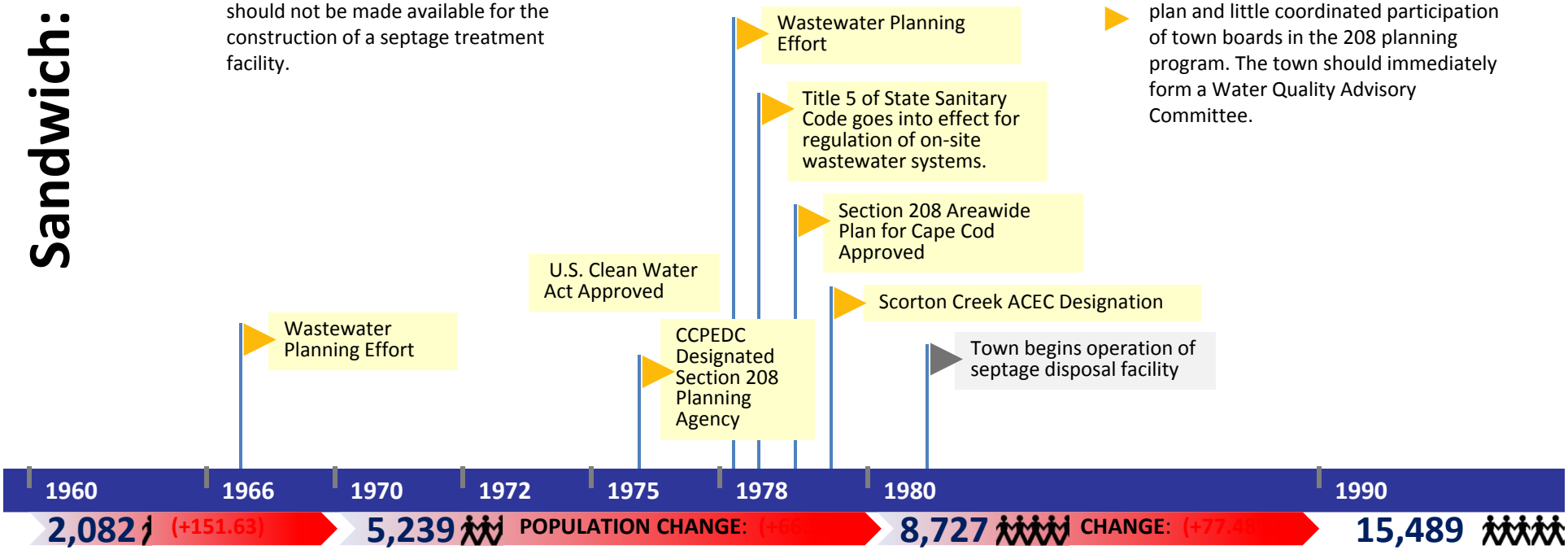
# Dennis: 1970-2013



# Sandwich: 1960-2013

## From 1978 Section 208 Plan

- A sewer facilities plan was completed for Sandwich in 1978. The plan calls for a small outfall into the Cape Cod Canal, which now could only be allowed through a special act of the legislature.
- Should the town fail to act by 1980, a DEQE investigation of Title 5 violations should be initiated.
- A septage treatment facility would not provide a comprehensive solution and could not be considered to be consistent with the 208 plan. Funds should not be made available for the construction of a septage treatment facility.
- The town health agent should strictly enforce Title 5 and should seek additional qualified personnel to implement the 208 recommended on-site systems management program.
- The town has taken progressive steps to increase lot sizes to at least one acre in most areas of town. The town has indicated willingness to cooperate with the 208 staff in delineating watershed areas and in adopting Watershed Protection Districts.
- The problem of the State Fish Hatchery discharging over half a million gallons of fresh water must be addressed by the Department of Fisheries and Wildlife as recommended in the "Water Conservation" section of the final plan.
- The town should actively participate in regional solid waste planning to develop a long-range solution to its solid waste management problems.
- There has been a serious delay in action on the town's proposed sewer facility plan and little coordinated participation of town boards in the 208 planning program. The town should immediately form a Water Quality Advisory Committee.



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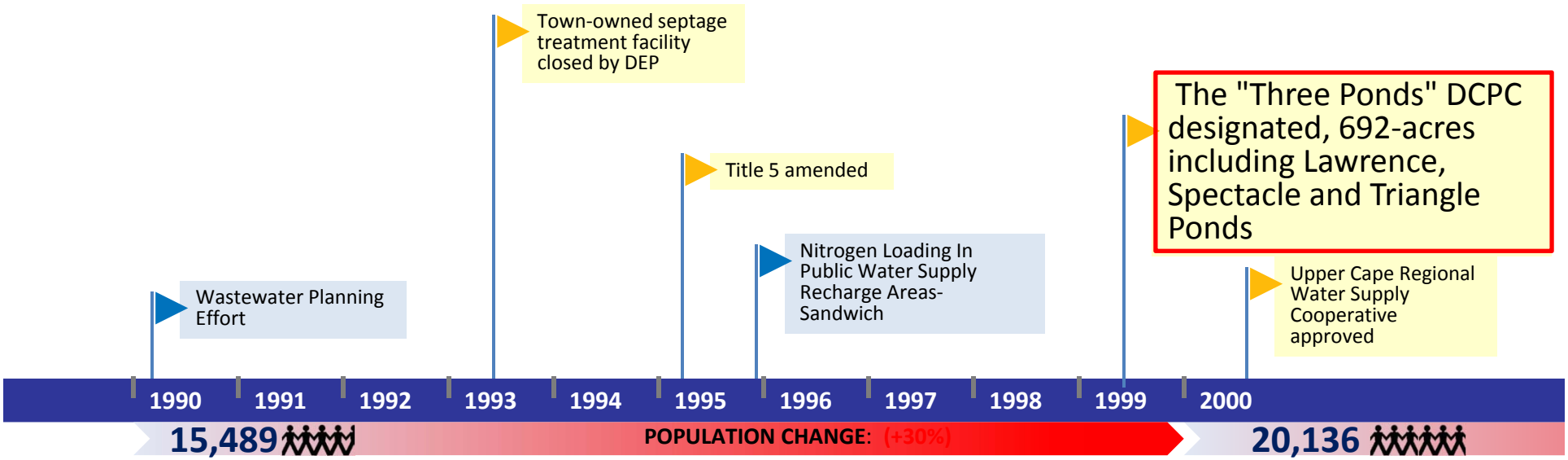

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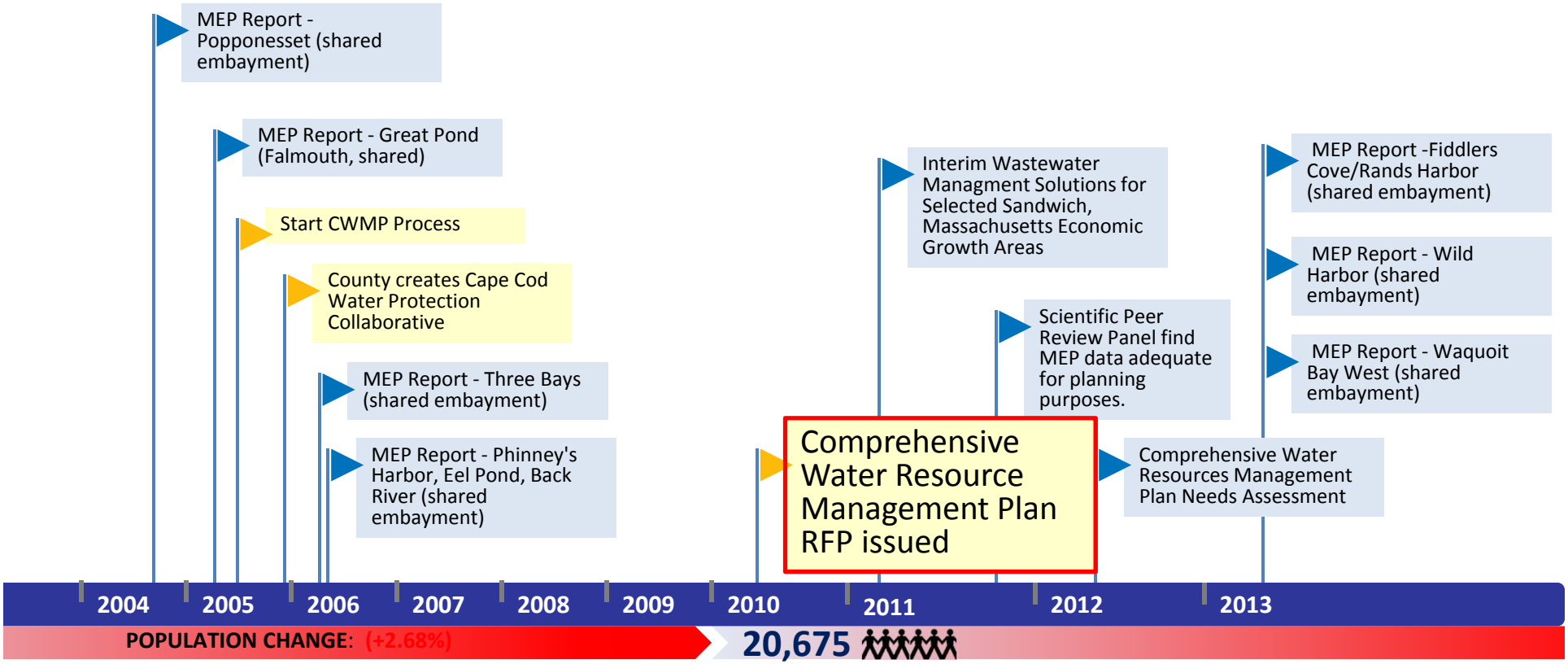
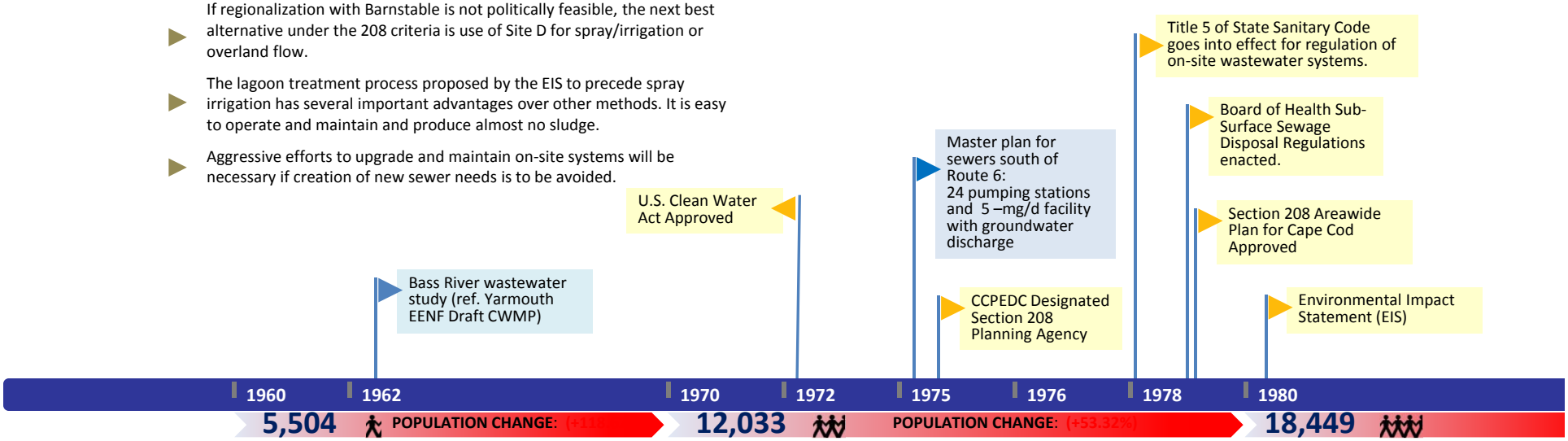


# Yarmouth: 1960-2013

## From 1978 Section 208 Plan

- The Wastewater management problems are reported to be severe in the commercial zone along Route 28. Water supply protection is also of critical concern to the town since development is rapidly encroaching upon existing and future wellfield areas.
- On-site system rehabilitation in problem areas is recommended, and would be eligible for funding.
- A sewer to serve the commercial Route 28 strip is necessary and cost-effective. The projected plan is approximately 0.5 MGD.
- Regionalization with Barnstable, (i.e. purchase of capacity at the Barnstable treatment plant) is desirable.
- It is recommended that the town immediately investigate the possibilities for regionalization with Barnstable. A separate septage facility would then be necessary, and regionalization with Dennis should be considered.
- If regionalization with Barnstable is not politically feasible, the next best alternative under the 208 criteria is use of Site D for spray/irrigation or overland flow.
- The lagoon treatment process proposed by the EIS to precede spray irrigation has several important advantages over other methods. It is easy to operate and maintain and produce almost no sludge.
- Aggressive efforts to upgrade and maintain on-site systems will be necessary if creation of new sewer needs is to be avoided.
- As soon as construction of the sewage/septage facilities is underway, the town should begin setting up a mandatory on-site system pumping program.
- Non-structural controls, including control of multi-family dwellings and possibly larger lot zoning, could help to prevent the development of serious problems.
- The town will have to face growth control issues in the implementation of its sewer construction project and water quality planning efforts.
- If limited sewage treatment and disposal capacities are available, the town will have to pass special bylaws to control the rate of hook-up and to allocate capacities to abutters.
- The planning board is proposing to eliminate the grandfather clause on substandard lots south of Route 28, and should also consider a "Seasonal Residential District" overlay to control conversions.



