Cape Cod 208 Area Water Quality Planning
Wellfleet Harbor and Pamet River Watershed Working Group

Meeting One
Wednesday, September 25, 2013
Wellfleet Council on Aging, 715 Old King's Highway, Wellfleet, MA 02667

Meeting Agenda

1:00 pm Welcome – *Cape Cod Commission*

1:05 Introductions, confirm working group membership and participation – *Kate Harvey (Facilitator) and Working Group*

1:30 Review 208 goals and process and the goals of today's meeting – *Cape Cod Commission*

1:45 Local Progress to Date: Chronology of what has been done to protect the watersheds in your area – *Cape Cod Commission*

2:00 Review and add to chronology of work to date – *Working Group*

2:15 Discussion: drawing on past work to move forward – *Kate Harvey (Facilitator) and Working Group*

2:30 Baseline Conditions: Understanding Your Watershed and its Water Quality Problem – *Scott Horsley (Area Manager)*

3:15 Break

3:30 Discussion of Baseline Conditions - *Kate Harvey (Facilitator) and Working Group*

4:00 Framework for Moving Forward: Preview Meetings 2 and 3 – *Scott Horsley (Area Manager)*

4:20 Review/Discuss Process Protocols - *Kate Harvey (Facilitator) and Working Group*

4:40 Public Comments

5:00 Adjourn

Wellfleet Harbor & Pamet River Group

Baseline Conditions & Needs Assessment

What is the 208 Plan?

Clean Water Act Section 208

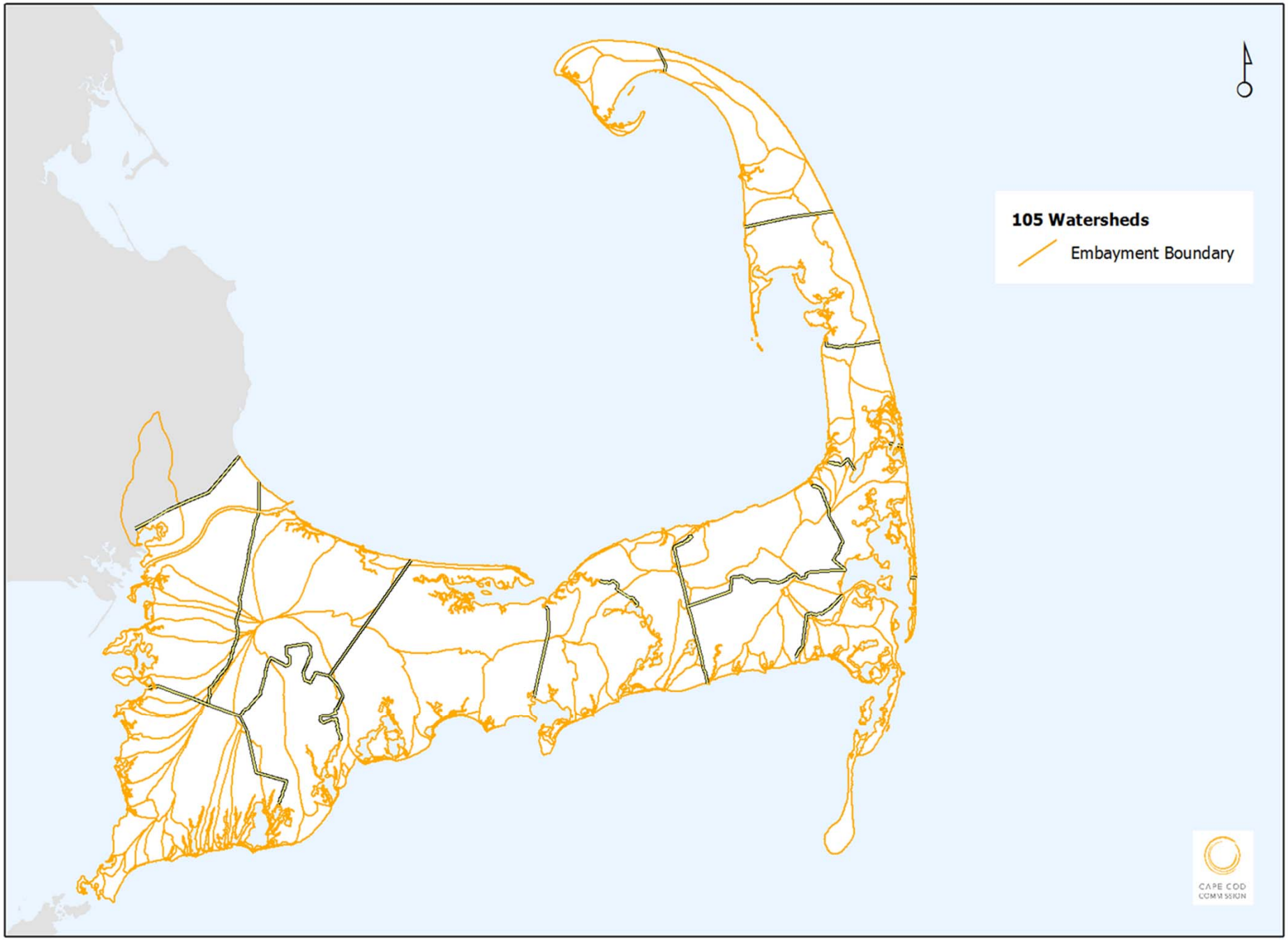
The Commission was directed to update the 1978 Plan

The Commonwealth provided $3 million to fund the project

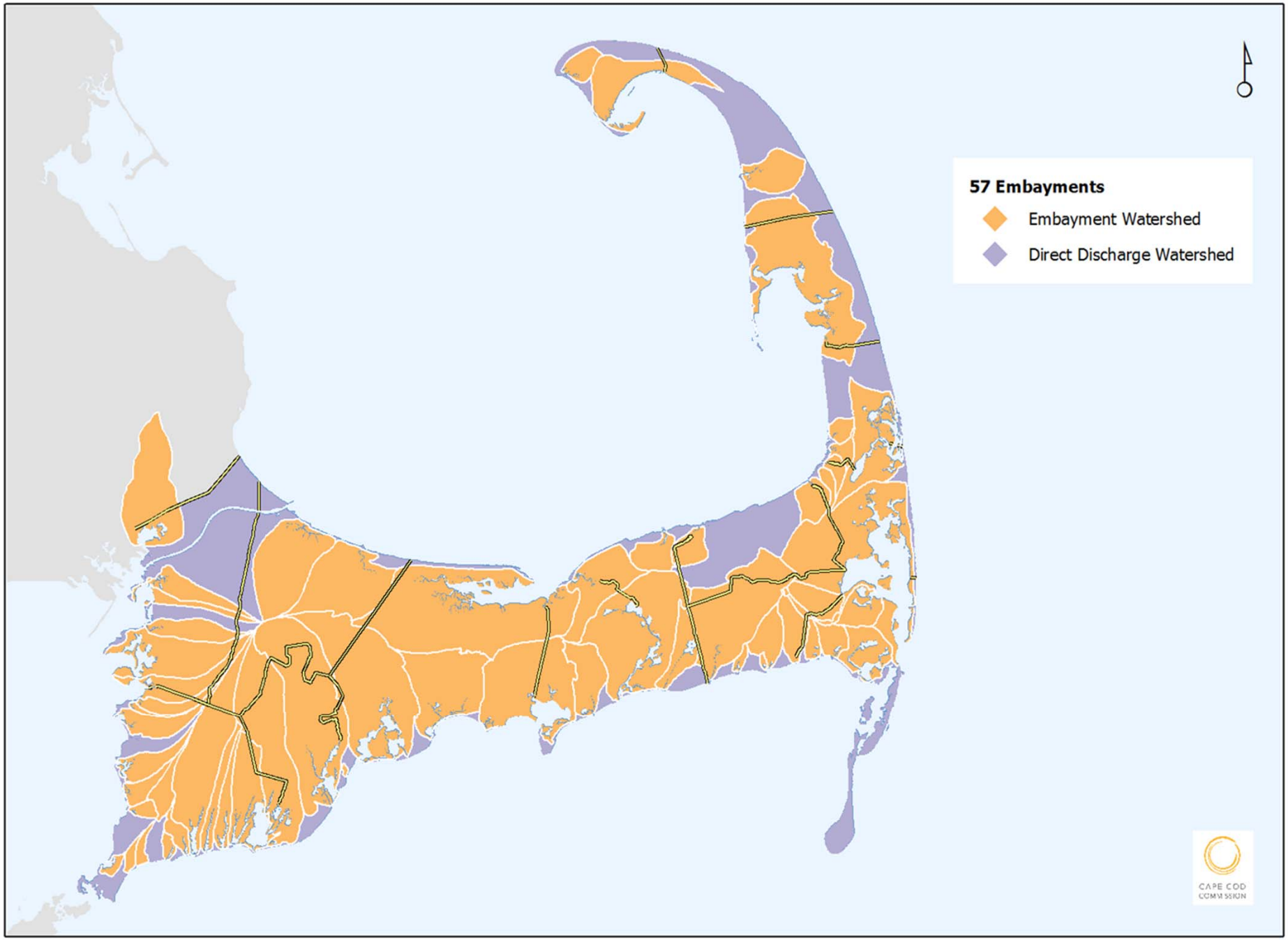
Focus on 21st Century Problems

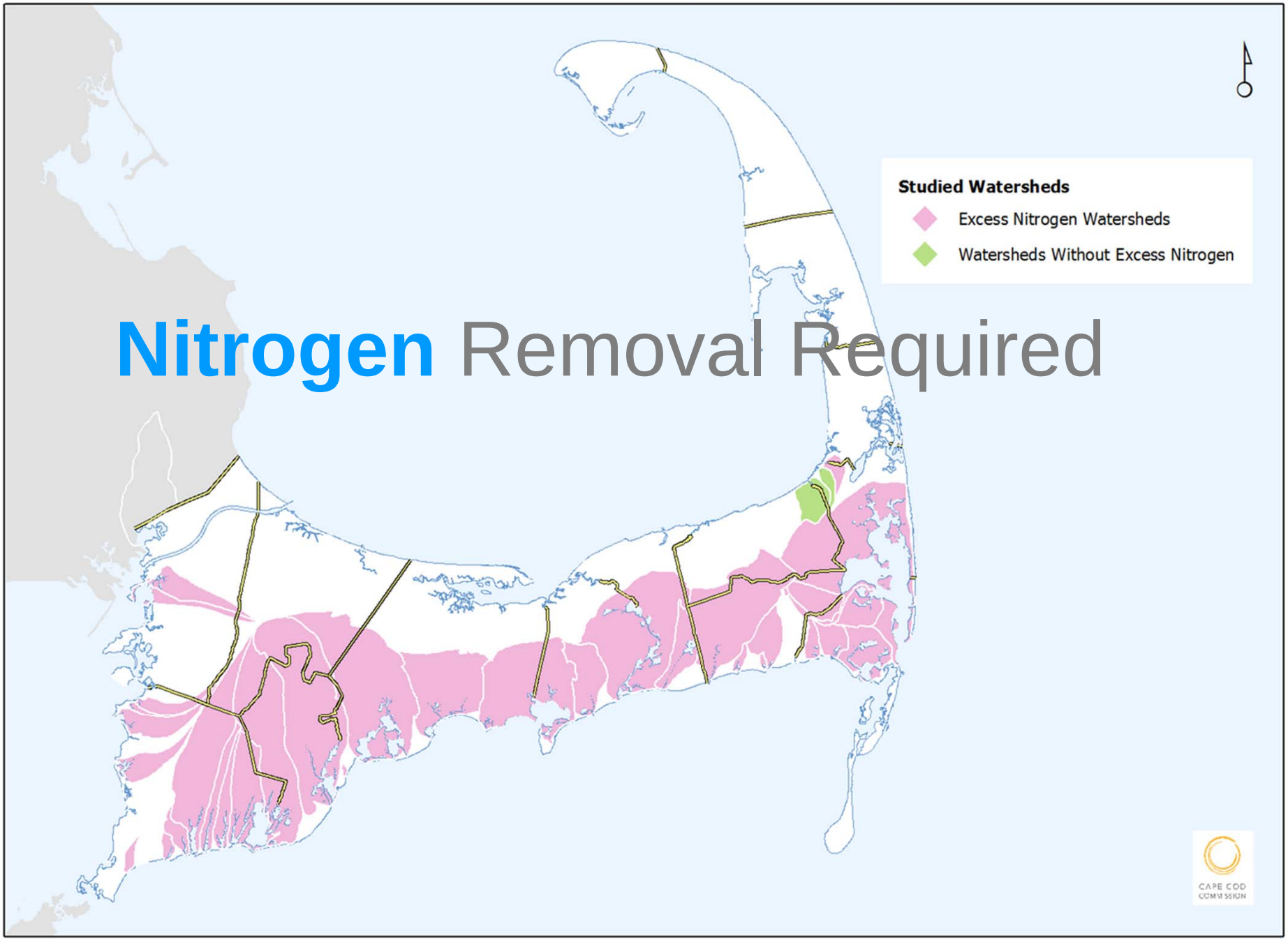
- Nitrogen: Saline Waters
- Phosphorus: Fresh Waters
- Growth & Title 5 Limitations

"Watershed Working Group - Wellfleet Harbor/Pamet River - Workshop 1"

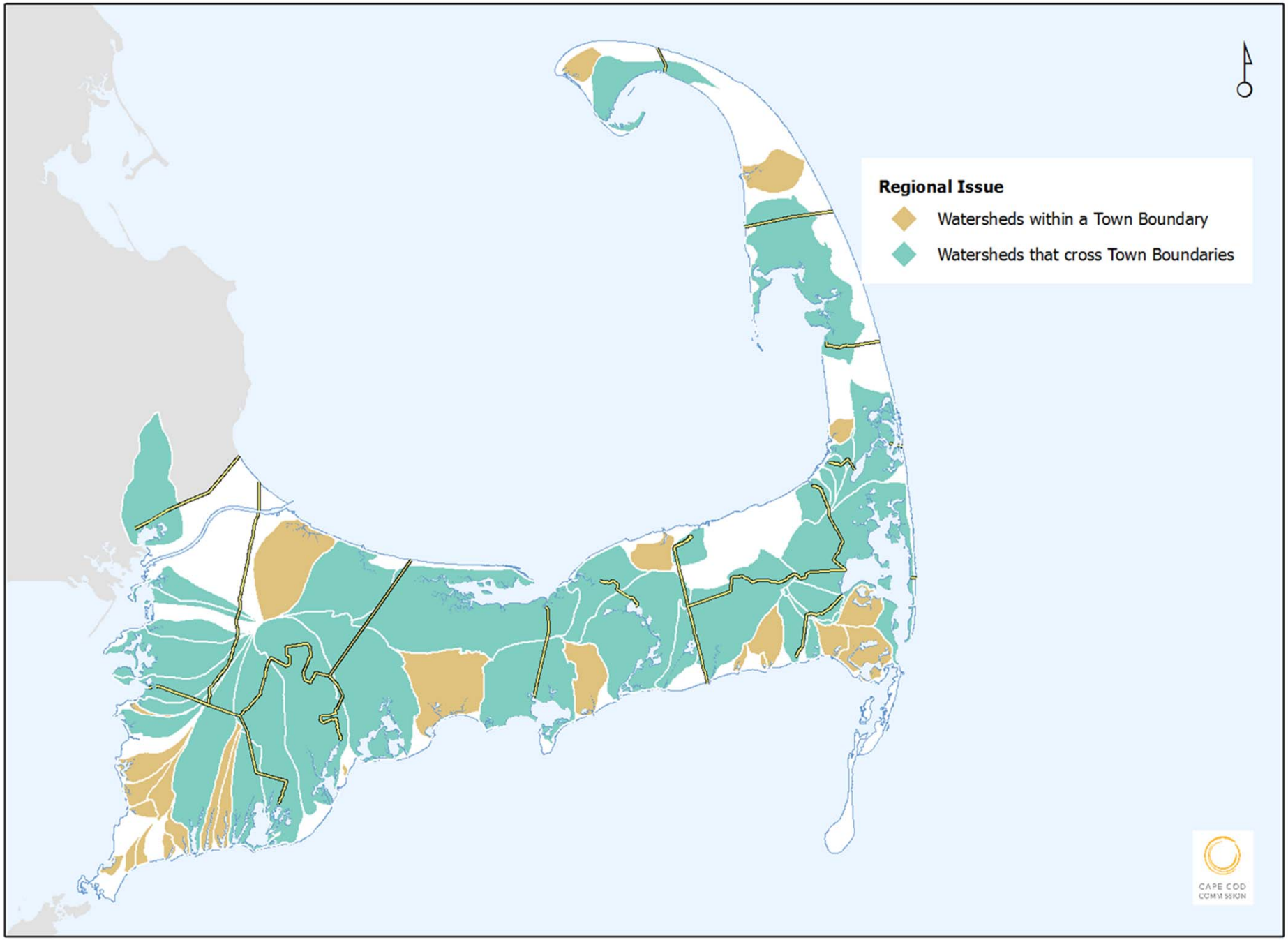


"Watershed Working Group - Wellfleet Harbor/Pamet River - Workshop 1"




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

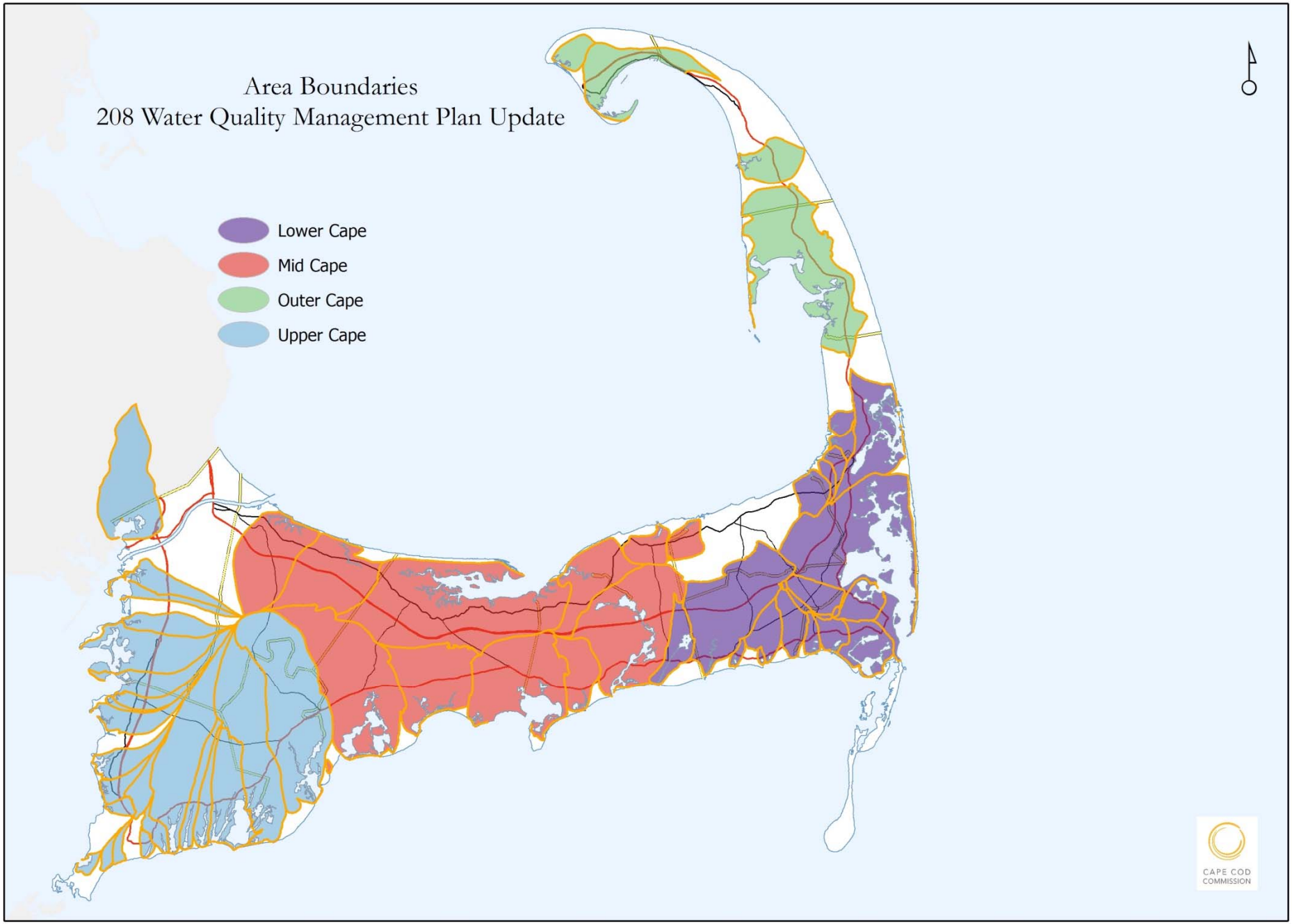
"Watershed Working Group - Wellfleet Harbor/Pamet River - Workshop 1"