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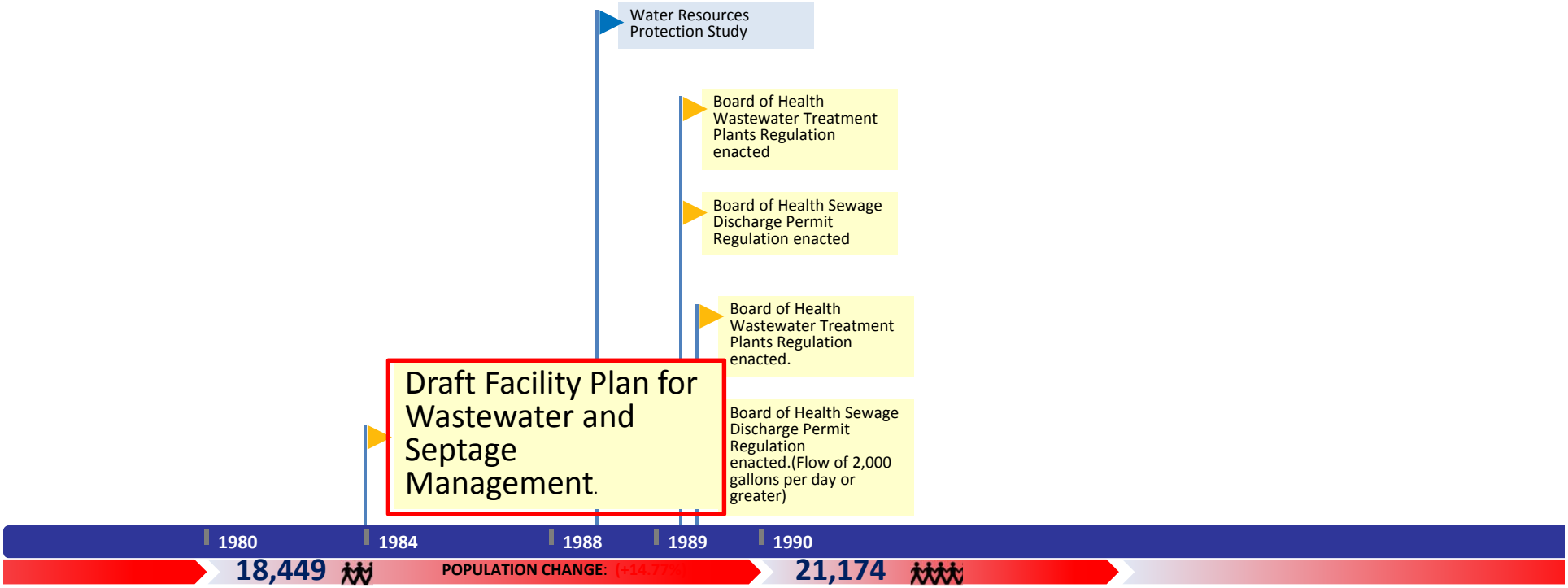

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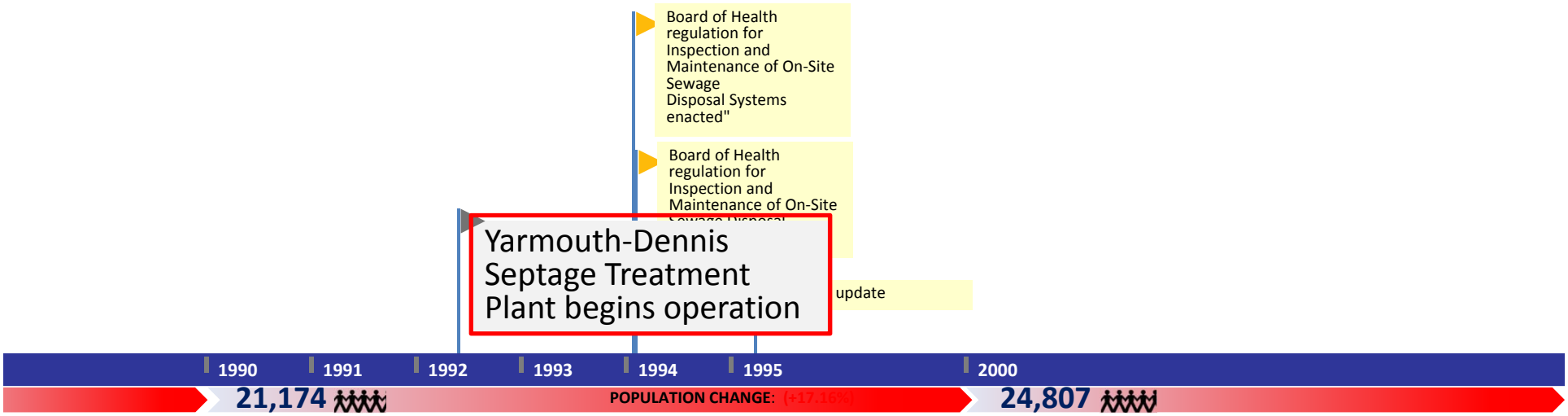

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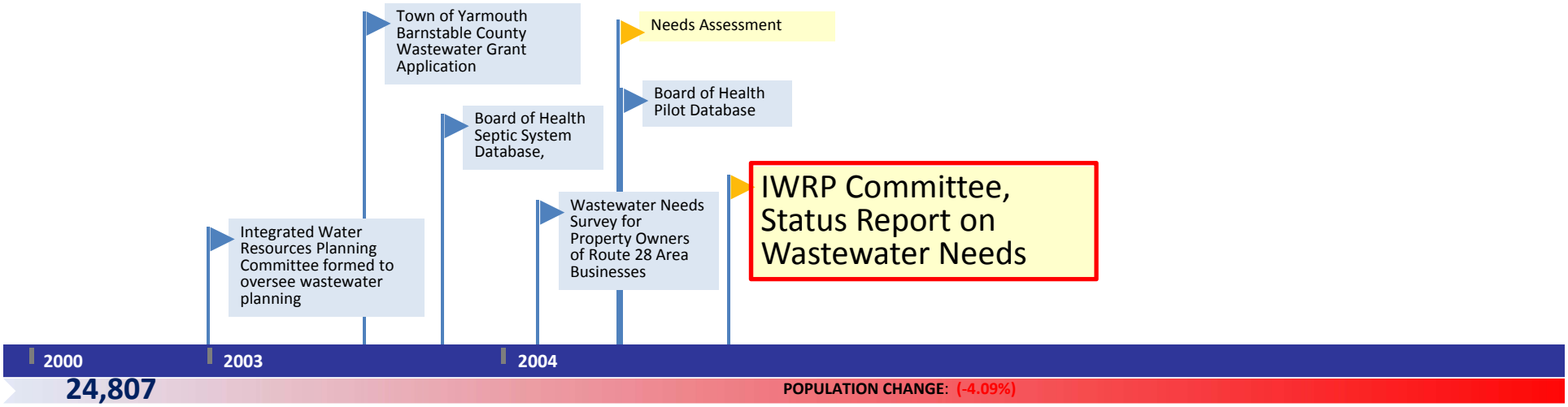

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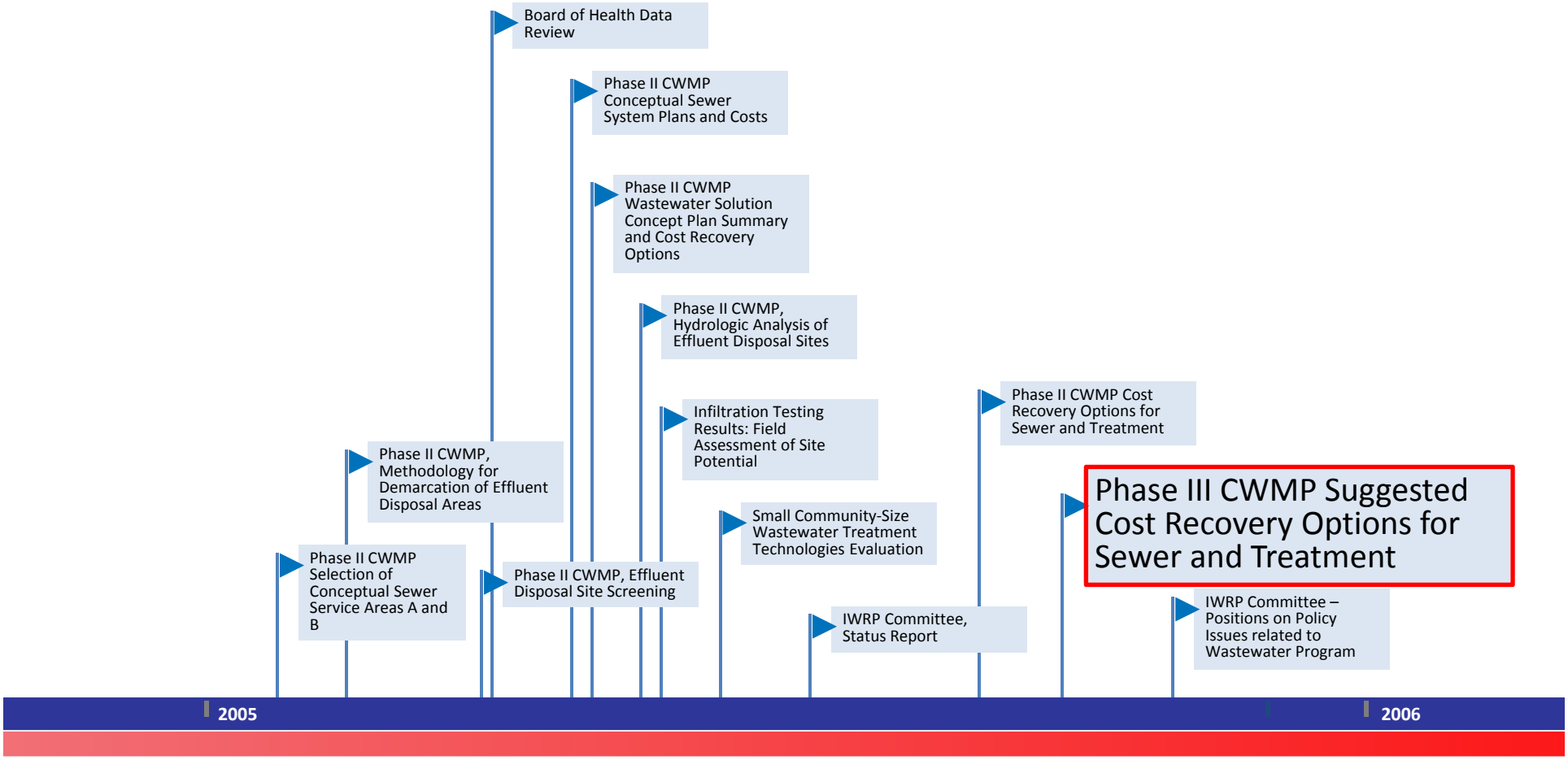

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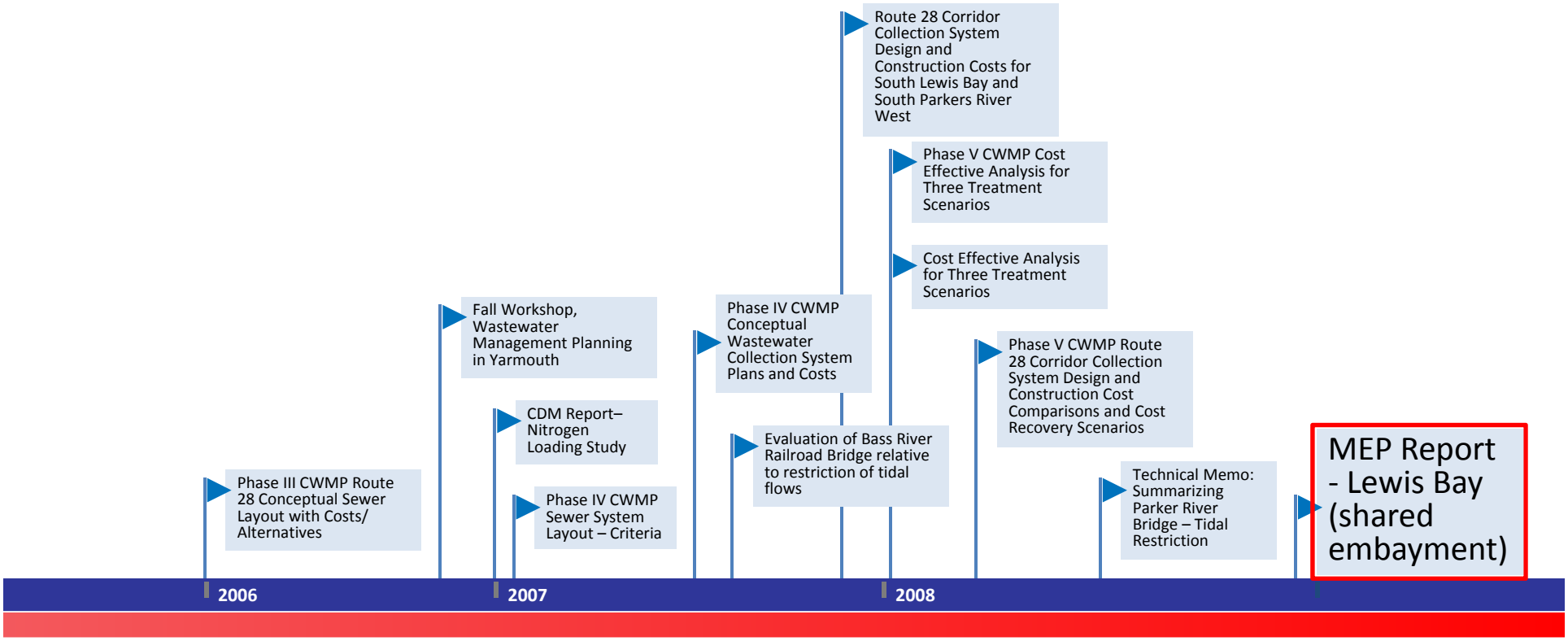

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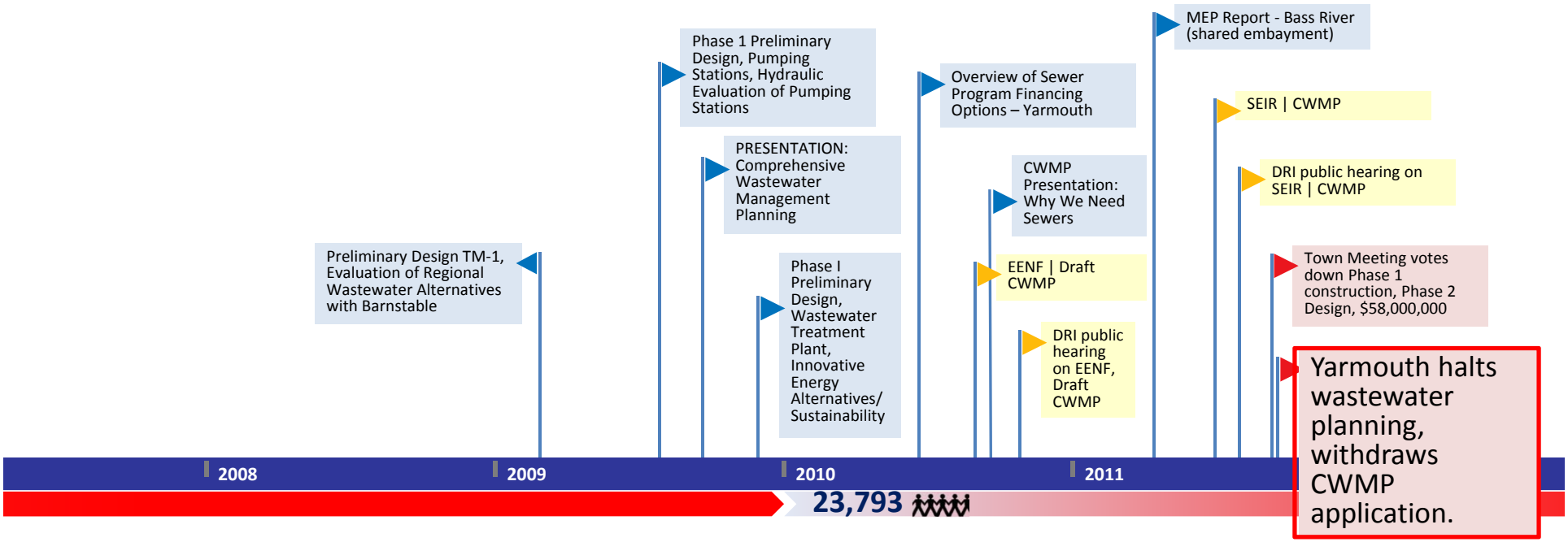

# Did we miss anything?

# Your Watersheds

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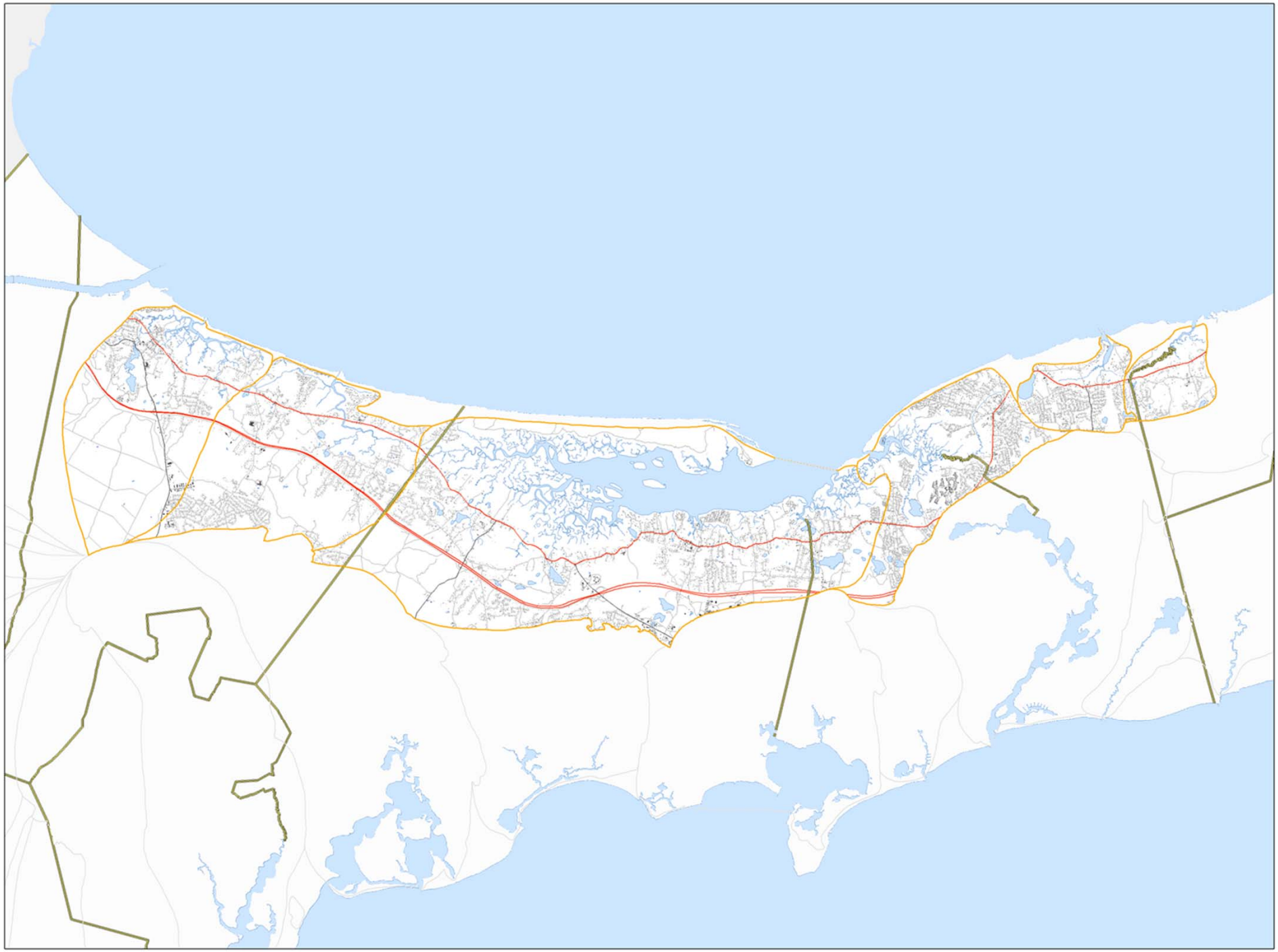
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

"Watershed Working Group - CC Bay Group - Workshop 1"




59.9 square miles


5 Towns

# 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 Sprcies 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

Sources: MassGIS, MassDOT, ICCOH, FEMA, CCC

# 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

Sources: MassGIS, MassDOT, CCC

# 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

Sources: MassGIS, MassDOT, CCC

# 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

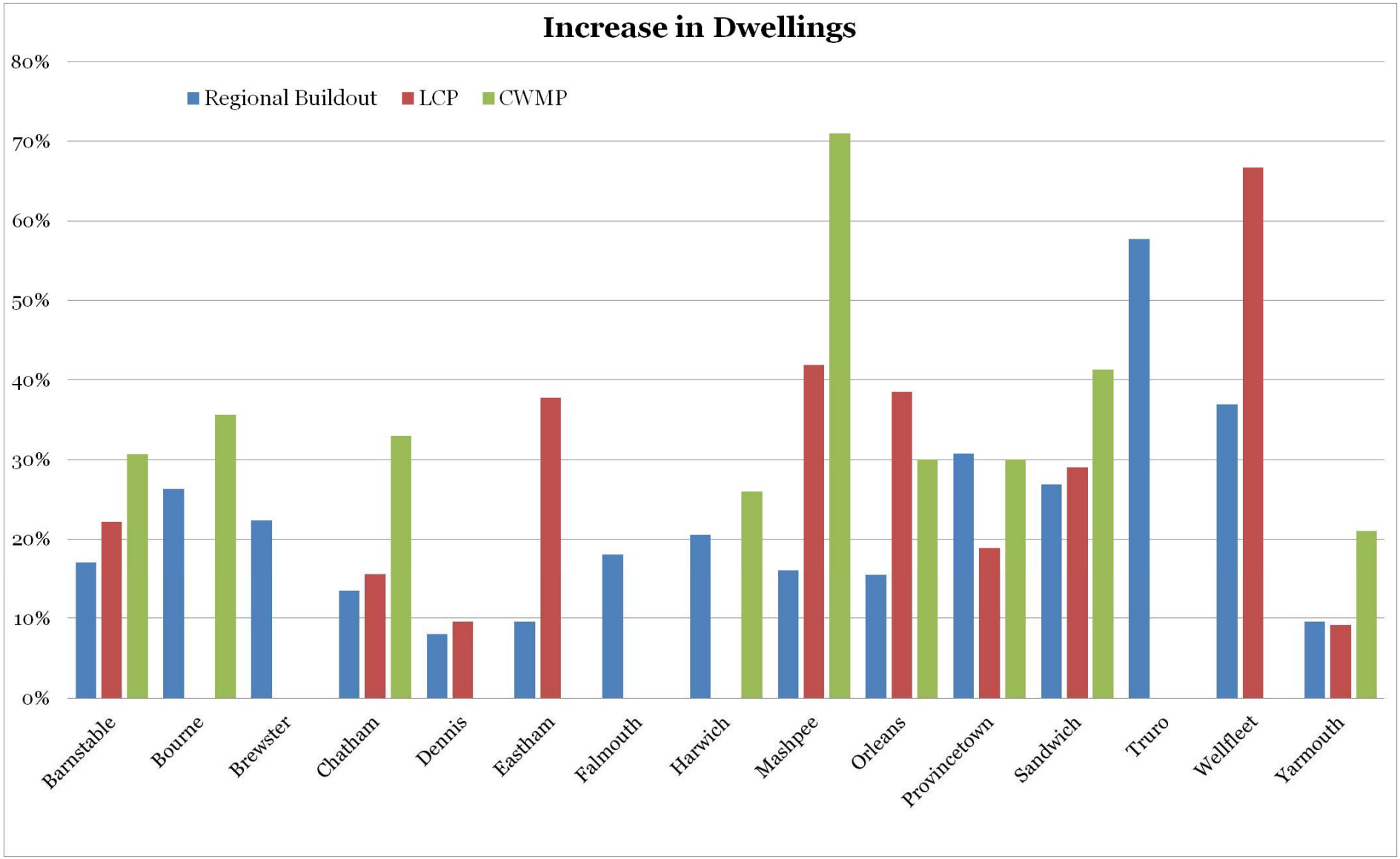
Sources: MassGIS, MassDOT

# Density

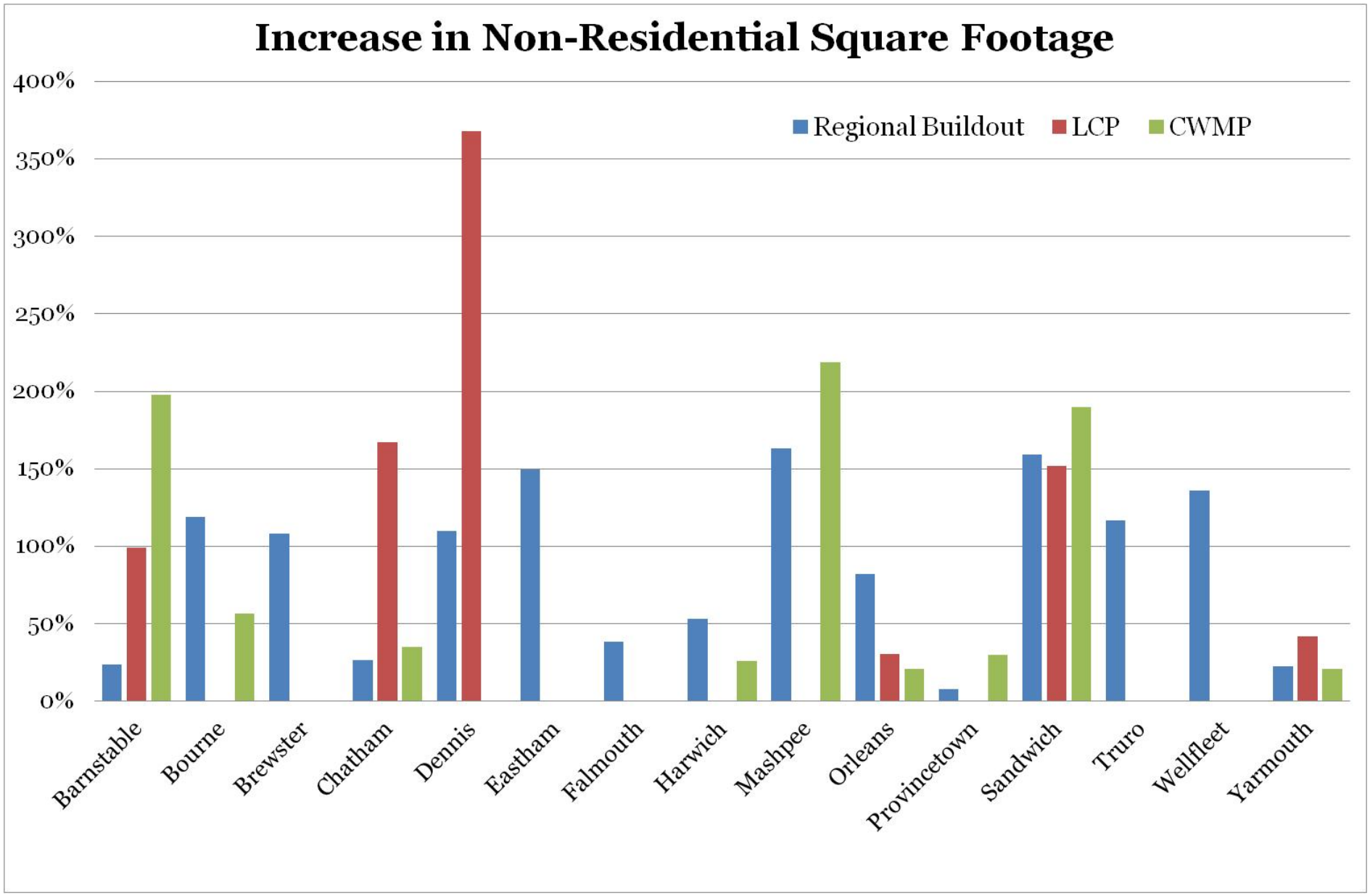
## Cape Wide Cost Estimate:

## 30% growth will increase capital costs by 40%

# Buildout

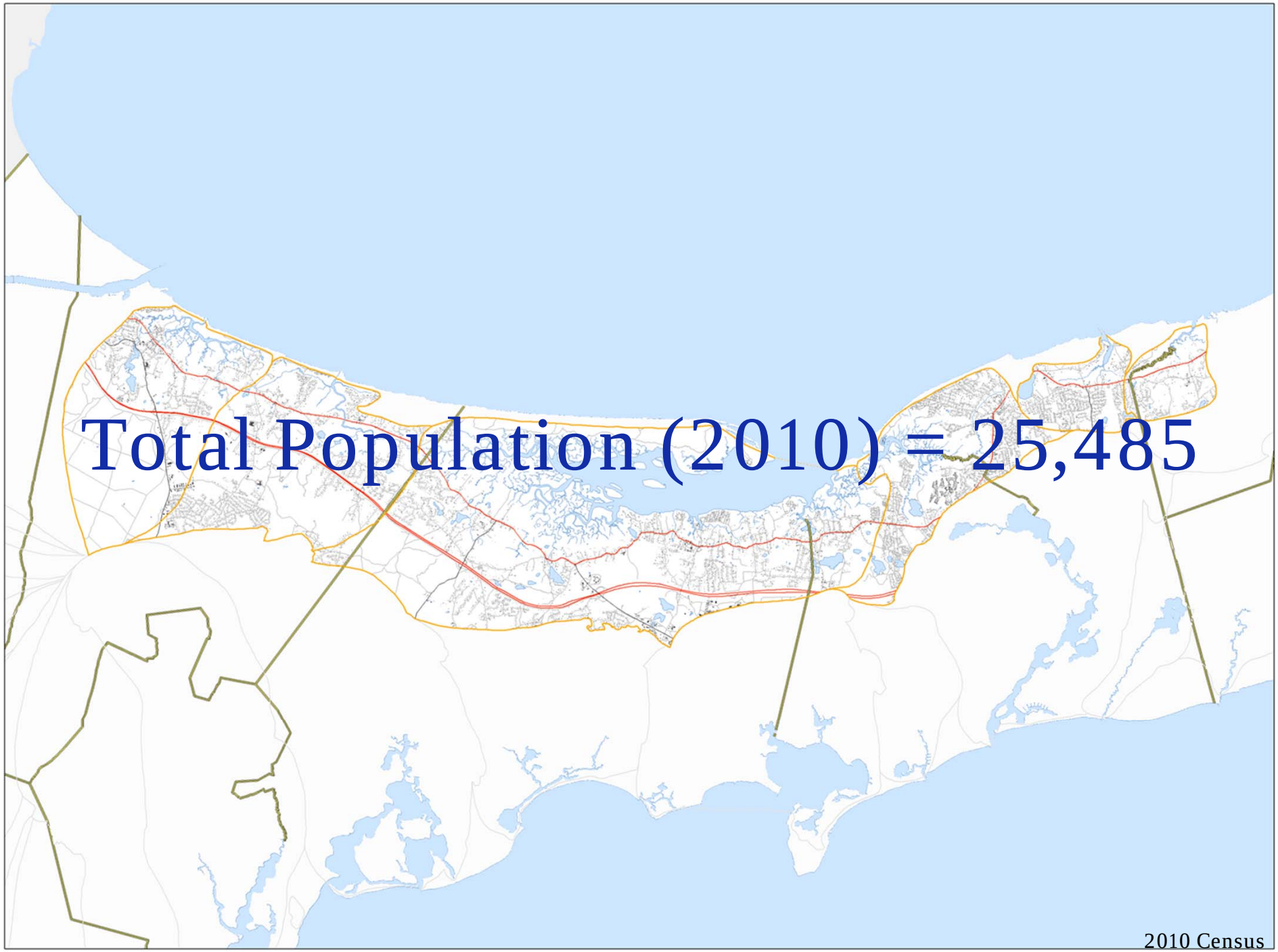

Increase in Dwellings
80%
70%
60%
50%
40%
30%
20%
10%
0%
Regional Buildout
LCP
CWMP
Barnstable
Bourne
Brewster
Chatham
Dennis
Eastham
Falmouth
Harwich
Mashpee
Orleans
Provincetown
Sandwich
Truro
Wellfleet
Yarmouth