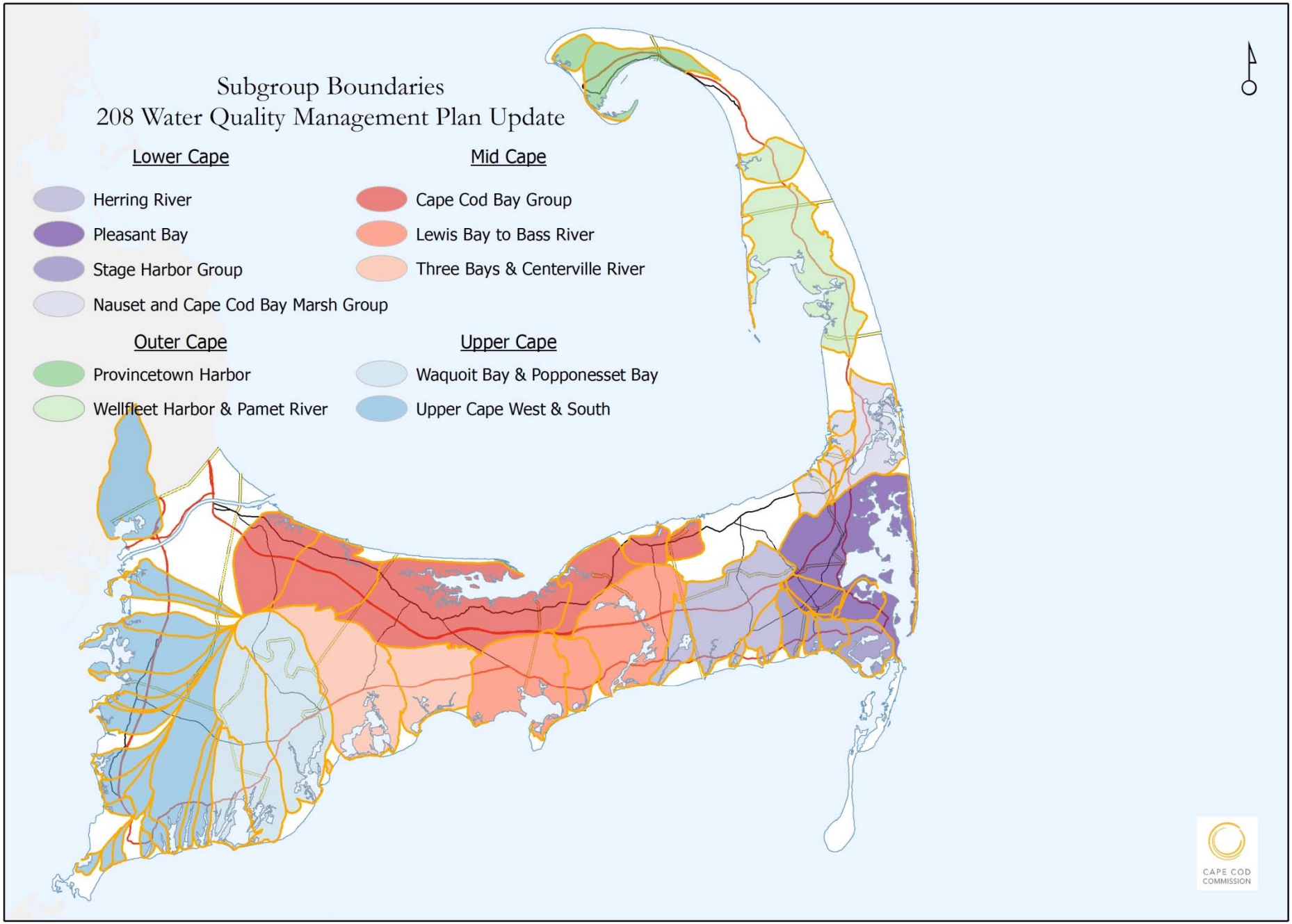


Approach to the 208 Plan Update

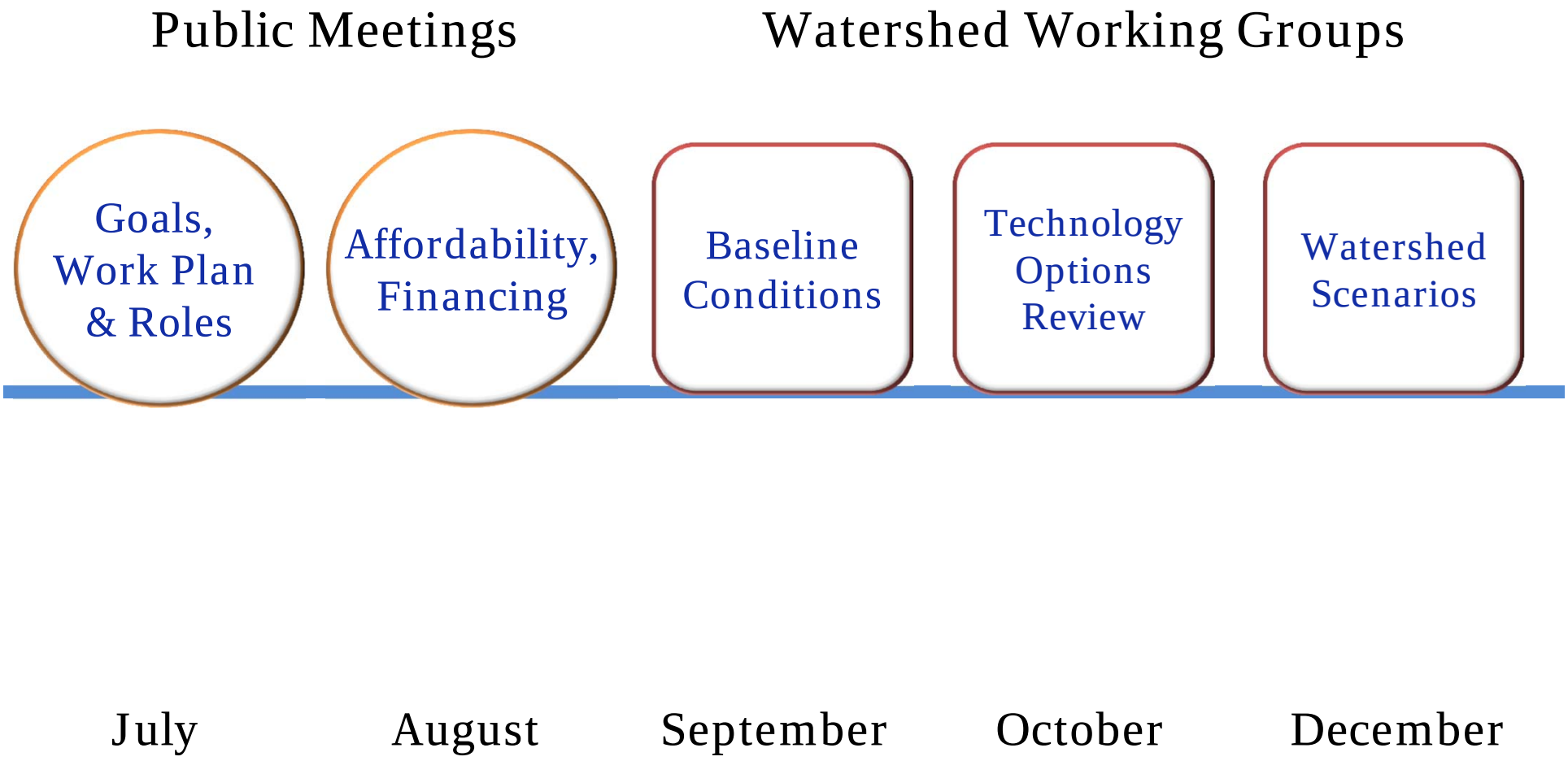
- Watershed Based
- Stakeholder Engagement
- Maximize Benefits of Local Planning
- No Optimal Solutions

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

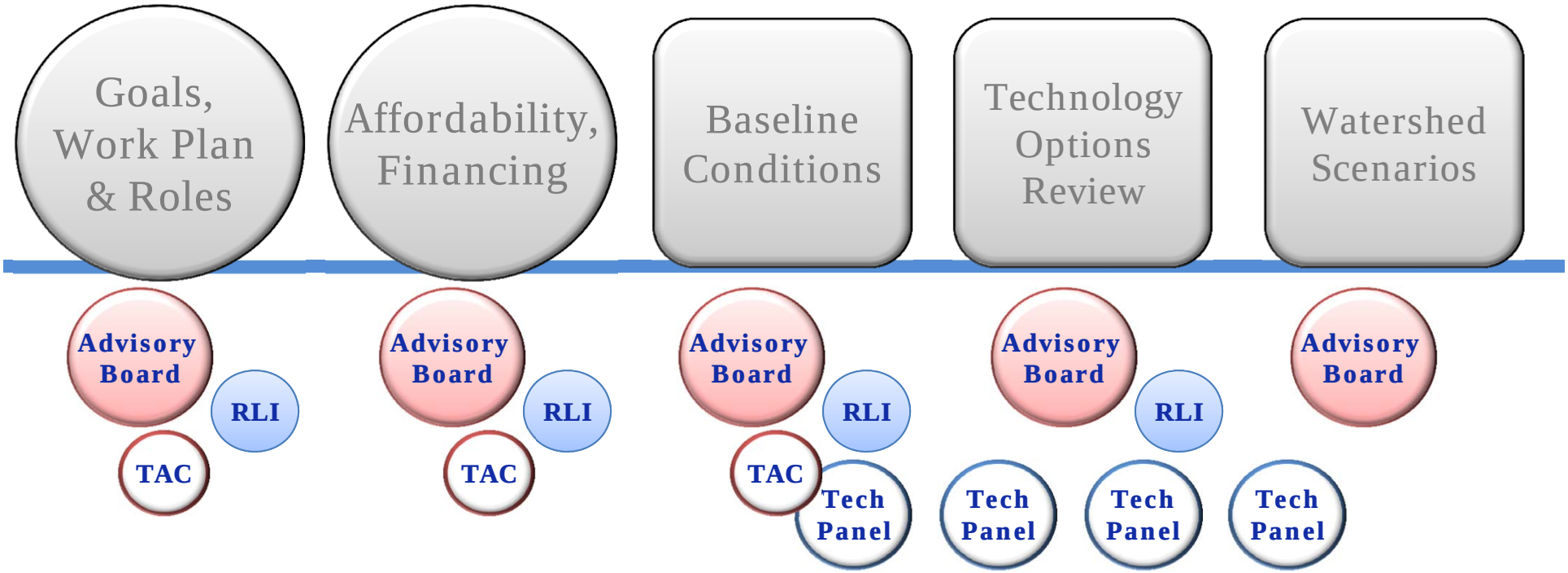
What is the stakeholder process?



208 Planning Process

Public Meetings

Watershed Working Groups



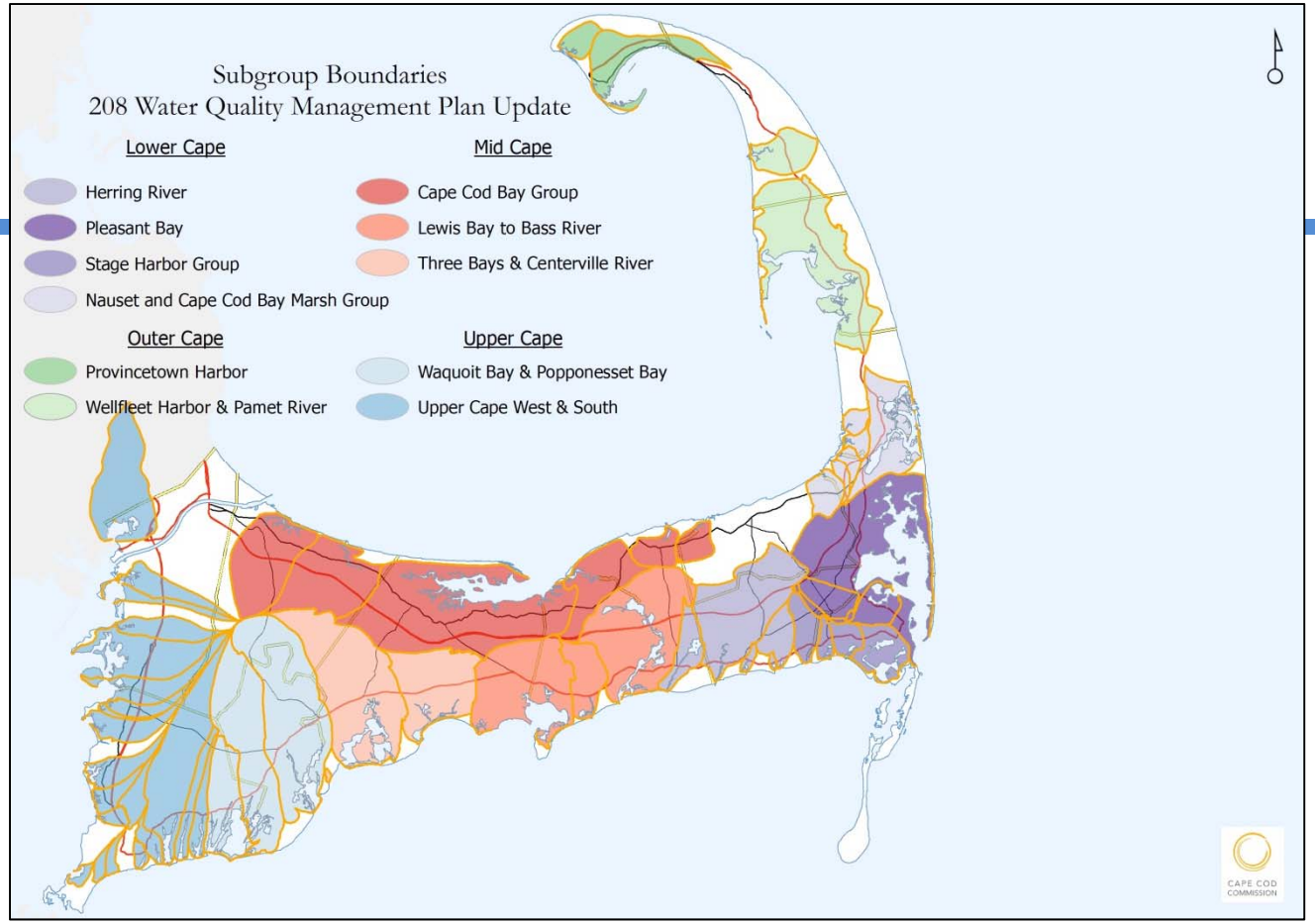
RLI — Regulatory, Legal & Institutional Work Group