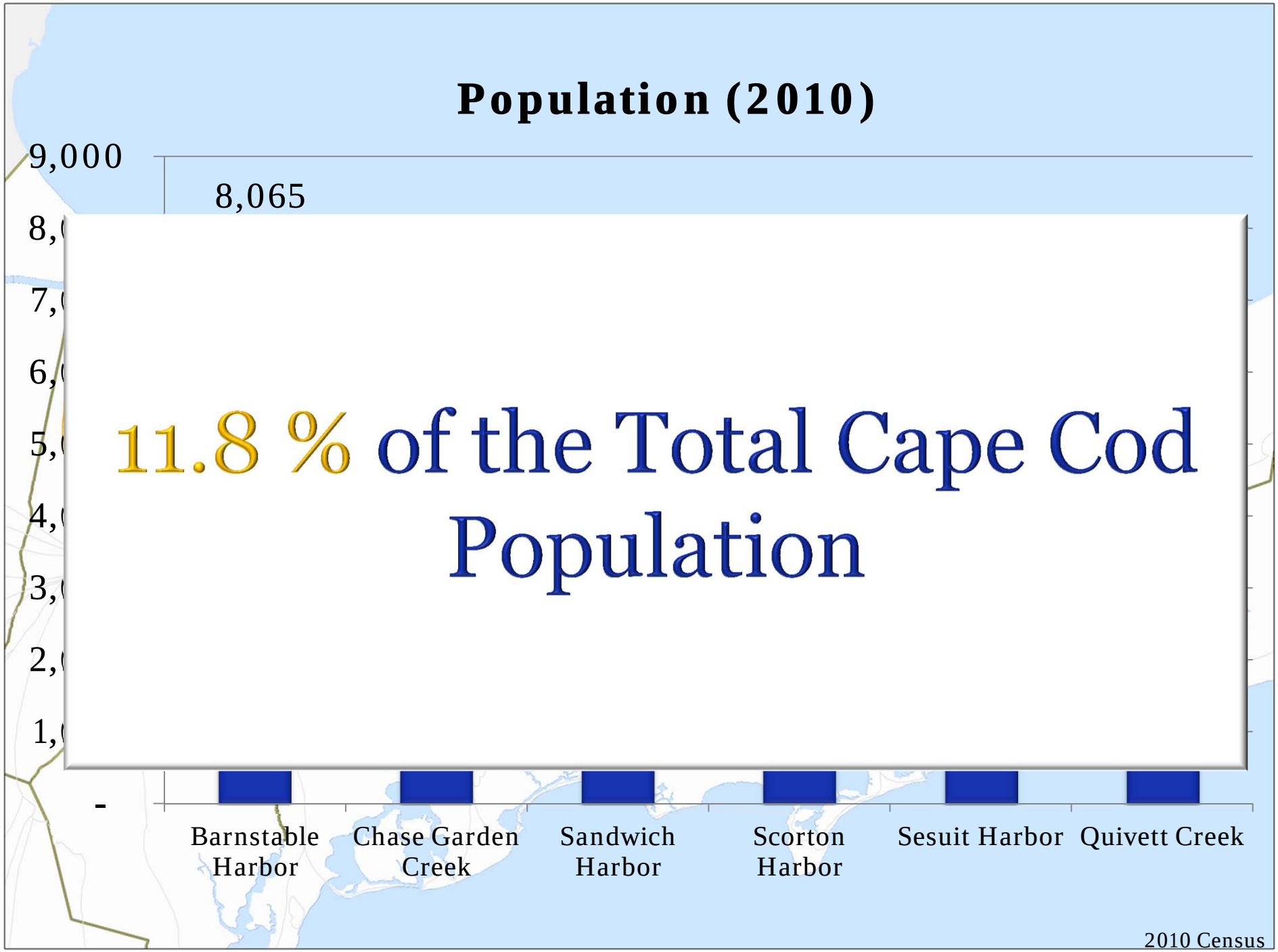
# Buildout

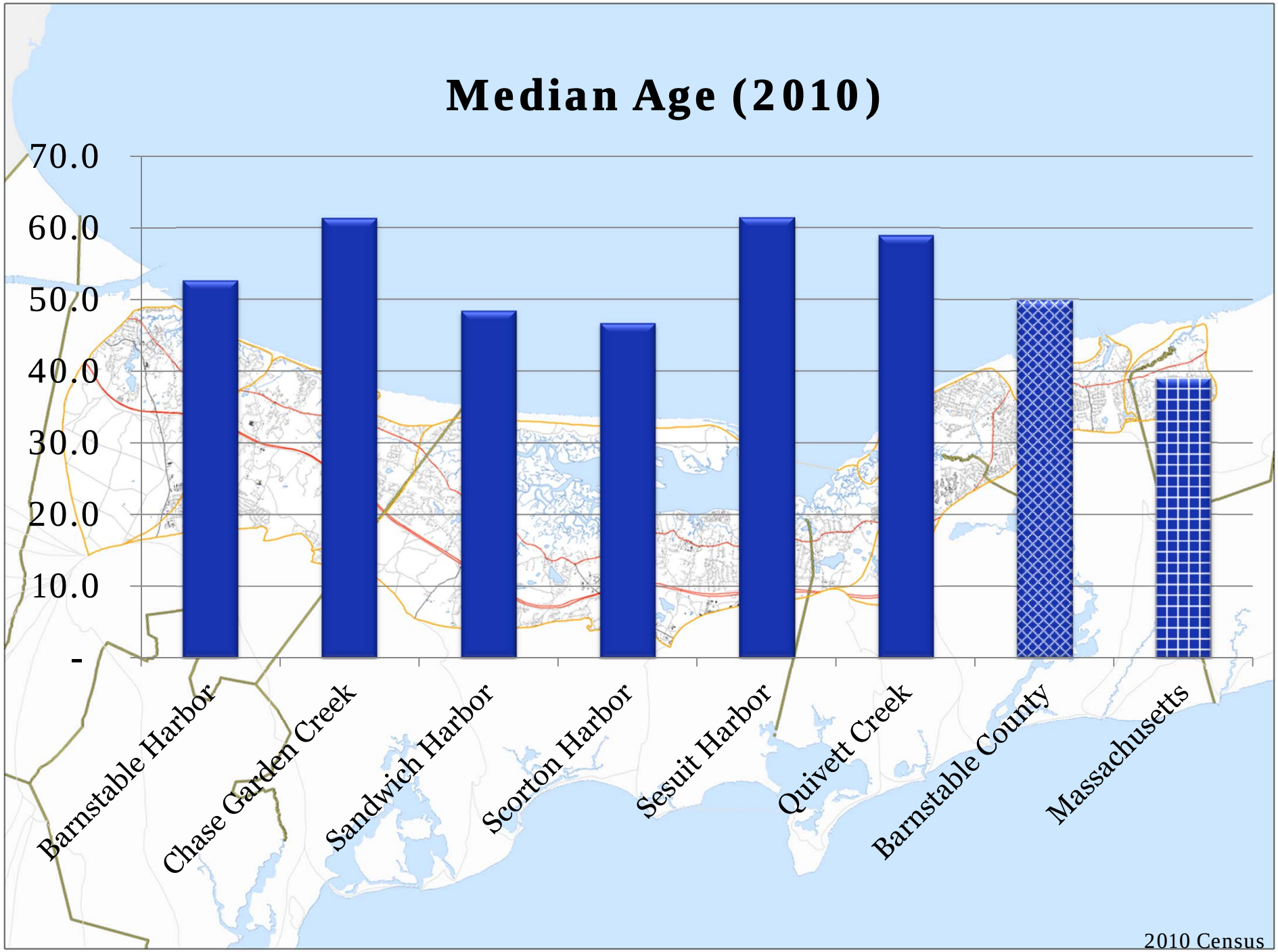

Increase in Non-Residential Square Footage
400%
350%
300%
250%
200%
150%
100%
50%
0%
Regional Buildout
LCP
CWMP
Barnstable
Bourne
Brewster
Chatham
Dennis
Eastham
Falmouth
Harwich
Mashpee
Orleans
Provincetown
Sandwich
Truro
Wellfleet
Yarmouth

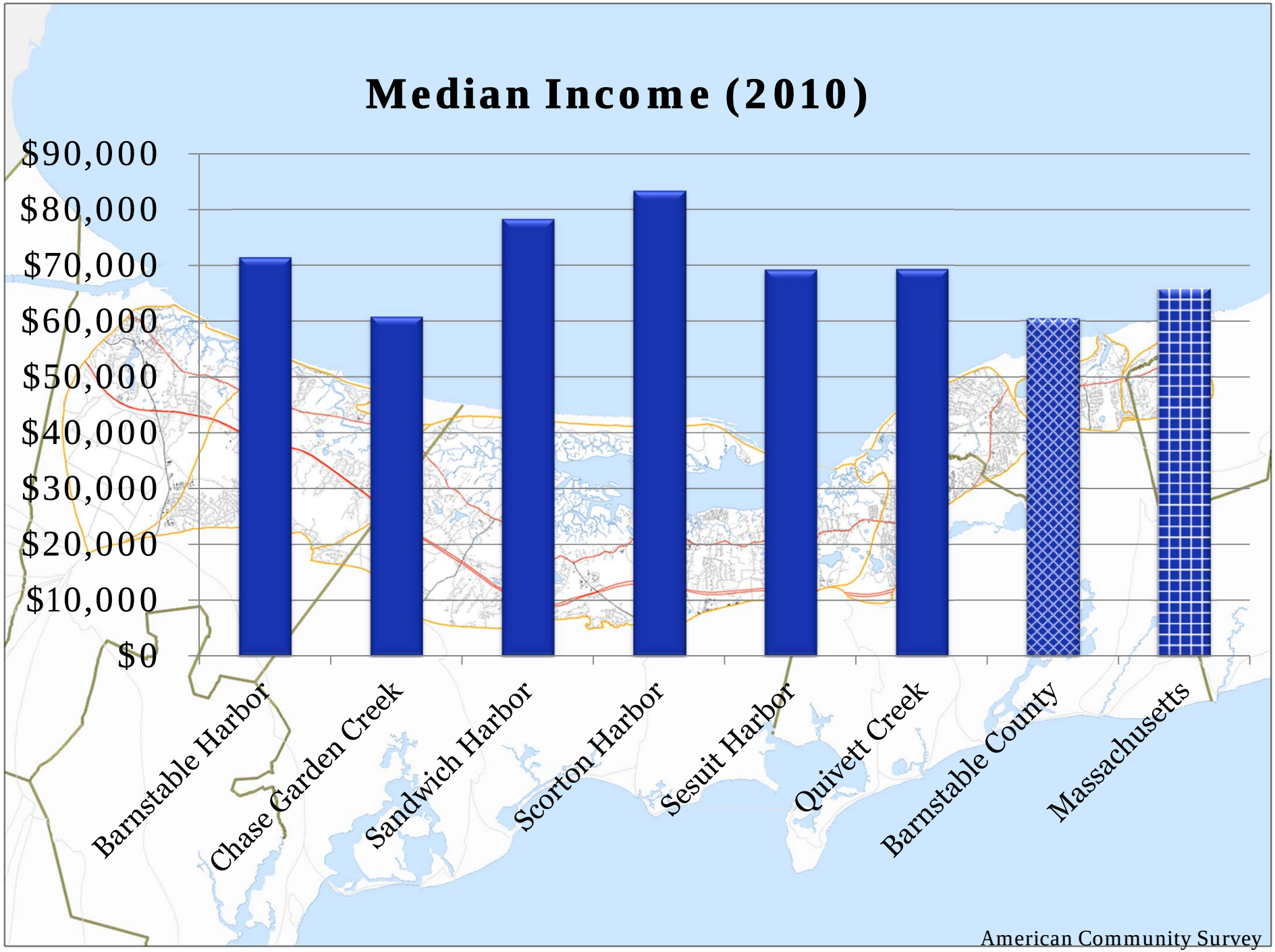
# The People

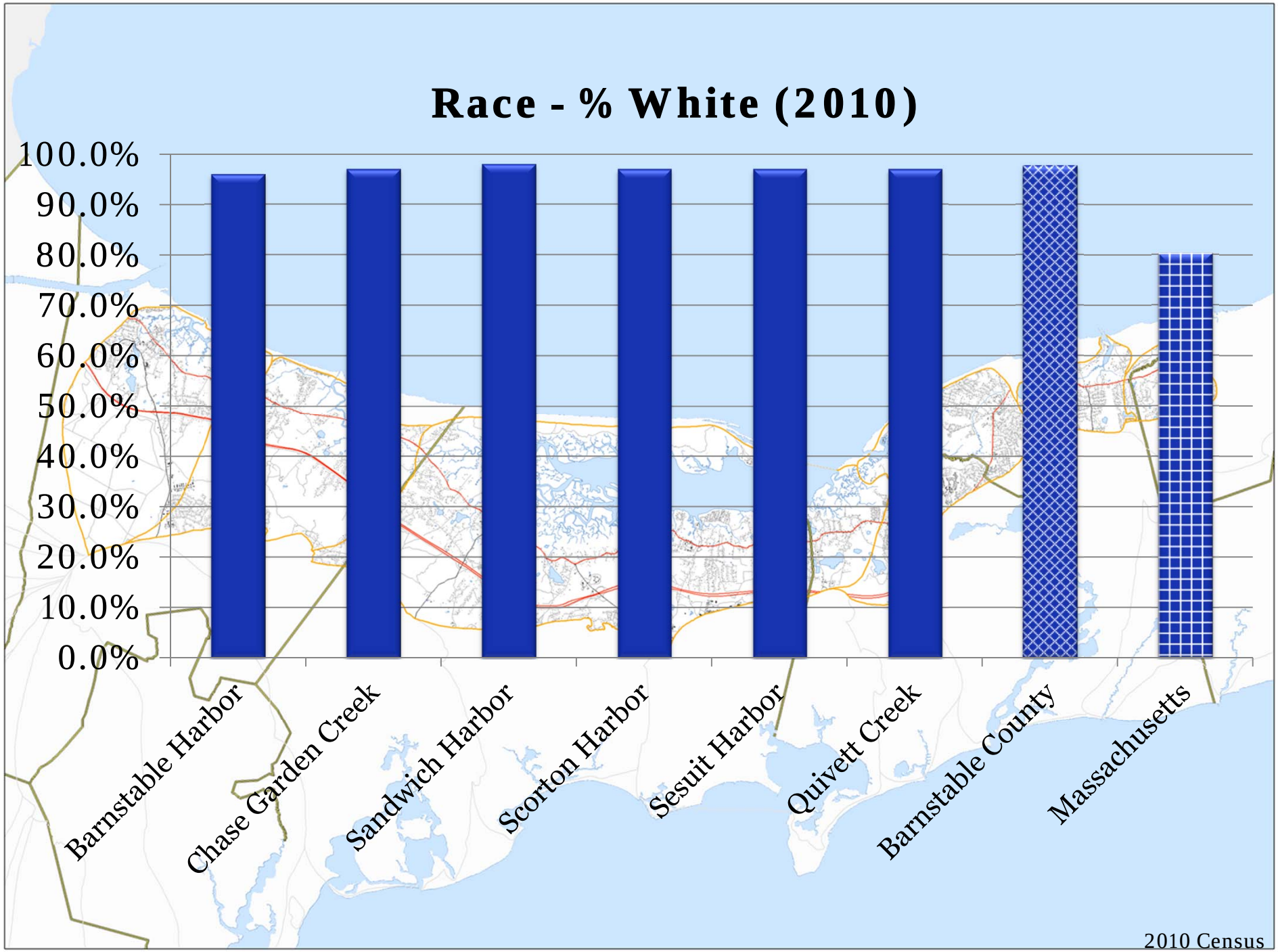
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