TAC — Technical Advisory Committee of Cape Cod Water Protection Collaborative

208 Planning Process

Baseline Conditions

11 Working Group Meetings: Sept 18-27



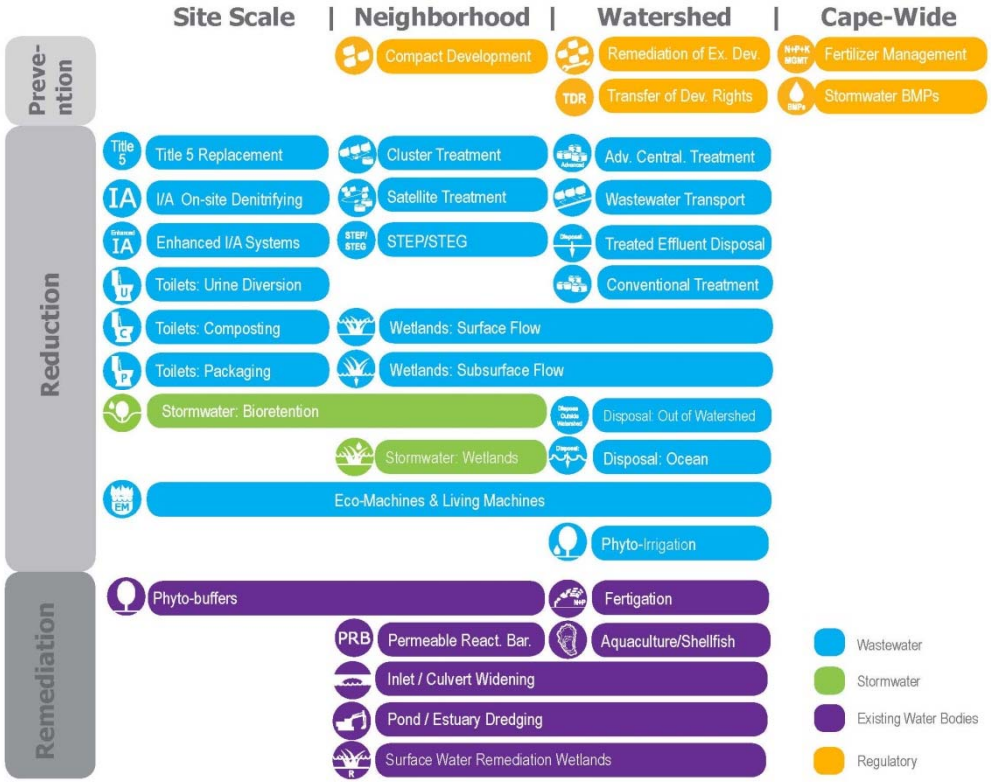
208 Planning Process

Baseline Conditions

11 Working Group Meetings: Sept 18-27

Technology Options Review

11 Working Group Meetings: Oct 21-Nov 5



208 Planning Process

Baseline Conditions

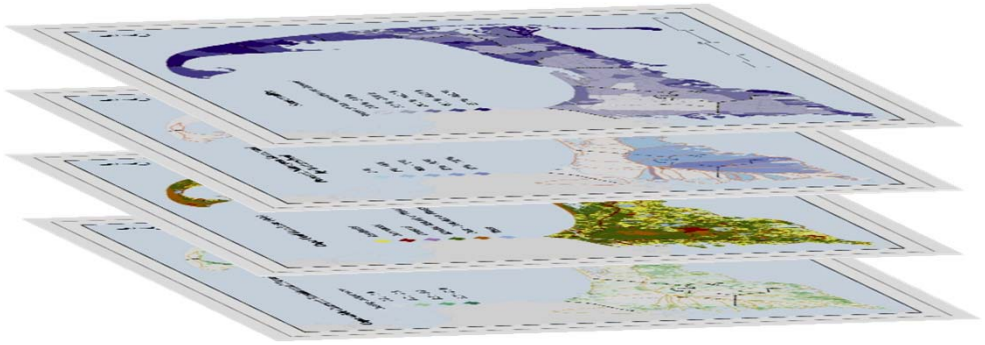
11 Working Group Meetings: Sept 18-27

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

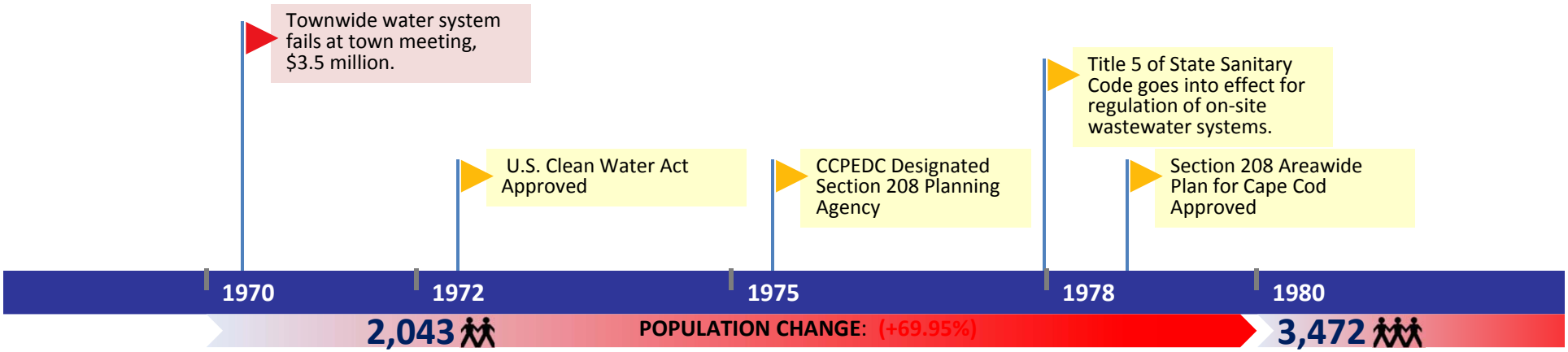
Local Progress to Date

Pamet River
Wellfleet Harbor

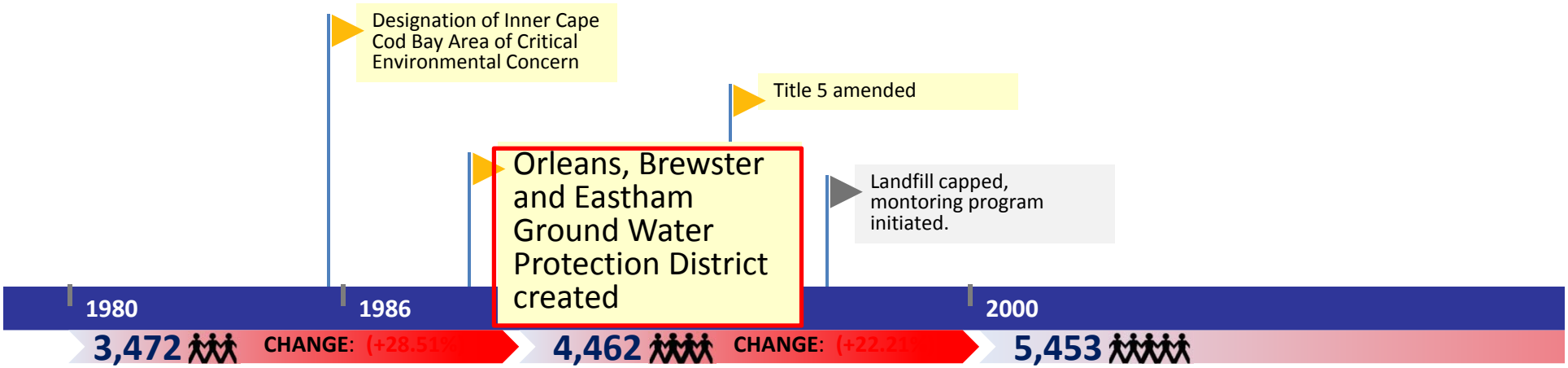
Eastham

From 1978 Section 208 Plan

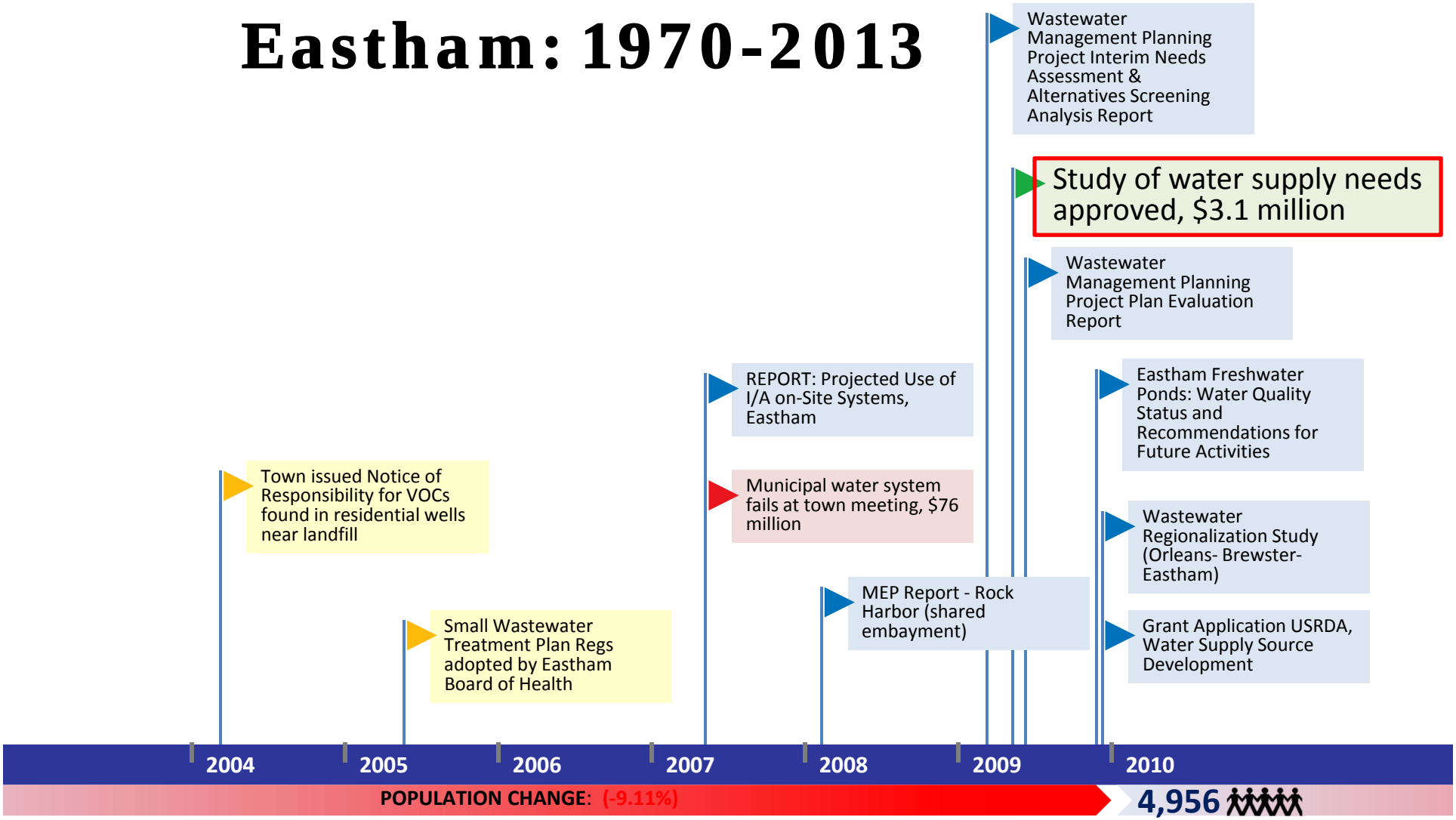
- Eastham should give priority to improving Title 5 enforcement and controlling conversion of seasonal dwellings.
- The town should work with CCPEDC to implement a Seasonal Residential District for the western shore of Eastham.
- Water supply is also of concern in Eastham. The high density areas and 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.