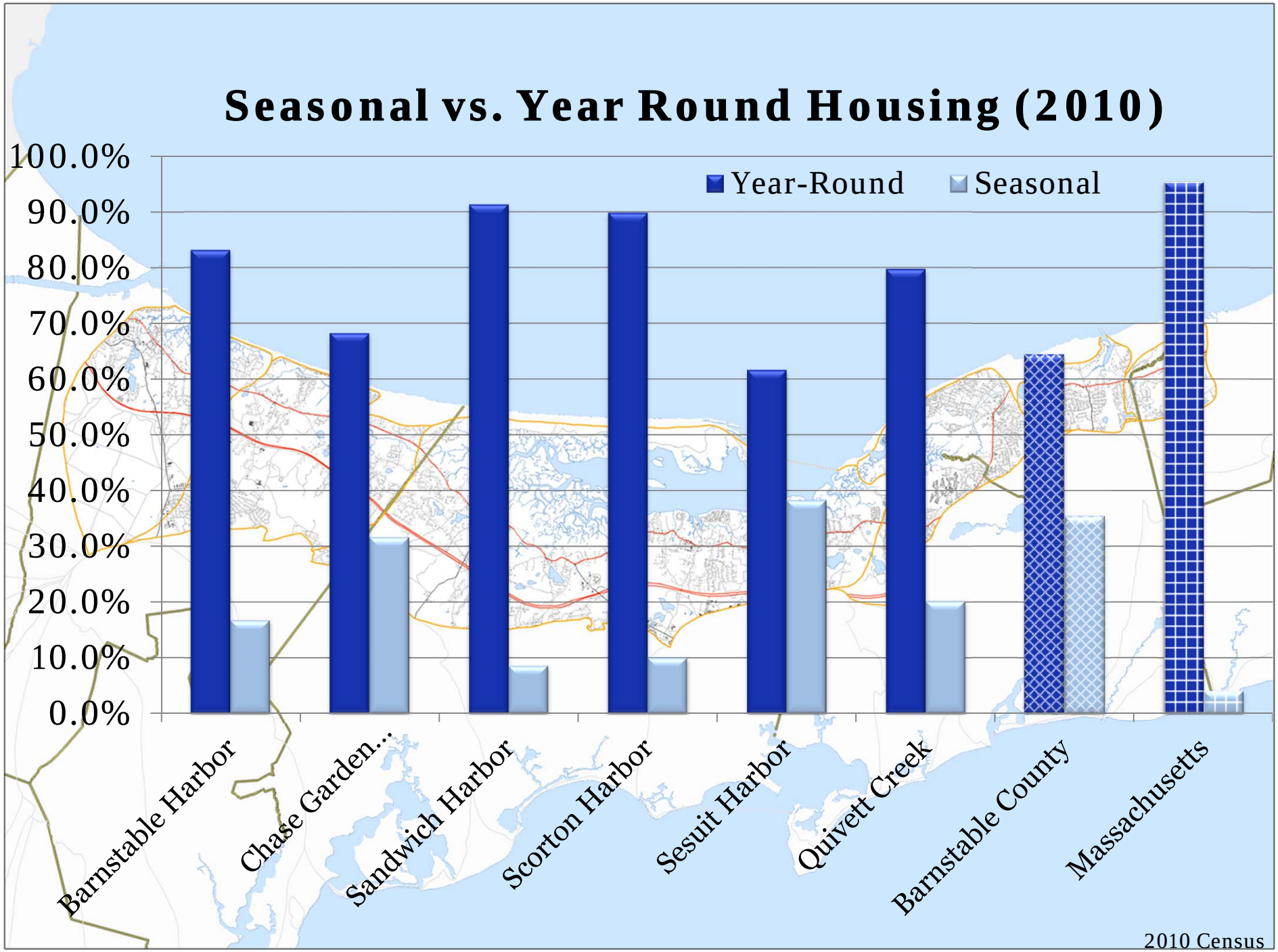

Total Population (2010) = 25,485
2010 Census


Population (2010)
9,000
8,065
11.8 % of the Total Cape Cod Population
-
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
2010 Census


Median Age (2010)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
-
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
Barnstable County
Massachusetts
2010 Census


Median Income (2010)
$90,000
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
Barnstable County
Massachusetts
American Community Survey

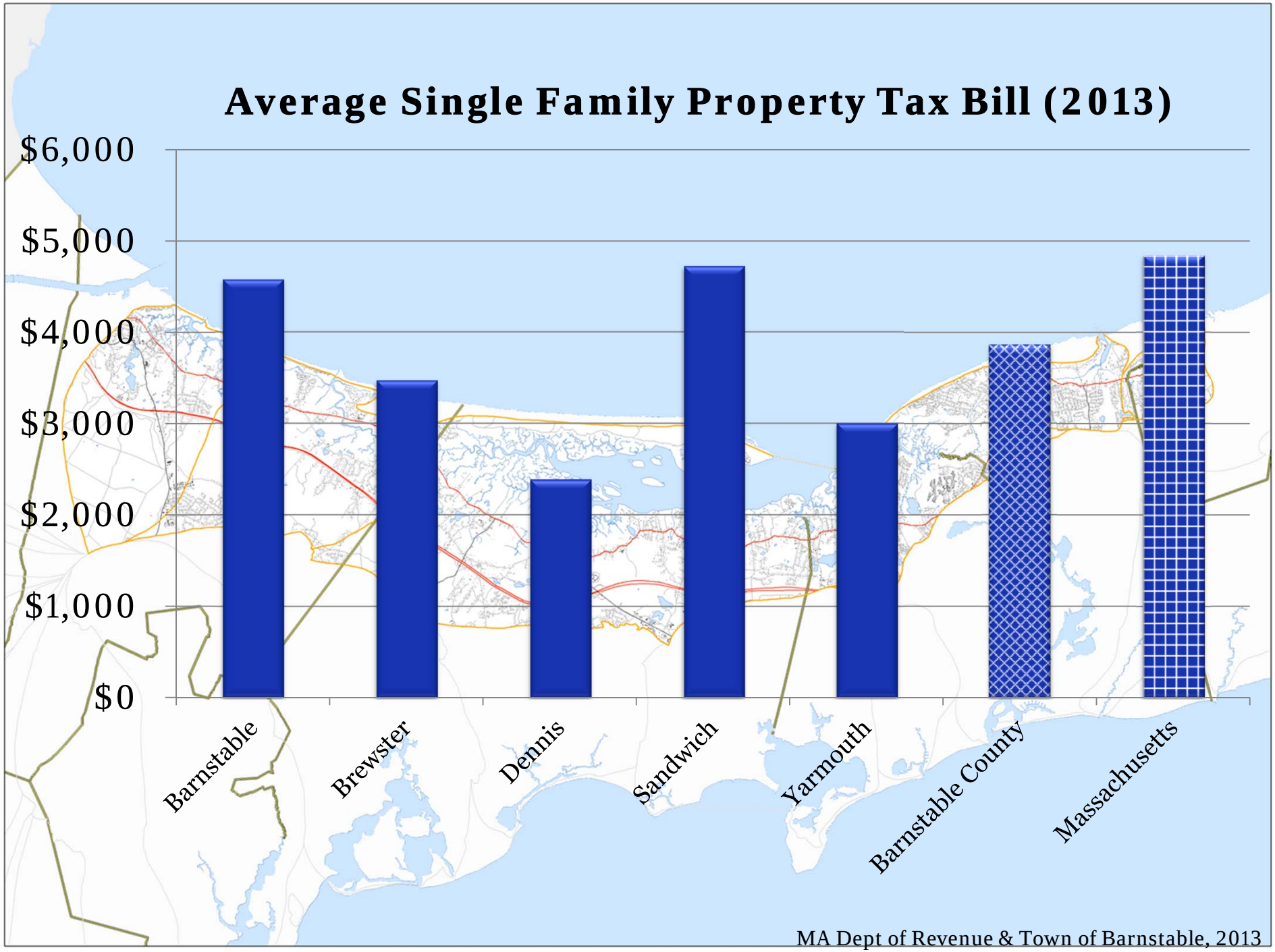

Race - % White (2010)
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
Barnstable County
Massachusetts
2010 Census

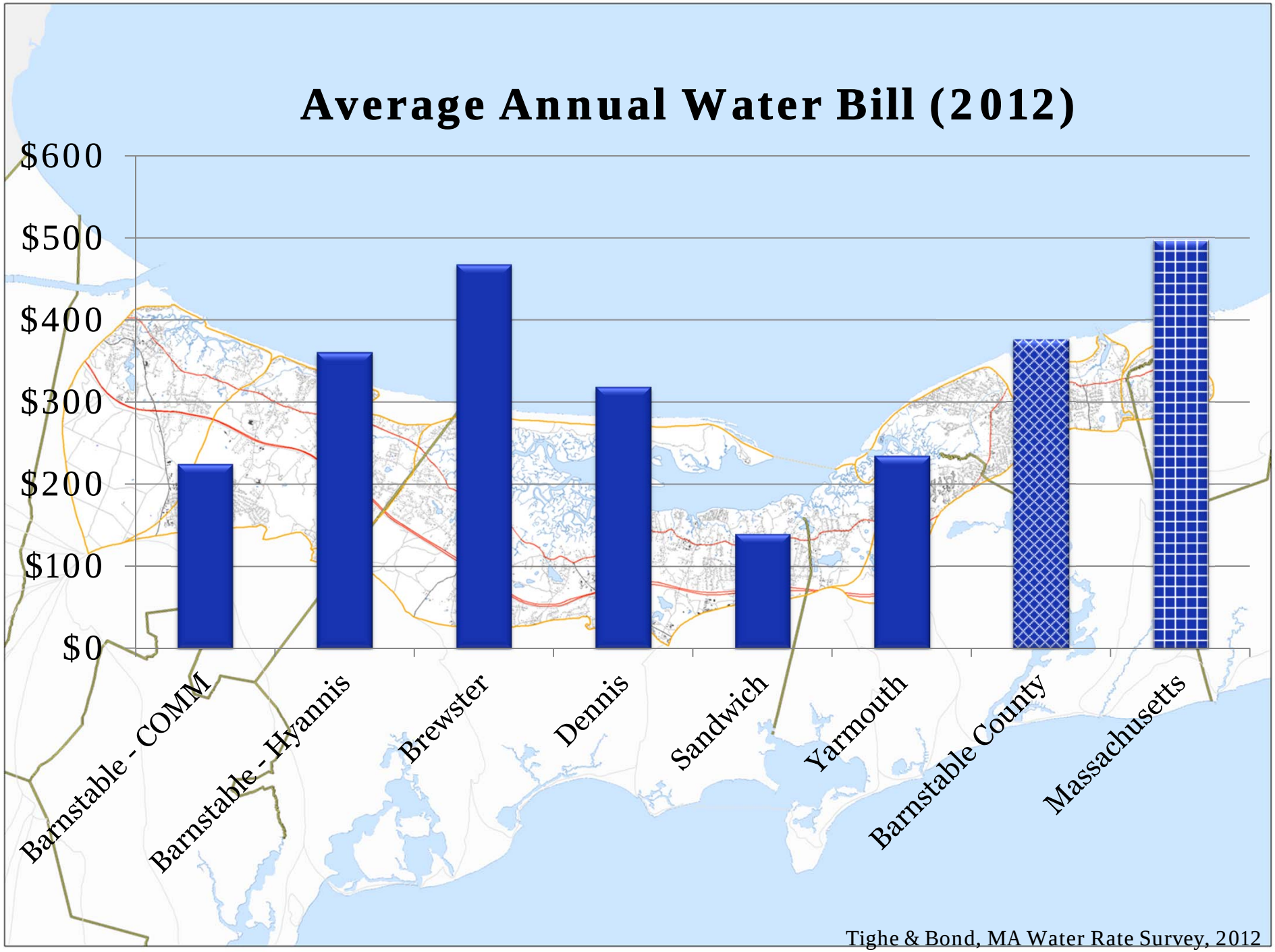

Seasonal vs. Year Round Housing (2010)
100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Year-Round
Seasonal
Barnstable Harbor
Chase Garden...
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
Barnstable County
Massachusetts
2010 Census

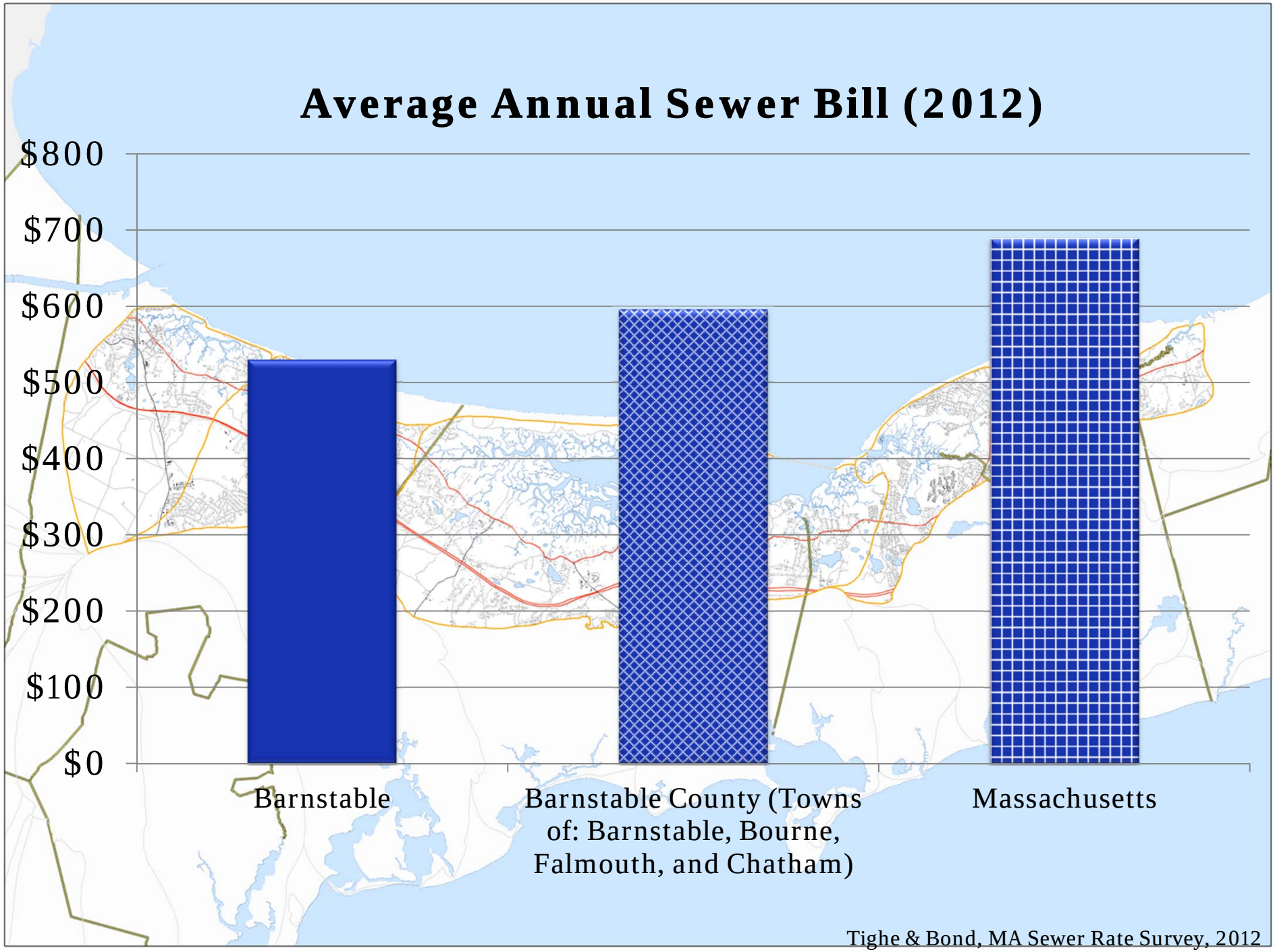

Total Assessed Value of Residential Homes=
$5,735,945,910
$70
$60
$50
$40
$30
$20
$10
$0
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek
Barnstable County
Massachusetts
2010 Census

# Your Government & Taxes


Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek


Average Single Family Property Tax Bill (2013)
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
Barnstable
Brewster
Dennis
Sandwich
Yarmouth
Barnstable County
Massachusetts
MA Dept of Revenue & Town of Barnstable, 2013

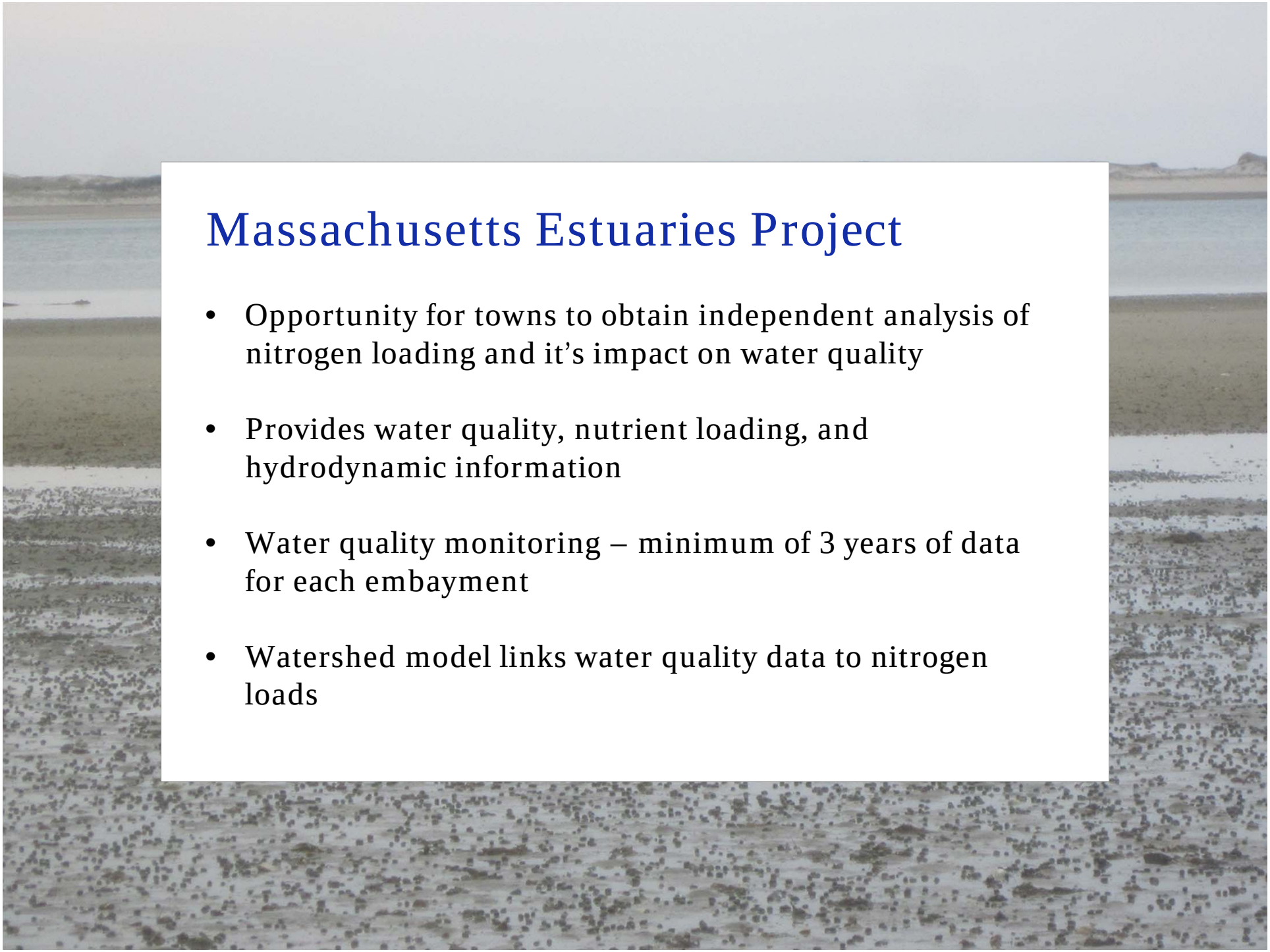

Average Annual Water Bill (2012)
$600
$500
$400
$300
$200
$100
$0
Barnstable - COMM
Barnstable - Hyannis
Brewster
Dennis
Sandwich
Yarmouth
Barnstable County
Massachusetts
Tighe & Bond, MA Water Rate Survey, 2012


Average Annual Sewer Bill (2012)
$800
$700
$600
$500
$400
$300
$200
$100
$0
Barnstable
Barnstable County (Towns of: Barnstable, Bourne, Falmouth, and Chatham)
Massachusetts
Tighe & Bond, MA Sewer Rate Survey, 2012

# The Problem

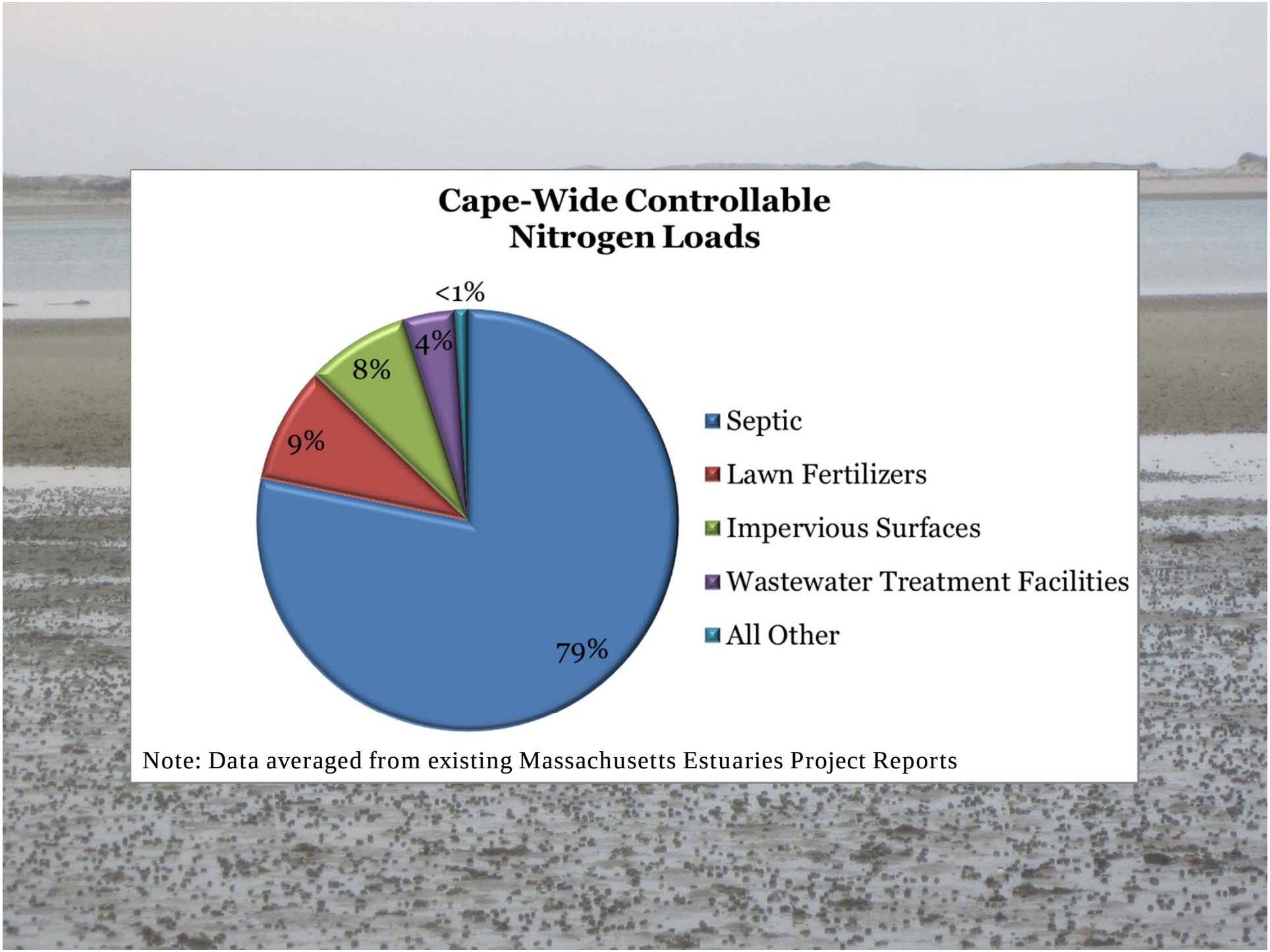
Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

"Watershed Working Group - CC Bay Group - Workshop 1"

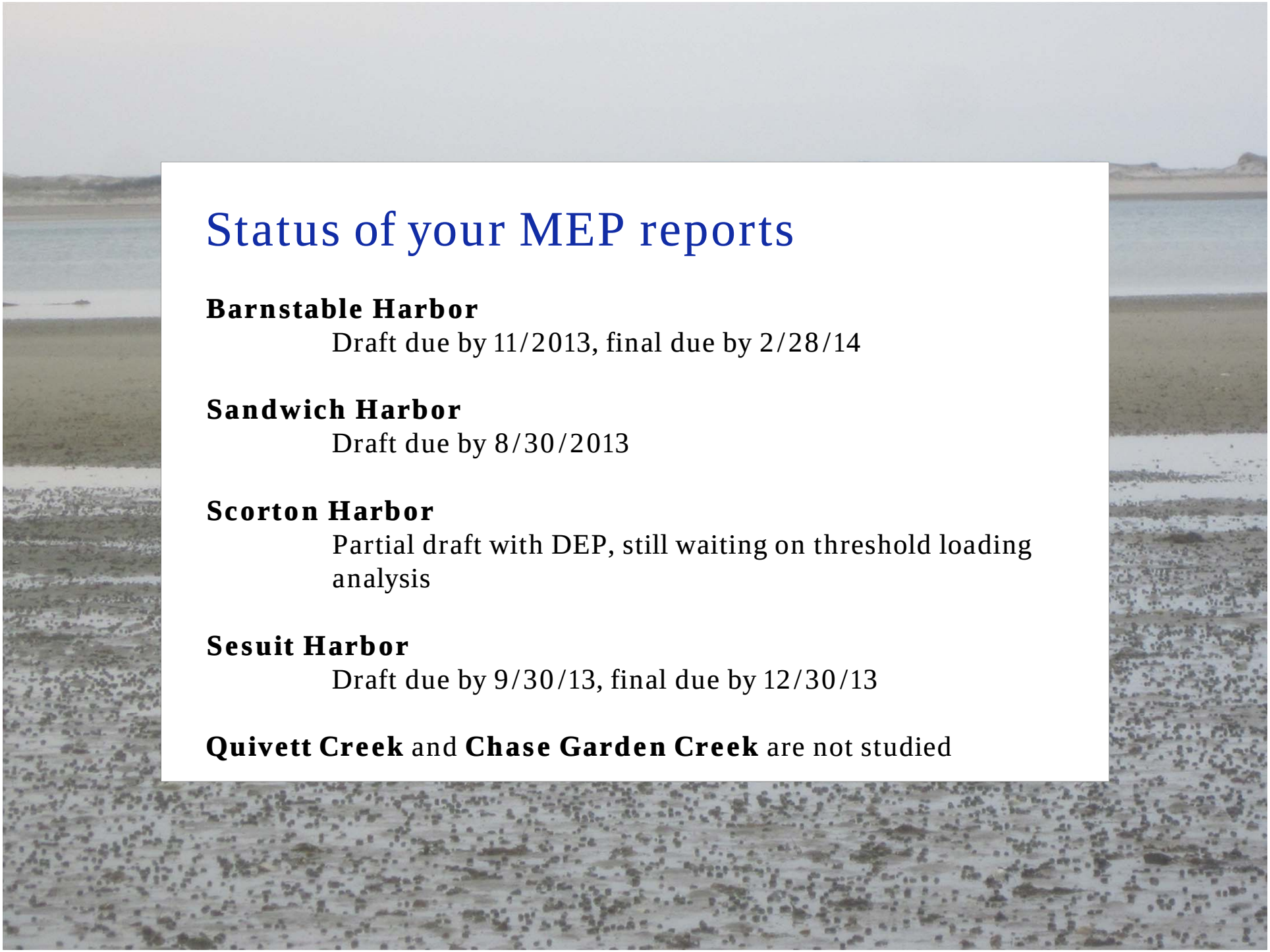


# Massachusetts Estuaries Project

- Opportunity for towns to obtain independent analysis of nitrogen loading and it's 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