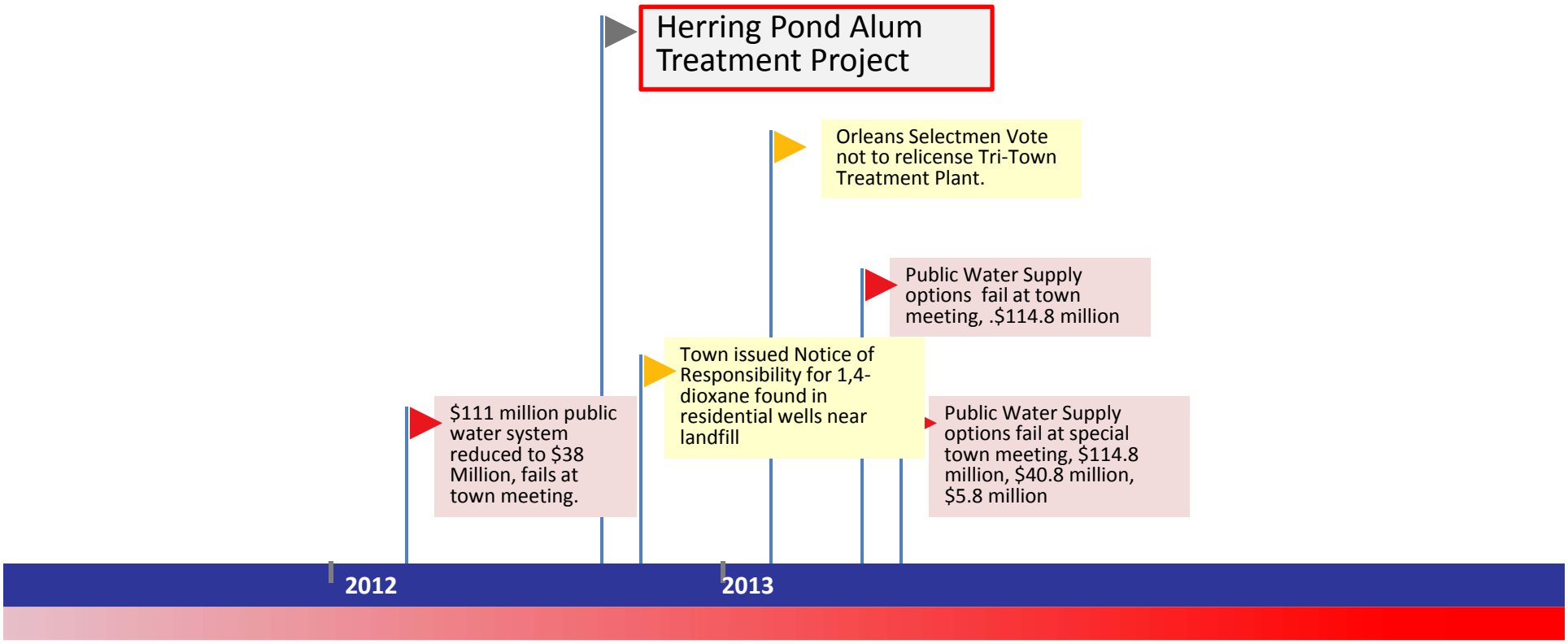
Eastham: 1970-2013



Eastham: 1970-2013



Eastham: 1970-2013



Truro: 1970-2013

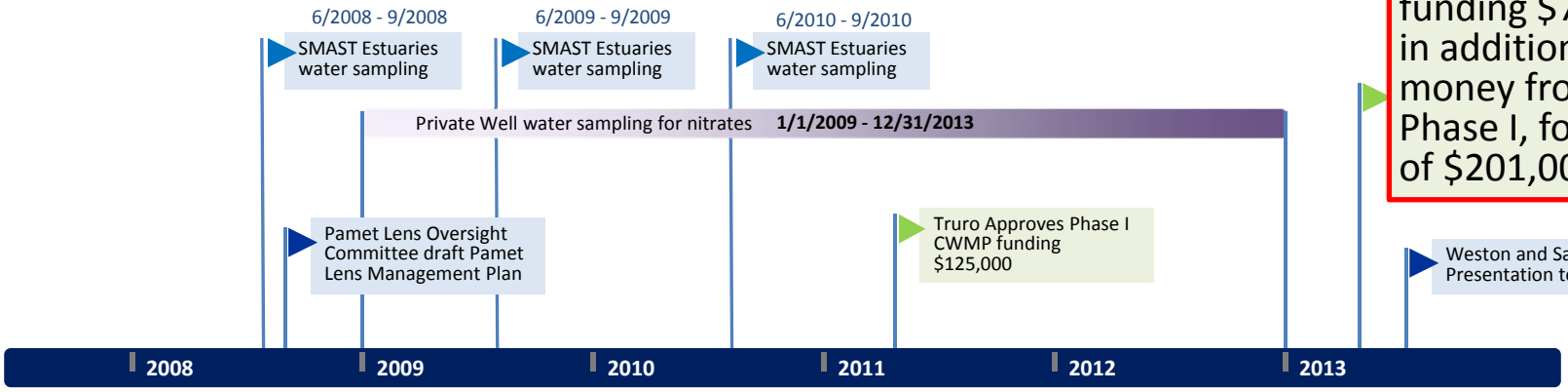
From 1978 Section 208 Plan

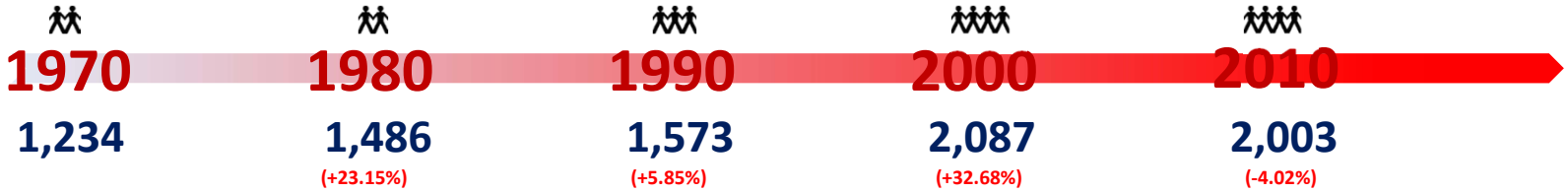
- A recent gasoline spill from a leaking service station storage tank has resulted in contamination of the groundwater approximately 600 feet from the South Hollow Well field.
- Even if the South Hollow Wellfield is put back into production, however, Provincetown presently needs an additional permanent water supply.
- Development of a water supply plan for the outer Cape groundwater basins should be given immediate priority by local, regional and federal agencies.
- Growth controls and water conservation must be given full consideration in such a planning effort to assure that the groundwater resource is not overdeveloped.
- With Truro' s naturally sandy soils, the town's wastewater problems are limited to a small strip of commercial development along a low-lying barrier beach known as Beach Point.

This area of was included in the Sewer Service Areas Map on the basis of the likely cost-effectiveness if a sewer is built for Provincetown.

- Local officials of Truro expressed concern over possible growth impacts of sewering. A means of growth control should be included in any facility plan for this reason.

Further investigation is also recommended of the water quality impacts of the landfill and septage pits.

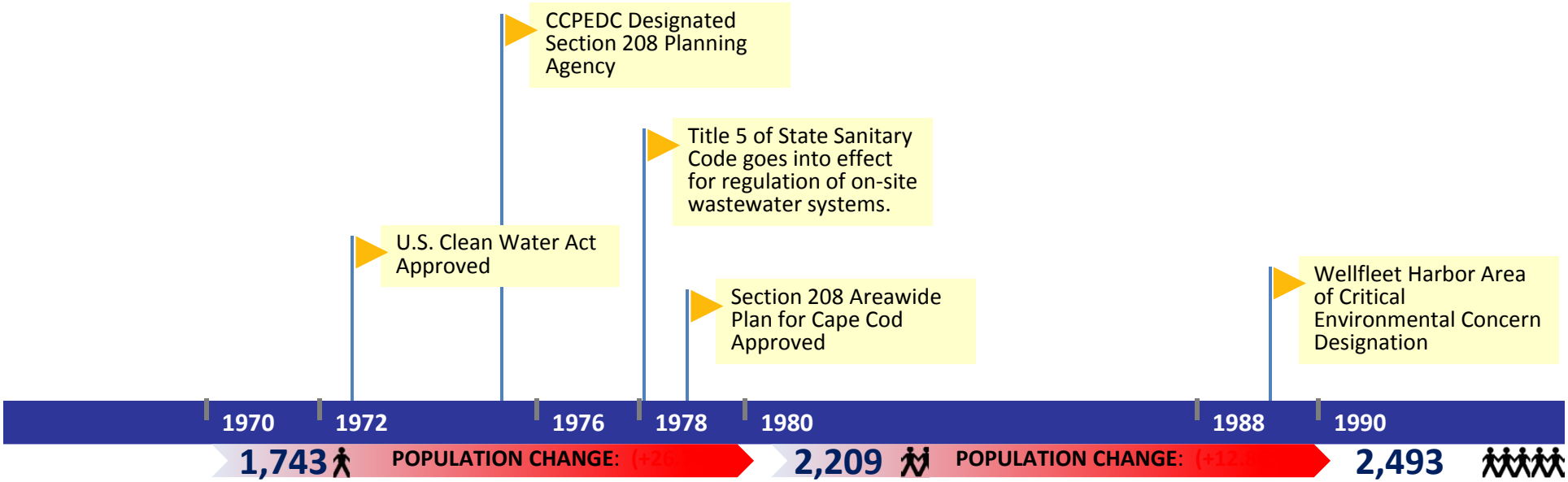




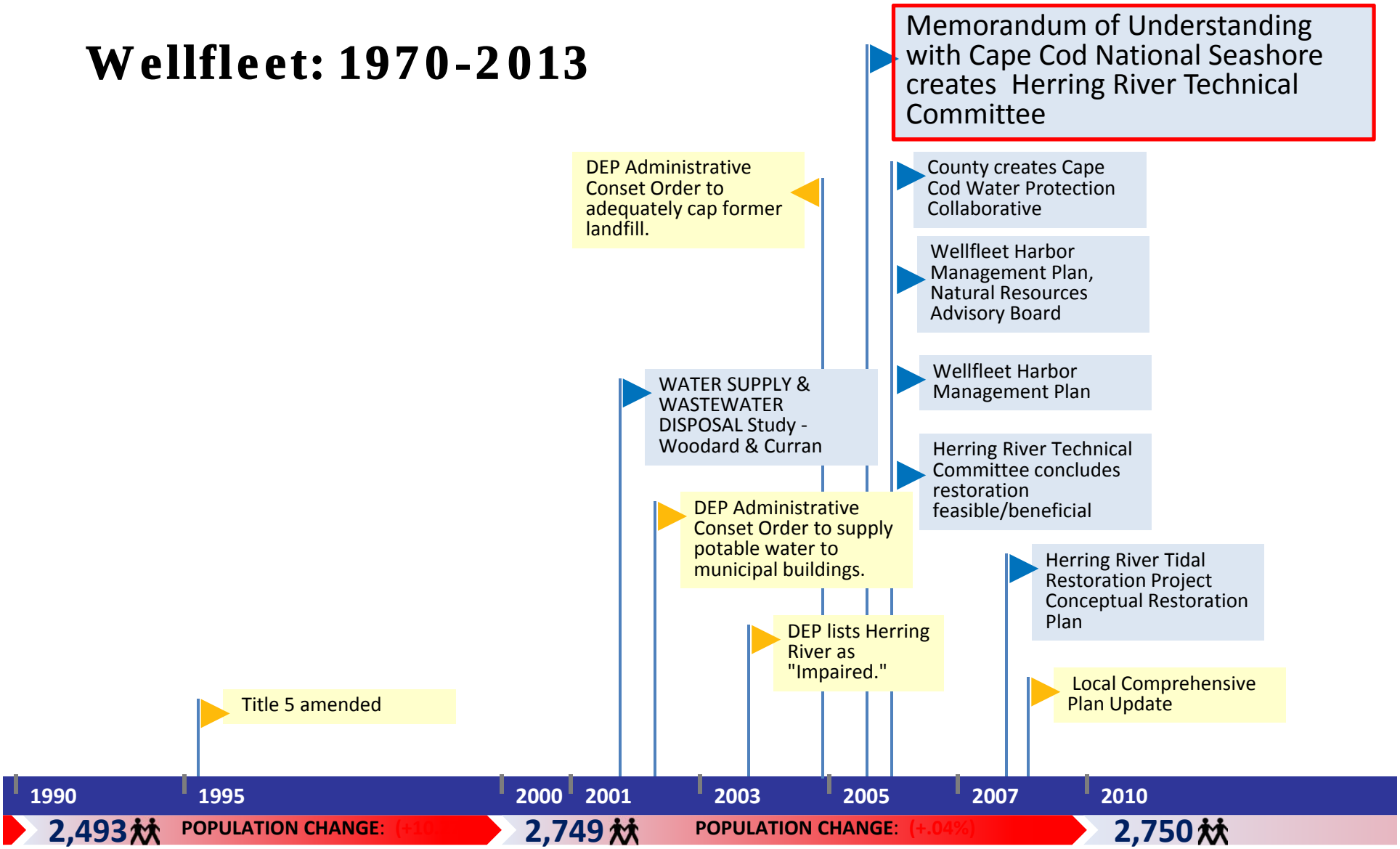
Wellfleet:

From 1978 Section 208 Plan

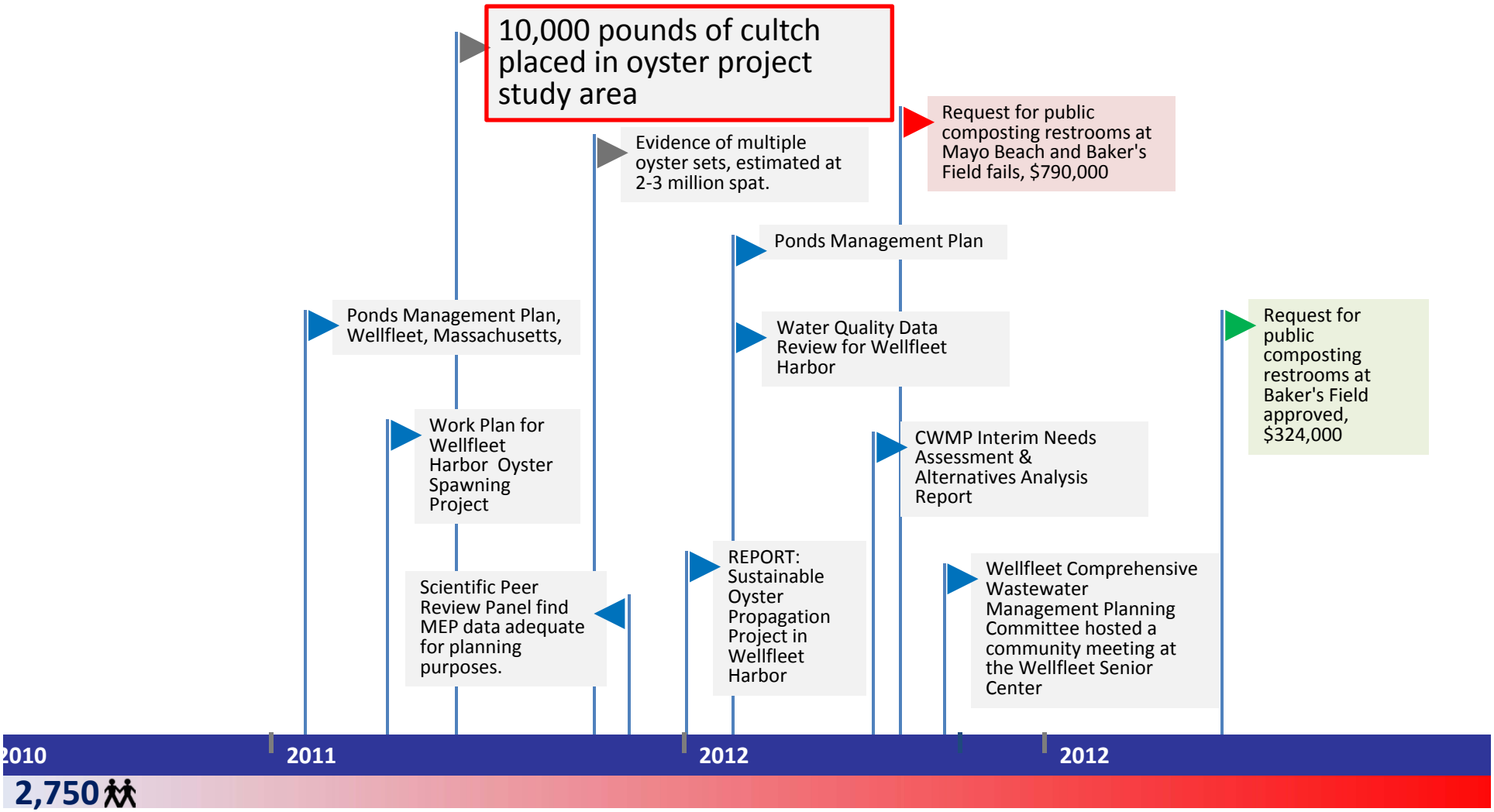
- The Town of Wellfleet is similar to Eastham and Truro in that it has a high influx of summer population and has no municipal water or sewer system.
- Wellfleet has a relatively densely populated downtown area which is indicated in the Wastewater Problem Areas Map
- It is recommended that the town regionalize with Truro for construction of a septage facility.
- Since Wellfleet has a major Category 2 problem area it would be the most appropriate town to be a lead agency and conduct a full 201 facility plan.
- On-site system installation and management should be administered by a professional health agent. Wellfleet should join with either Eastham or Truro and apply for state funds for a shared health agent.
- There's an immediate need for a public water supply in Wellfleet Center.
- Since Wellfleet is one of the few Cape Cod towns which has no water supply engineering plan, a combined water and sewer study would be desirable.
- The town planning board is presently revising its master plan. Water quality should be a priority consideration, and should be coordinated through the establishment of a water quality advisory committee.



Wellfleet: 1970-2013



Wellfleet: 1970-2013

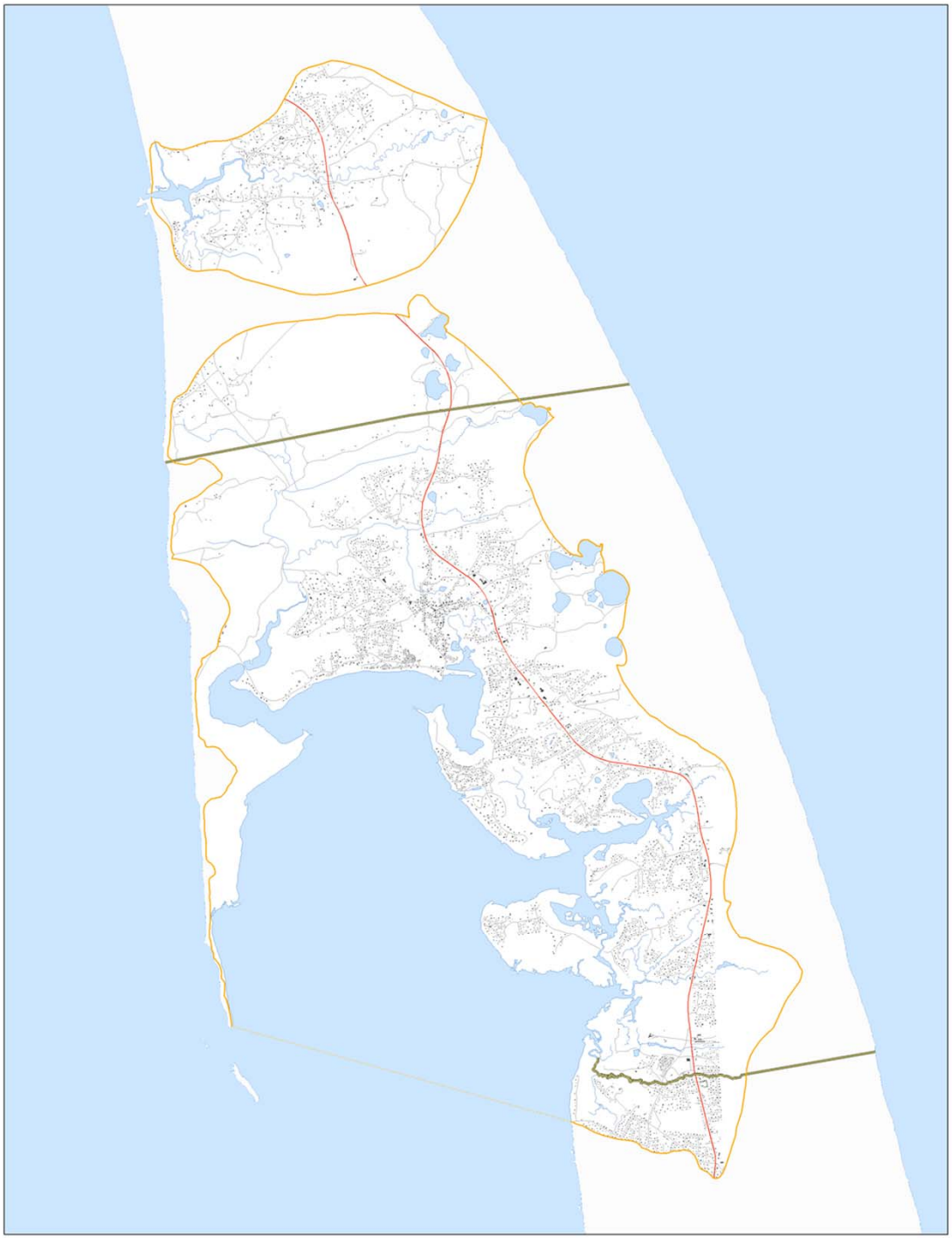


Did we miss anything?

Your Watersheds

Pamet River
Wellfleet Harbor

"Watershed Working Group - Wellfleet Harbor/Pamet River - Workshop 1"



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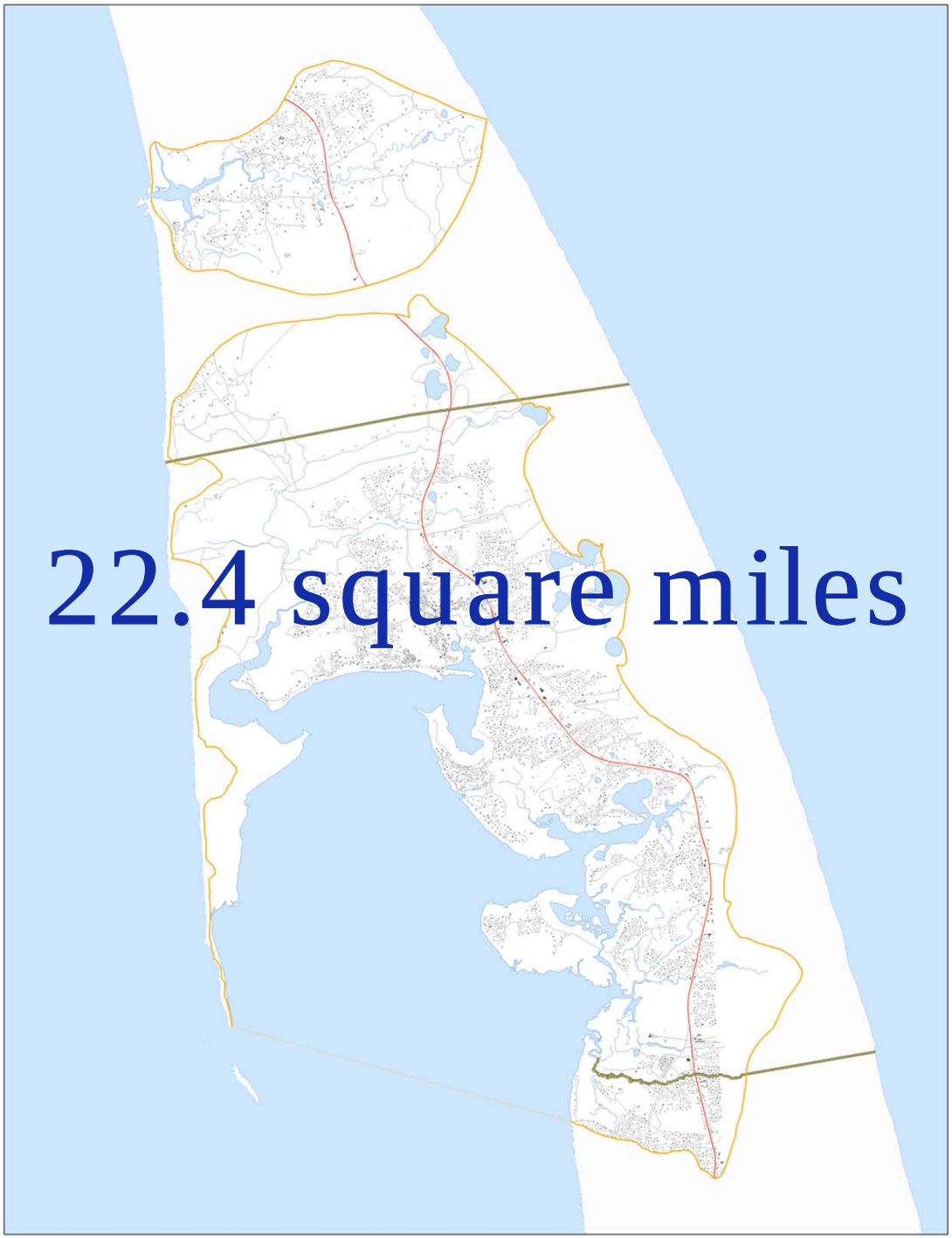

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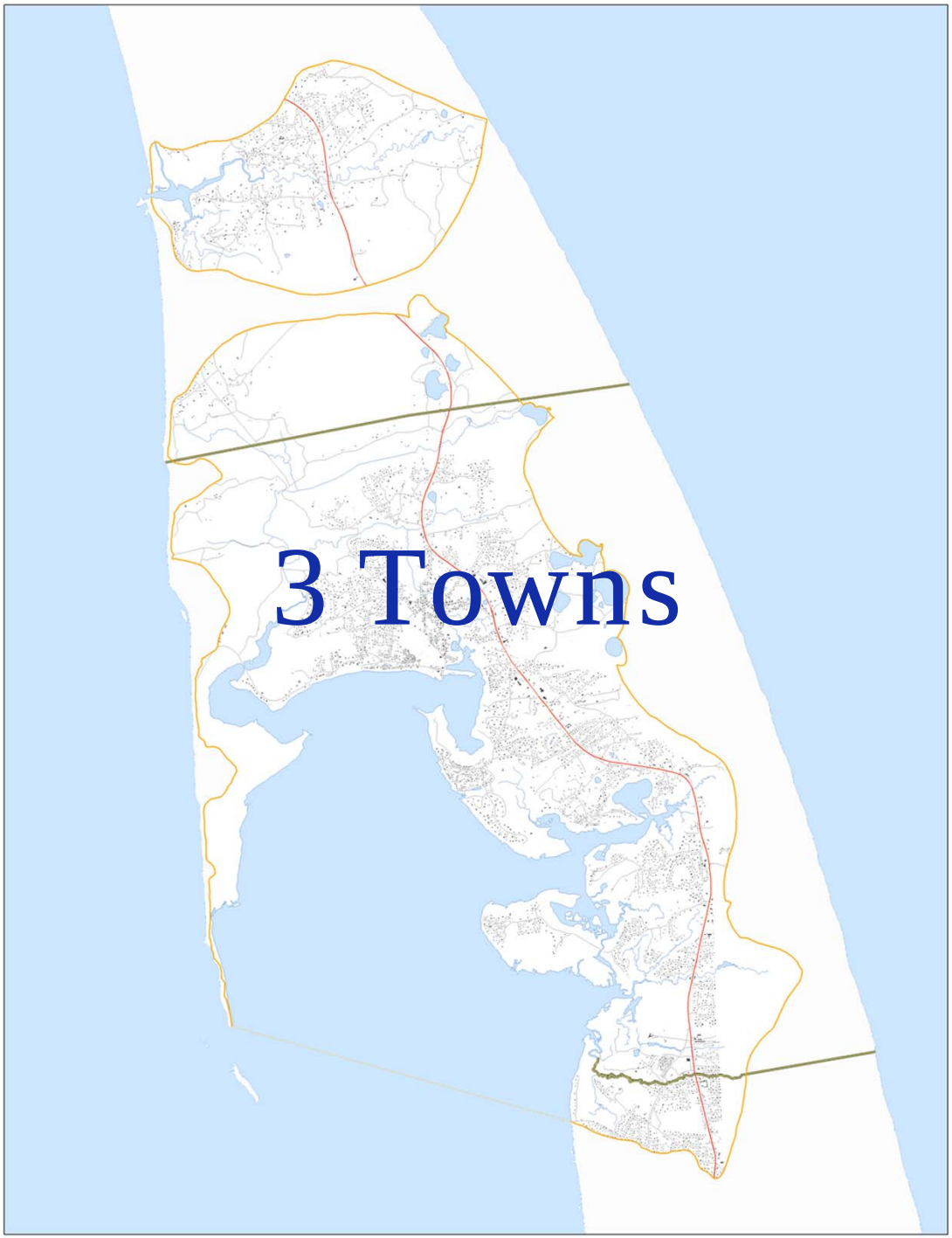