Note: Data averaged from existing Massachusetts Estuaries Project Reports



# Status of your MEP reports

**Barnstable Harbor**

Draft due by 11/2013, final due by 2/28/14

**Sandwich Harbor**

Draft due by 8/30/2013

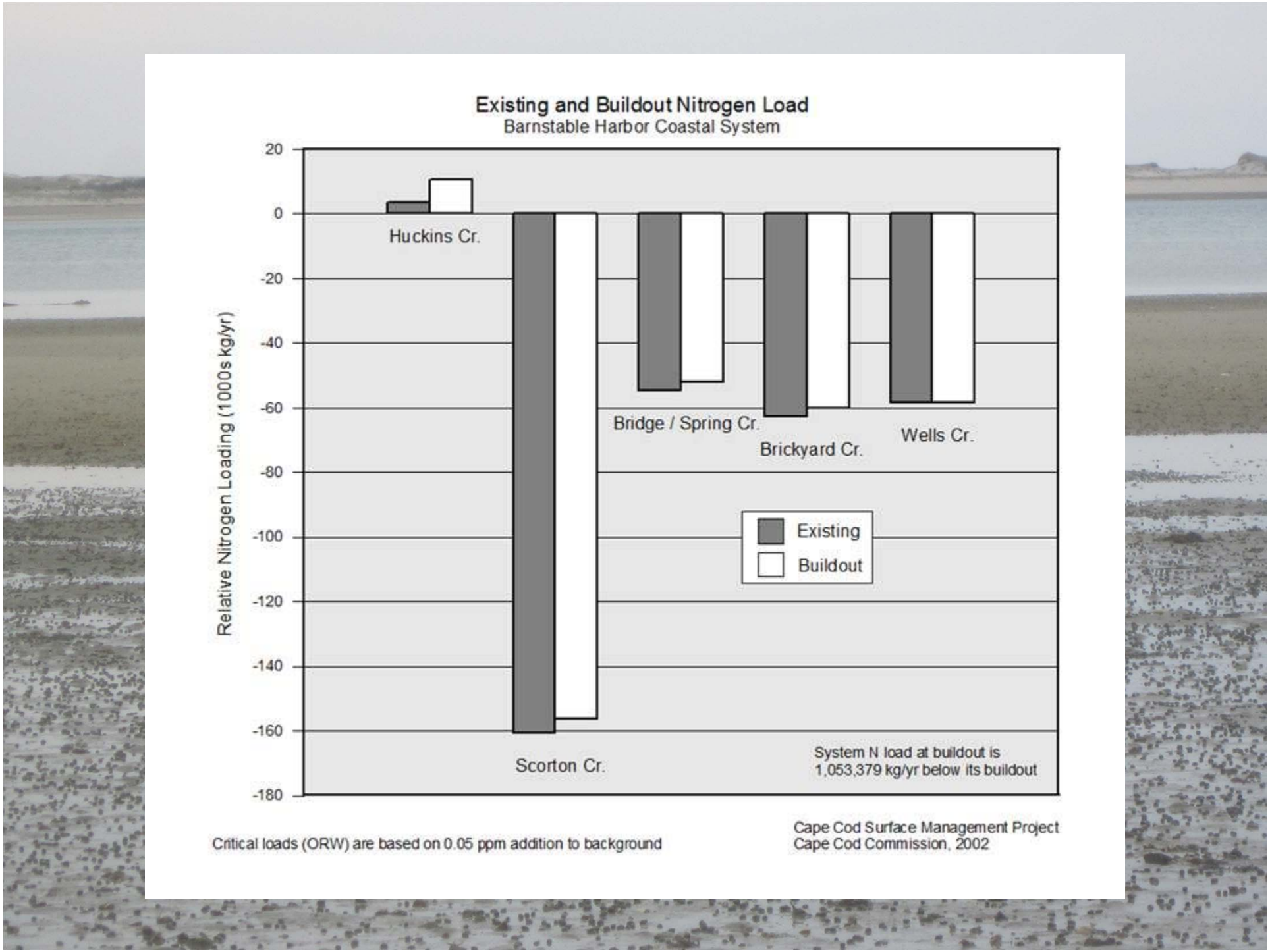
**Scorton Harbor**

Partial draft with DEP, still waiting on threshold loading analysis

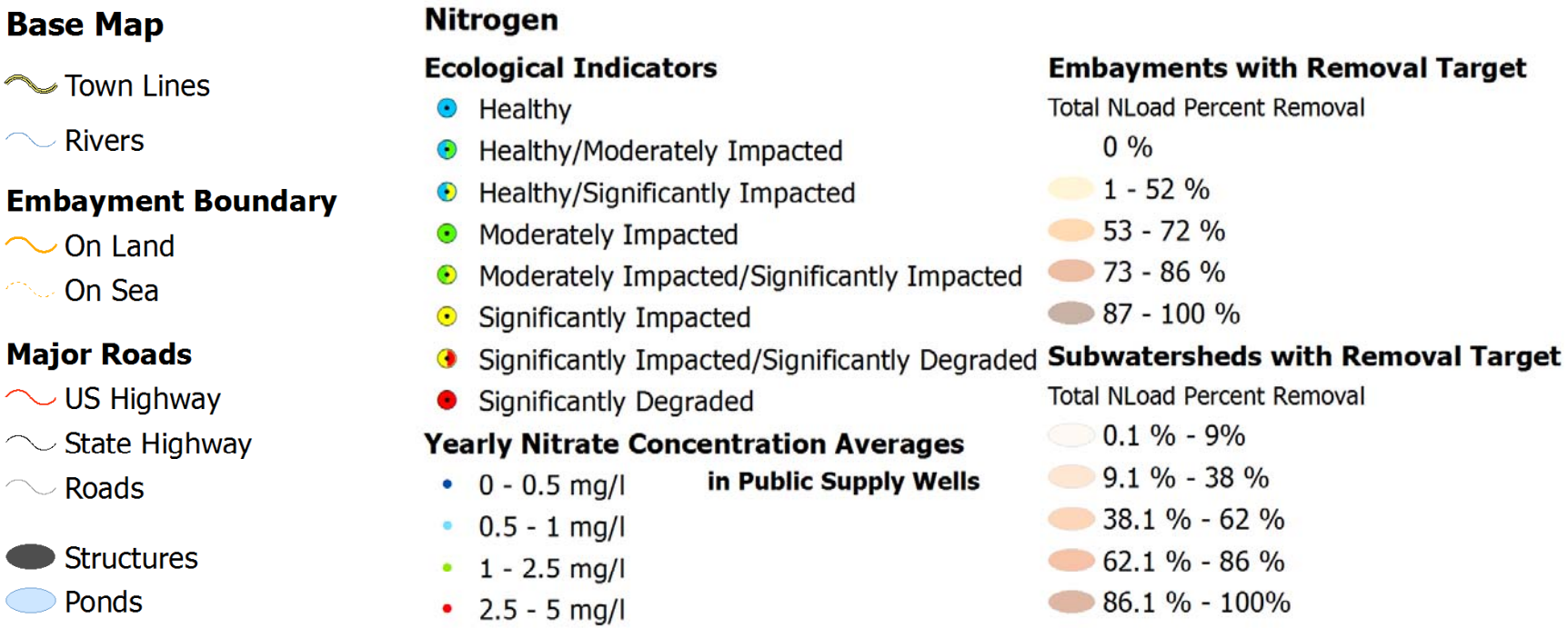
**Sesuit Harbor**

Draft due by 9/30/13, final due by 12/30/13

**Quivett Creek** and **Chase Garden Creek** are not studied


Existing and Buildout Nitrogen Load
Barnstable Harbor Coastal System
Relative Nitrogen Loading (1000s kg/yr)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
Huckins Cr.
Bridge / Spring Cr.
Brickyard Cr.
Wells Cr.
Scorton Cr.
Existing
Buildout
System N load at buildout is
1,053,379 kg/yr below its buildout
Critical loads (ORW) are based on 0.05 ppm addition to background
Cape Cod Surface Management Project
Cape Cod Commission, 2002

# Nitrogen Problem




Sources: MassGIS, MEP, CCC

# 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

Sources: MassGIS

# 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

Sources: MassGIS, MassDOT, CCC

# 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

Sources: MassGIS, MassDOT, MassDEP, Barnstable County Community Septic Loan Program, CCC

# Existing & Proposed Solutions

Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

# 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

Sources: MassGIS, MassDOT, MassDEP, Barnstable County Community Septic Loan Program, CCC

# 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

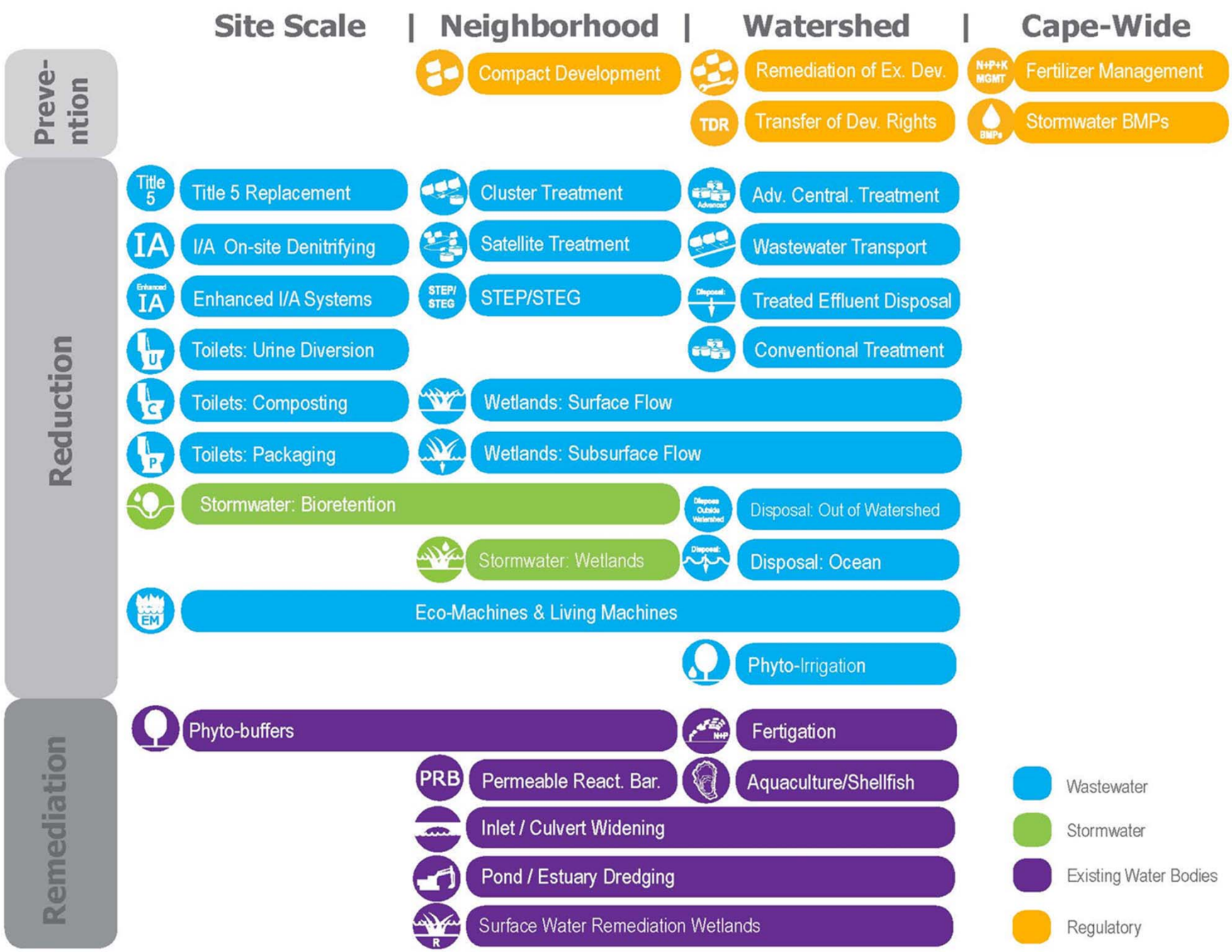
2041 - 2050

Sources: MassGIS, MassDOT, CCC


# Framework for Addressing Solutions Moving Forward

Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

"Watershed Working Group - CC Bay Group - Workshop 1"




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
N+P+K MGMT
BMPs
Watershed/Embayment Options
A. Permeable Reactive Barriers
B. Inlet/Culvert Openings
C. Constructed Wetlands
D. Dredging
PRB
R
Alternative On-Site Options
A. Eco-toilets (UD & Compost)
B. I/A Technologies
C. Enhanced I/A Technologies
D. Shared Systems
Title 5
Enhanced IA
IA
C
U
P
Priority Collection/High-Density Areas
A. Greater Than 1 Dwelling Unit/acre
B. Village Centers
C. Economic Centers
D. Growth Incentive Zones
Advanced
Disposal:
STEP/ STEG
Supplemental Sewering
Advanced

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

http://watersheds.capecodcommission.org/index.php/watersheds/mid-cape/cape-cod-bay-group

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Barnstable Harbor
Chase Garden Creek
Sandwich Harbor
Scorton Harbor
Sesuit Harbor
Quivett Creek

**Cape Cod Commission 208 Area Water Quality Planning**
**Cape Cod Bay Watershed Working Group**

**Meeting One**
**Tuesday, September 24, 2013**
**Cape Cod Commission, Innovation Room, 3225 Main Street, Barnstable, MA 02630**

**MEETING SUMMARY**

## Action Items

The following action items were captured of the Working Group meeting:
Next Meeting: Tuesday, November 5, 2013
8:30 am to 12:30 pm
Cape Cod Commission

- 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.
  - Provide the Commission with information about discrepancies in the buildout data.
  - Review technology fact-sheets in advance of the November 5 meeting. (Technology fact sheets will be distributed in mid October)
  - Look up potential experts on buildout in your town to connect with the Cape Code Commission (CCC).
- Cape Cod Commission:
  - Follow-up with Sue Leven for additions to Brewster chronology.
  - Follow-up with Dave Mason for additions to Sandwich's chronology.
  - Double-check the Brewster buildout data with the Brewster Planner.
  - Provide links to the Local Comprehensive Planning reports on the website.
  - Verify whether or not atmospheric nitrogen deposits are included in the Cape-wide estimates for nitrogen from impervious surfaces.
  - Update the MEP data slide—Chase Garden Creek has been studied.
  - Make all GIS data layers publically available.
  - In the next meeting, provide answers to the questions that arose about buildout in this meeting.
  - Prepare to discuss housing seasonality and its impact on this process in the next meeting.
  - Obtain lists of targeted stormwater projects for the towns of Barnstable and Sandwich.
- Consensus Building Institute
  - Distribute list of working group member names and contact information.

## Welcome and Introduction

Ms. Carri Hulet, the facilitator from the Consensus Building Institute (CBI), welcomed the members of the Cape Cod Bay Watershed Working Group, reviewed the agenda, and described CBI's role in the process. Appendix A contains a list of the group members who were in attendance. All meeting documents and presentations for the Cape Cod Bay Watershed Working Group are located here:

http://watersheds.capecodcommission.org/index.php/watersheds/mid-cape/cape-cod-bay-group

Ms. Hulet explained that the goal of the first meeting was to review and develop a 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. She emphasized that the group members' role in this meeting would be to identify inaccuracies and missing items in the chronologies and data to help create a more accurate view of the past and to make sure the Cape Cod Commission analyzes all the available data sets.

**REVIEW OF GOALS AND PROCESS**

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.

The Area Manager, Mr. Scott Horsley, will attend the Cape Cod Bay Watershed Working Group meetings and the Commission will prepare materials for subsequent workshops. In Spring 2014, Mr. Horsley will work with the Cape Cod Commission staff to draft a

comprehensive Cape-wide plan that combines the specific recommendations from the Cape Cod Bay Watershed Working Group with the recommendations of the other 11 watershed working groups on the Cape.[1]

Ms. Perry reviewed the timeline of the 208 Plan Update. In July, public meetings were held across the Cape to present the 208 Plan Update goals, work plan, and participant roles. 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.[2] As previously noted, the September working group meetings were focused on baseline conditions. During the next working group meeting in October, stakeholders will review and discuss the technological options to address the issues in their watershed. Stakeholders will develop watershed scenarios drawing on discussions from the September and October meetings during the final meeting in December.