Natural Features

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

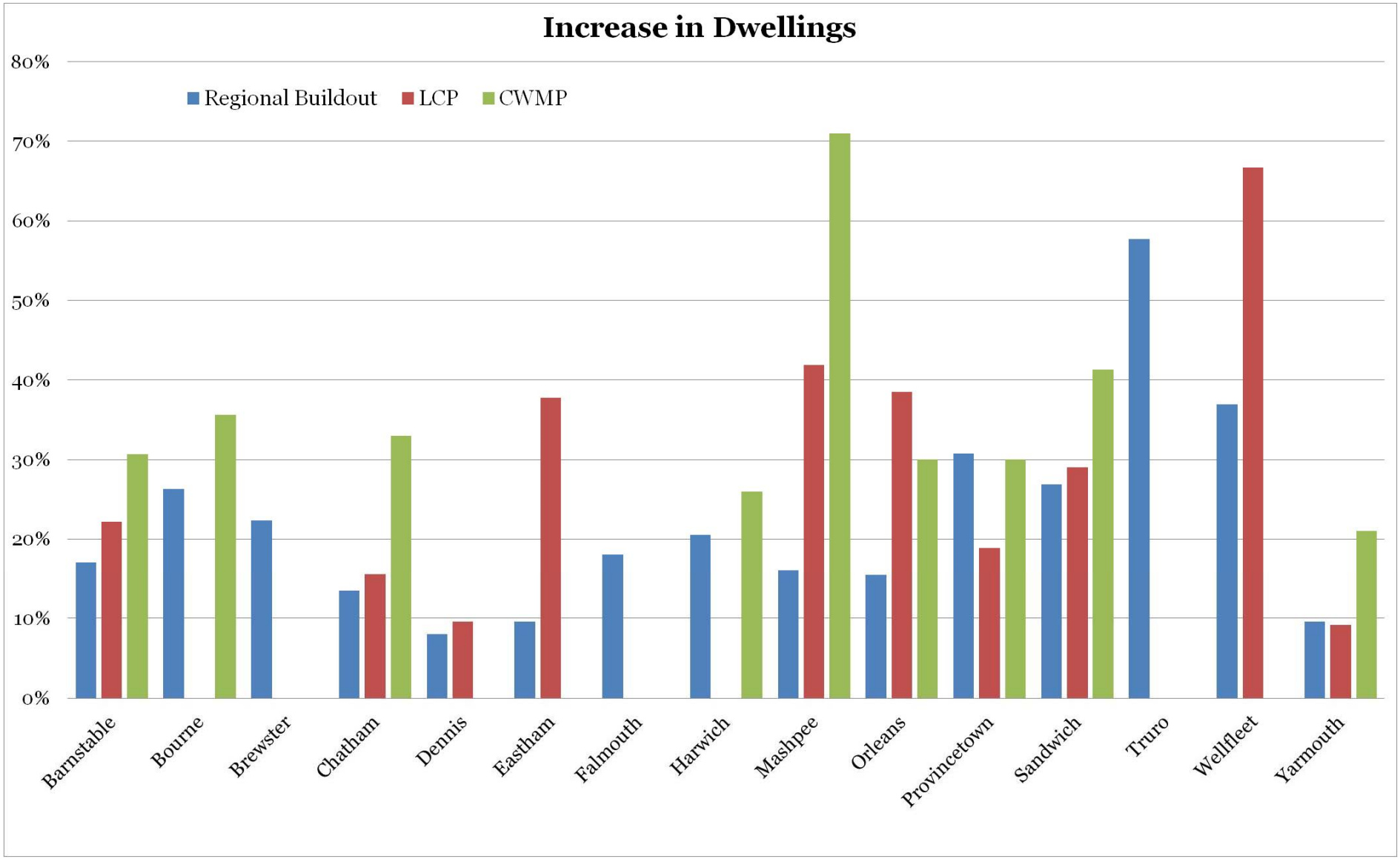
Sources: MassGIS, MassDOT

Density

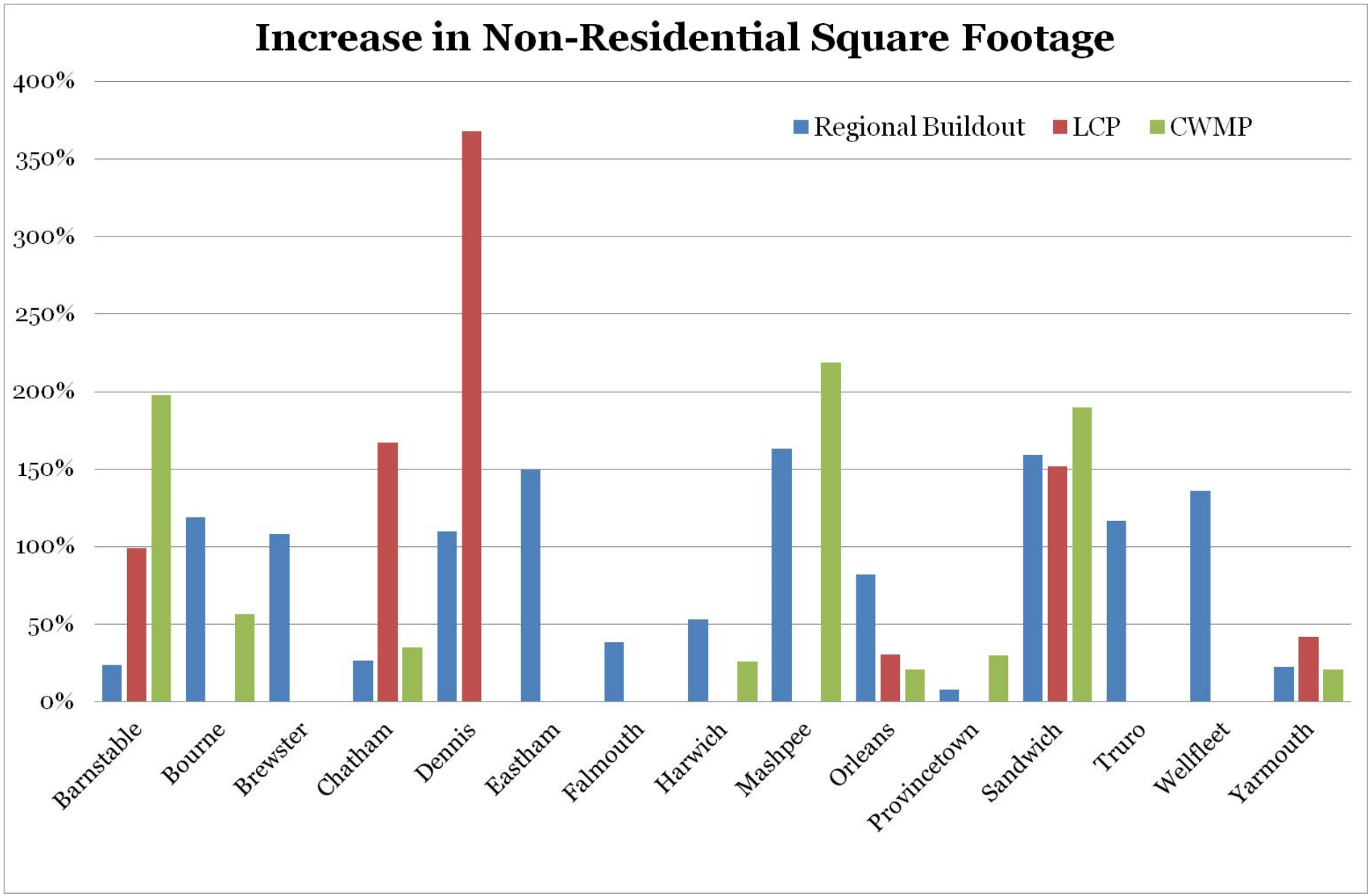
Cape Wide Cost Estimate:

30% growth will increase capital costs by 40%

Buildout

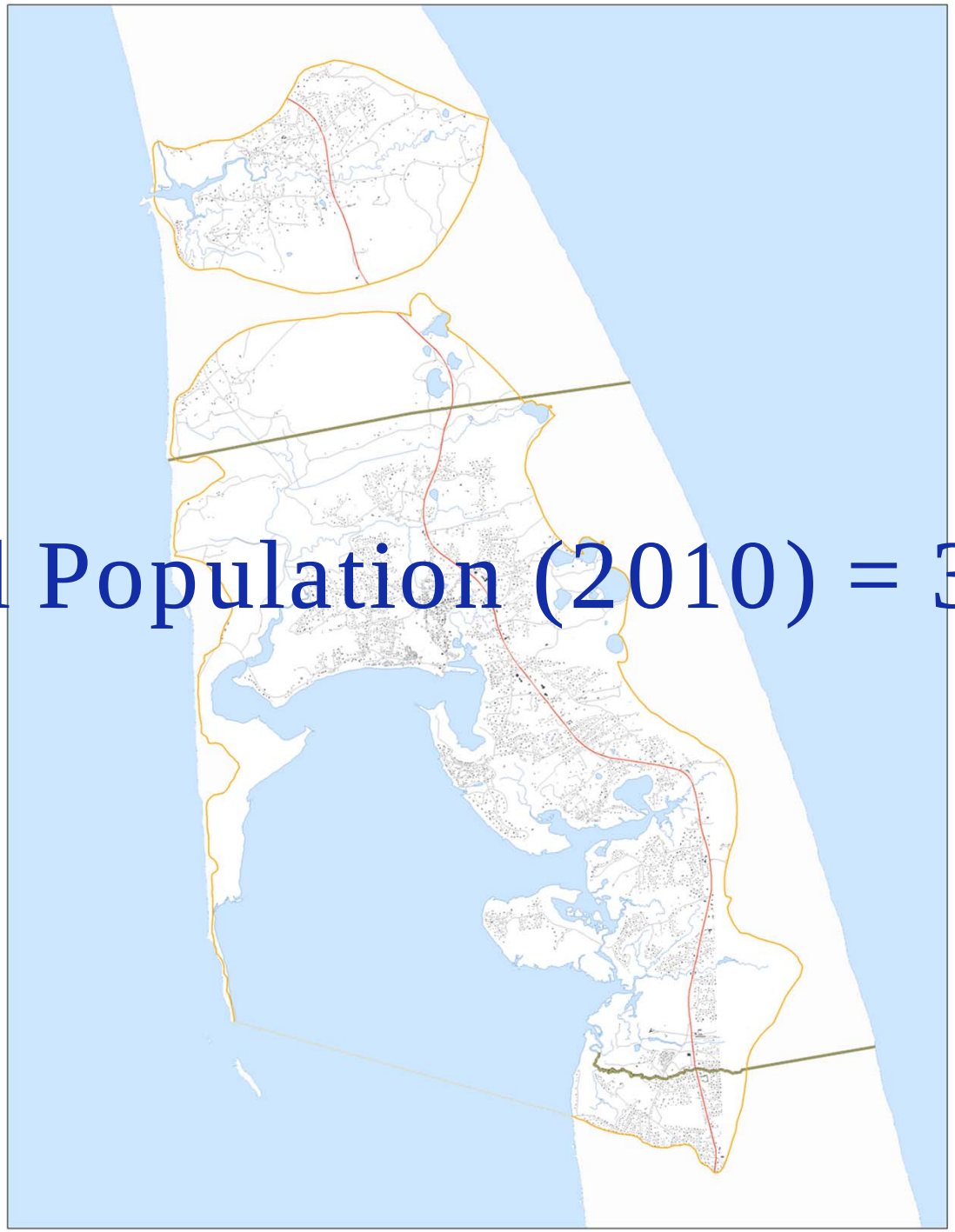

Increase in Dwellings
80%
70%
60%
50%
40%
30%
20%
10%
0%
Regional Buildout
LCP
CWMP
Barnstable
Bourne
Brewster
Chatham
Dennis
Eastham
Falmouth
Harwich
Mashpee
Orleans
Provincetown
Sandwich
Truro
Wellfleet
Yarmouth