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 management technologies comprise the TAC, which is a committee of the Cape Cod Water Protection Collaborative. The Technology Panel consists of academic and research institutions, state watershed managers, and consultants.

**LOCAL PROGRESS TO DATE**

Mr. Horsley highlighted past actions that had been taken in Barnstable, Brewster, Dennis, and Sandwich that would either protect or inhibit water quality in Barnstable Harbor, Chase Garden Creek, Sandwich Harbor, Scorton Harbor, Sesuit Harbor, and Quivett Creek.[3] Working group members 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.

[1] Information about the Area Managers and their role was not described during the meeting, but is included here for general purposes.

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

[3] Detailed chronologies are available in the Cape Cod Bay Baseline Data Presentation located here: [LINK]

Participants made the following comments and suggestions on the Barnstable chronology:

- Participants suggested that land preservation and growth management issues should be included, as regulations in that area were major victories for managing resources.
- Revise the entry on Stewart's Creek. The town council passed a vote to authorize funds for the Stewart Creek project and it is now under construction.
- Revise the entry on Wequaquet Lake. The voters, not the Town Council, rejected this project because of several issues, including sewering problems.

Participants made the following comments and suggestions on the Brewster chronology:

- Sue Leven said she had a timeline for Brewster that could be compared to the Cape Cod Commission's chronology. Items that could be added to the Cape Cod Commission might include:
    - Add the approval of the DCPC for the Zone 2 areas, the formation of a Comprehensive Water Planning Committee to draft the Integrated Water Resource Plan, major drainage projects in 2010 and 2011 on Route 6a near Paine's Creek and near the mill site, fertilizer reduction plans at Captain's Golf Course, GIS layer update and training on direct outfalls, and a recent buildout analysis of Mill Pond to identify the source of impairment.
- Add the adoption of natural resource zoning protection

Participants made the following comments and suggestions on the Dennis chronology:

- Add the purchase of 100 acres of land for construction of a future sewage facility. The town still owns this land, but the facility was not constructed.

Participants made the following comments and suggestions on the Sandwich chronology:

- Dave Mason can provide a timeline of Sandwich for comparison.
- Include the Town Meeting approval to use open space as a trade-off for turtle habitat in the Scorton Creek watershed (Tagrest Bay)

No comments or revisions were suggested on the Yarmouth chronology.

Mr. Horsley remarked on the legacy of key decisions, for example, the 1 – 2 acre zoning codes were initiated for wellhead protection and although they worked for their intended purpose, now those areas create a real challenge for wastewater management (particularly related to the relatively high cost of sewering at that density).

**BASELINE CONDITIONS**

Mr. Horsley and Mr. Shawn Goulet, Cape Cod Commission GIS Analyst, presented GIS data layers, demographic data, and water quality data both Cape-wide and specific to the watersheds to be addressed by the Cape Cod Bay Watershed Working group. Working group members and members of the public are encouraged to view the layers on the Cape Cod Commission website. Mr. Horsley described how the lack of data was a key issue twenty-five years, but the abundance of data now available is a challenge and requires that the Stakeholders make sure that we are focusing on the most relevant information.

Mr. Horsley noted that the area is mostly rural, there are no sewer systems (with the exception of a limited area of Barnstable Village) and many homes have private wells. Additionally, pathogens are a concern in addition to high nitrogen levels in this watershed due to the high runoff rates associated with the lower-permeability soils. 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, as well as any differences of opinion they had with the Commissions' analysis or methodology.

*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.

Mr. Horsley pointed out the high number of wetlands on the northern reach of the watershed and indicated the wetlands capacity to assimilate nitrogen is a positive characteristic that will help control nitrogen concentration levels in this area. He also noted the high flushing rate associated with a large tidal range.

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.

Mr. Horsley mentioned that although there is less impervious area in this area, storm water runoff might be a bigger issue due to the low-permeability soils in the area that encourage runoff during storm events.

Regulatory Layer – Mr. Horsley covered regulatory areas, which includes Areas of Critical Environmental Concern (ACECs), MassDEP-approved wellhead protection areas,

Economic Centers, Village Centers and Growth Incentive Zones (GIZ). Open Space data is displayed in terms of three levels of land protection: land protected in perpetuity, limited protection, and no protection. There are two Growth Incentive Zones in this area, in Barnstable and Hyannis.

Mr. Horsley noted that the nitrate concentration standard for drinking water is 10mg/liter, whereas the standard for estuaries is approximately 0.4mg/liter. In this sense, dealing with estuaries is much more challenging than dealing with groundwater.

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, which is based on 2012 data, shows the maximum potential buildout over a 20-25 year time horizon using the towns zoning regulations and normalizing that data by applying state designated zoning layers. Mr. Horsley emphasized that buildout scenarios are an art, not a science, and that there are many ways to conduct a buildout analysis. He illustrated this point by showing a slide that depicted differences between the Regional Buildout, the Comprehensive Waste Management Plan buildout, and the Local Comprehensive Planning Buildout for communities across the Cape. The Commission came up with a standardized buildout methodology for all towns across the Cape so there would be a consistent standard throughout the 208 Plan Update process. Mr. Horsley noted that buildout and future growth is a critical component to the 208 Update Plan since 30% growth could increase capital costs by 40%.

Working group members made the following comments and questions on the GIS data layers:

- A group member commented that the buildout seems very high and noted that Brewester has buildout data that could be included in the analysis.
- Noting the importance of buildout data, a group member said it would be useful to create a buildout specific for this study area, instead of looking at buildout across the entire Cape. Mr. Goulet responded that the Commission could create this type of layer with the data they currently have, but they need a consistent data set to compare across towns for the 208 Plan Update.
- Another member asked how the Commission will address differences between local and regional buildouts. For example, Dennis and Chatham predicted greater non-residential development in their buildouts than is predicted by the Commission's buildout. Mr. Goulet said commercial buildout is the most difficult

to predict due to the assumptions used for mapping the non-residential buildout projections.

- A group member asked how the Commission will address a town's desire to do something that is not represented in the regional buildout. Mr. Goulet requested the group members to provide buildout data or development plans, along with the assumptions made about those data sources, to the Commission.

*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.[4] 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. The average annual single-family property tax bill includes fire district taxes. After reviewing this data, the group members made the following comments and questions.

- Several discussants felt the seasonal housing data might be inaccurate. In particular, one group member noted the Sesuit Harbor seasonal and year round data should be reversed. Ms. Perry said members of watershed working groups suggested determining seasonality data by looking at water use. A participant indicated water use might not be accurate given other influential variables, including sprinkler use. Another member said Barnstable is currently collecting seasonality data.
- Another participant suggested it would be impossible to determine whether or not a seasonal house would be seasonable in the future. The participant said many seasonal homes have been converted to primary homes over the past 50 years.
- Another group member wondered how the seasonal use of septic systems, (whether the systems are used 3-months versus 9-12 months), might influence management decisions.

**THE PROBLEM**

Mr. Horsley explained that nitrogen loading in coastal estuaries and phosphorous loading in ponds and lakes are the primary problems to address in the 208 Plan. In many areas of the Cape, the Massachusetts Estuary Project (MEP) provides at least three years of nutrient loading, water quality monitoring data, and hydrodynamic information to link water quality data to nitrogen loads. However, MEP data is not yet available for this study area. The final MEP for Barnstable Harbor is due on February 28, 2014; the draft MEP report for Sandwich Harbor is due August 30, 2013; the Scorton Harbor report is only partially completed; the final Sesuit Harbor report is due December 30, 2013, and Quivett Creek and Chase Garden Creek have not been studied.

Mr. Horsley 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 wasterwater treatment facility effluent and natural sources comprise the remaining one percent. Mr. Horsley stated that in the absence of completed MEP data analysis in this area, Cape-wide averages could be used for this area in the 208 Plan Update as one option. He requested group members to provide any water quality data they may have to aid the analysis. Mr. Tom Cambareri said water quality data the Commission developed a nutrient analysis in 1998 that could be incorporated into the study area on an interim basis. It was noted that nitrogen reduction may not be as important as pathogen reduction since the watersheds in this study area have a high capacity to assimilate nitrogen.

Participants had the following questions and comments:

- In response to a question about whether or not the 208 Plan Update will address nitrogen deposition originating from the Midwest, Mr. Horsley said the 208 Plan Update will not focus on "uncontrollable" nitrogen from sources like rainfall.
- A participant commented that the group should mention in the 208 Plan Update the presence of uncontrollable nitrogen sources in Cape Cod's system.
- A participant said the Chase Garden Creek has been studied.
- A participant asked whether nitrogen on impervious surfaces represented atmospheric nitrogen or controllable sources. Mr. Tom Cambareri, the Cape Cod Commission's Water Resource Program Manager, said he did not think it contained atmospheric nitrogen.
- Another participant inquired if the Commission had data on 100% of nitrogen loads to understand the percentage of the total nitrogen load the group would address through the controllable nitrogen sources. Mr. Cambareri said the Commission does not have data on total natural loads but might be able to provide some local examples.
- A group member asked if the 'other' category included pesticides and chemicals. Mr. Cambareri said he thought it only included nitrogen from natural load sources.
- A participant asked if phragmites growth is an indicator of nitrogen. Mr. Horsley said it is an invasive that grows in areas of disturbance, but it is not necessarily an indicator of nitrogen.

In regards to the phosphorous issue, Mr. Cambareri said the Pond and Lake Stewardship Project (PALS) provides a snapshot of the physical water quality parameters of 200 inland water bodies and connects this data to trophic status. Mr. Cambareri clarified that the ponds highlighted as 'priority' have not been prioritized. Instead, they represent ponds that have been sampled. He added that the working group should keep in mind the pathogen issues in these ponds, since the PALs data does not include pathogens. Participants made the following comments:

- One member suggested the town of Brewster should encourage homeowners to implement water quality improvement measures in their ponds before requesting assistance from the town.
- A group member commented on a recent publication about pharmaceutical pollution in the water.[5] Mr. Cambareri said the pharmaceutical issue will not be the priority of the 208 Plan Update, but the group should keep in mind contaminants of emerging concern as they develop solutions.

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. Goulet offered a few caveats with the data: 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 more likely to exhibit compliance issues due to the small size of the land parcels, shallow depth to groundwater at the parcel locations, soil structure, 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.

**EXISTING AND PROPOSED SOLUTIONS**

Mr. Horsley and Mr. Goulet 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 will illustrate the locations of natural attenuation sites and CWMP sewershed phasing, if applicable. They requested group members provide additional information on planned stormwater upgrades to existing infrastructure. One group member said the towns of Barnstable and Sandwich have maps of targeted stormwater projects. A group member said the Engineering Department and the Department of Public Works should have information on stormwater infrastructure.

**NEXT STEPS**

Mr. Horsley 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. He noted that the packaging toilets option would likely be removed from the matrix. 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.

[5] Referring to a study done by Silent Springs, which can be found here: http://www.silentspring.org/pdf/our_research/Contaminants%20of%20Emerging%20Concern%20and%20Septic%20Systems%202013%20Report.pdf.

Mr. Horsley then reviewed the screening method for the different plans, emphasizing that the goal is not to pick a definitive solution but a range of approaches for future discussion. The group will:

1. Decide upon target goals (which will be challenging for this area given the lack of clear numbers)
2. Examine approaches with low barriers to implementation, including existing programs to address fertilizers and stormwater
3. Study watershed abatement options such as permeable reactive barriers, inlet/culvert openings, constructed wetlands, dredging, etc.
4. Consider alternative on-site options such as eco-toilets (UD and compost), I/A technologies, enhanced I/A technologies, shared systems, etc.
5. Research plans for priority collection and high density areas
6. Look into supplemental sewering if all other options fail as this approach is not necessarily cost effective or politically achievable

A participant asked if they would talk more about effluent discharge from collection systems at the next meeting. Mr. Cambareri responded that this area is unique as there is less nitrogen, so this is not a large problem, but there may be opportunities for regional cooperation by participating in sewer trading with the south side of Cape Cod.

Ms. Hulet asked the group to reflect upon what it can learn from the past and how it can use these lessons to develop guiding principles going forward. Several different comments and themes emerged from this discussion:

- Participants discussed the hidden cost of title 5 systems and the need to make this cost apparent to the general public.
- Reflecting on past failures to advance water quality initiatives, several participants discussed the value of and need for more public education. Group members described the importance of interpreting this issue for a general audience to help people understand the problem and support the proposed solutions.
- A participant asked if the group was creating a problem by linking the Title 5 compliance issue to climate change and expressed skepticism about the reality of global warming and sea level rise. Mr. Horsley responded that there is little debate that sea level is rising, though there is disagreement about the timeframe in which sea level rise will occur. Ms. Hulet said the group could use sea level rise as a potential screen when deciding upon proposed technologies. The same participant suggested using the SLOSH data to look at storm surges rather than uncertain climate change science.
- Another discussant suggested using aesthetic considerations as another screen, especially for managing growth on the north side
- Some agreed that land management is important.

- A group member suggested the need to coordinate between the fire districts and the town since the fire districts plan their own wells
- A participant noted potential conflicts between ground water and wastewater management goals.
- While describing a potential agreement between Dennis and Barnstable to jointly purchase a dredge, a group member suggested that cost efficiency for regional or shared solutions could be another screen to apply.

**OPERATING PROTOCOL**

Ms. Hulet reviewed a draft of the operating protocols and asked the group for their feedback, specifically mentioning the role of the group, the expectations for membership in the group, and communication protocols. 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. She requested any suggested revisions to the protocols within the next week.

**PUBLIC COMMENTS**

Ms. Hulet opened the floor for public comments. One member of the public, Alex Marks, said he was glad to be included in the process and learn from it.

**Appendix A**
**Attendance**

| **Name** | **Affiliation** |
|---|---|
| *Working Group Members* | |
| Kyle Hinkle | Executive Director, Brewster Chamber of Commerce |
| Bill McMahon | Robert B. Our |
| Sue Leven | Town Planner, Town of Brewster |
| Peter McDowell | Dennis Water District Wastewater Committee |
| Ed Nash | Golf Course Superintendents Association of Cape Cod |
| Elizabeth Jenkins | Principal Planner, Town of Barnstable |
| Charles Spooner | Yarmouth Port |
| David Mason | Health Agent, Town of Sandwich |
| Ann Canedy | Town Councilor, Town of Barnstable |
| Dan Santos | Director of Public Works, Town of Barnstable |
| | |
| *Observers* | |
| Matthew Capone | Tufts University |
| Alex Marks | MIT |
| | |
| *Staff* | |
| Scott Horsley | Area Manager for the Mid Cape Groups and Consultant to the Cape Cod Commission |
| Erin Perry | Special Projects Coordinator, Cape Cod Commission |
| Shawn Goulet | GIS Analyst, Cape Cod Commission |
| Carri Hulet | Facilitator, Consensus Building Institute |
| Eric Roberts | Associate, Consensus Building Institute |
| Griffin Smith | Associate, Consensus Building Institute |