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

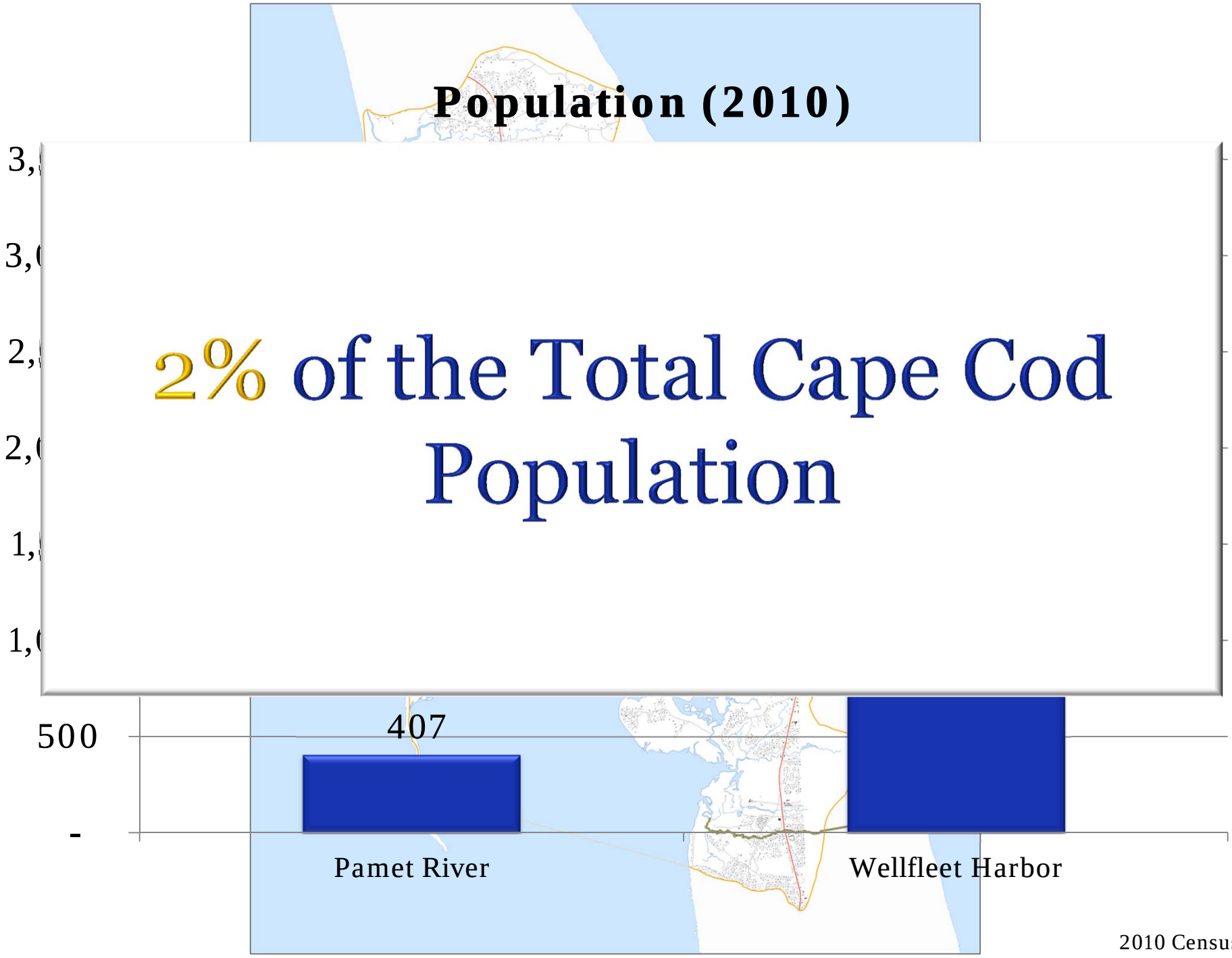
Pamet River
Wellfleet Harbor



Total Population (2010) = 3,447

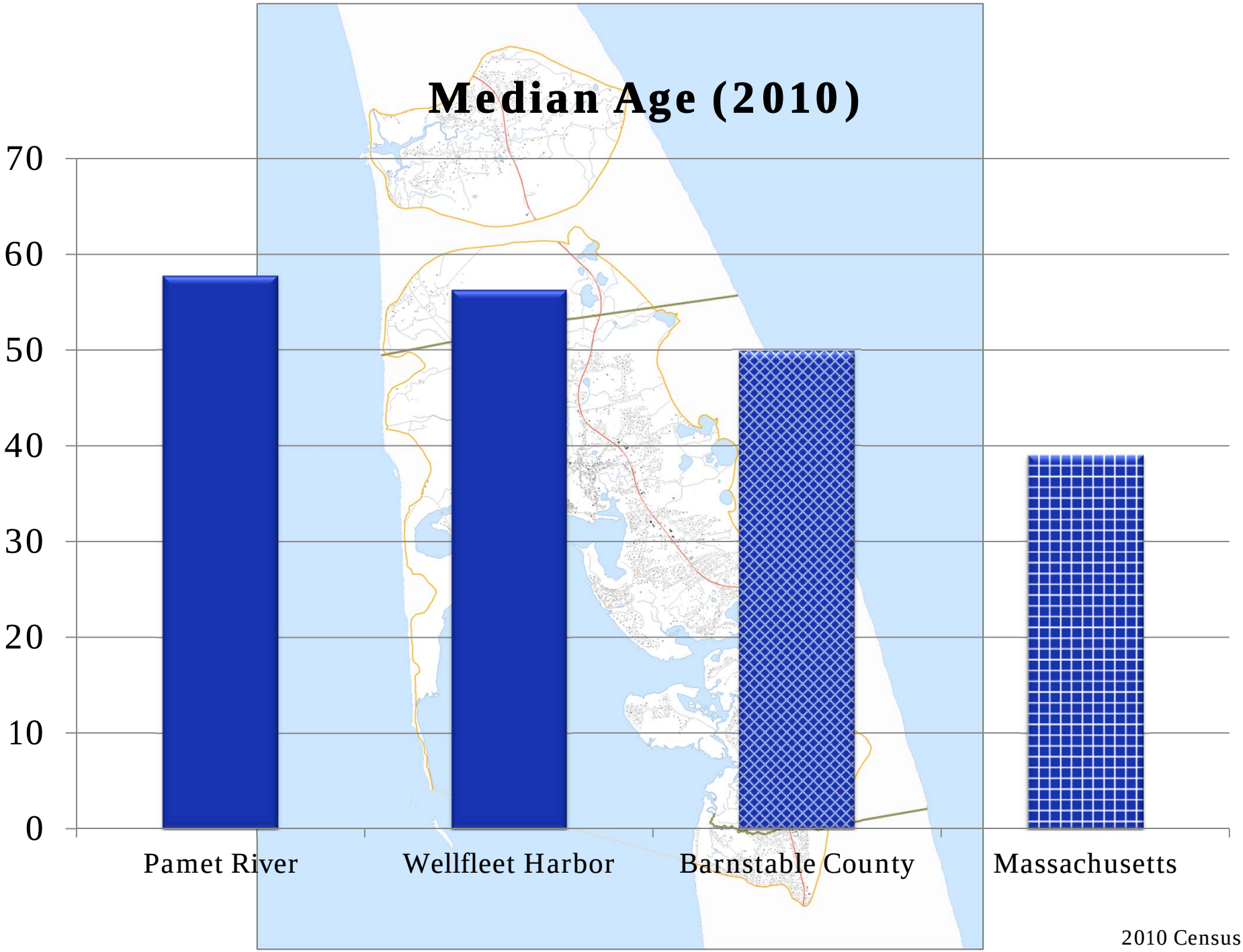
2010 Census

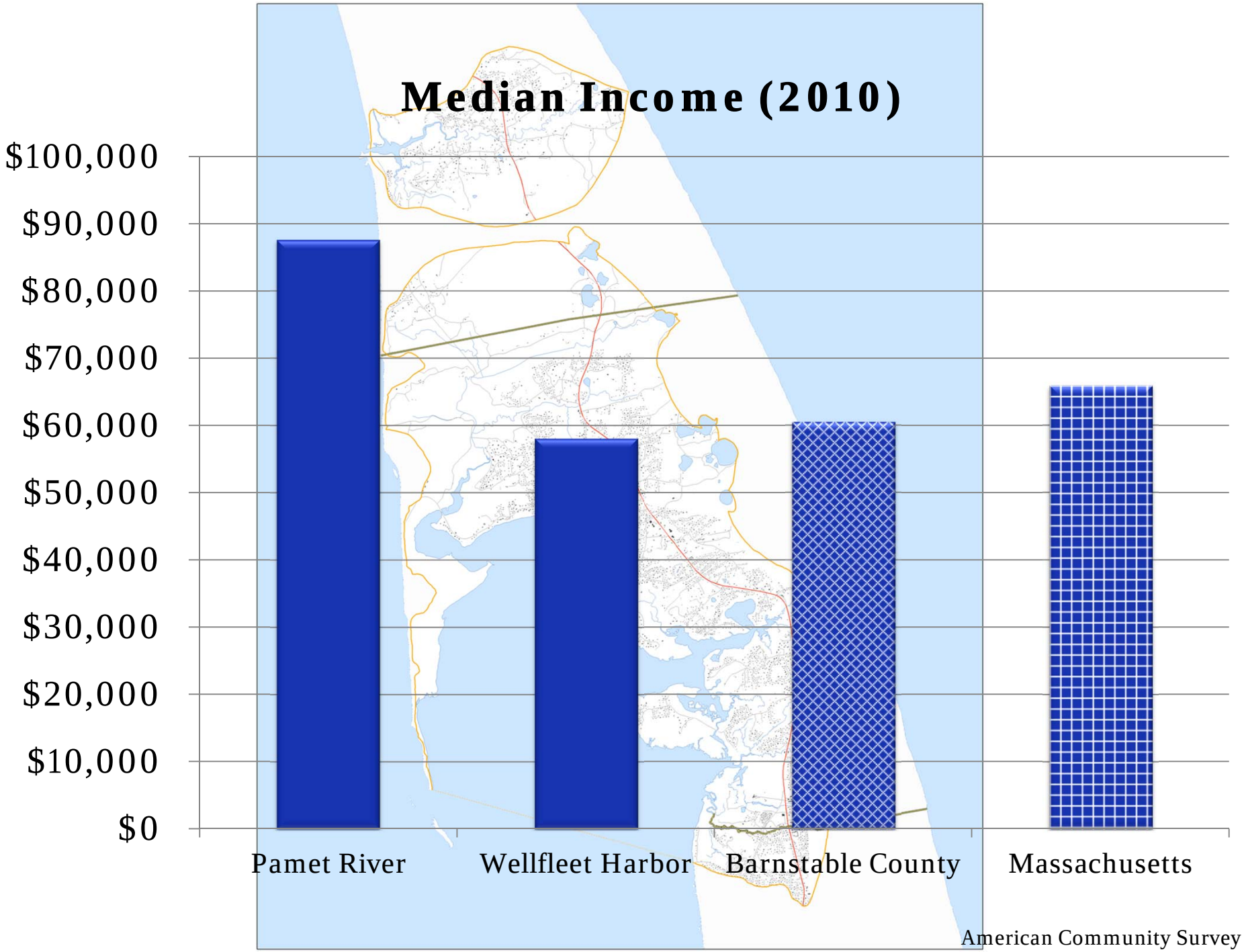
Population (2010)

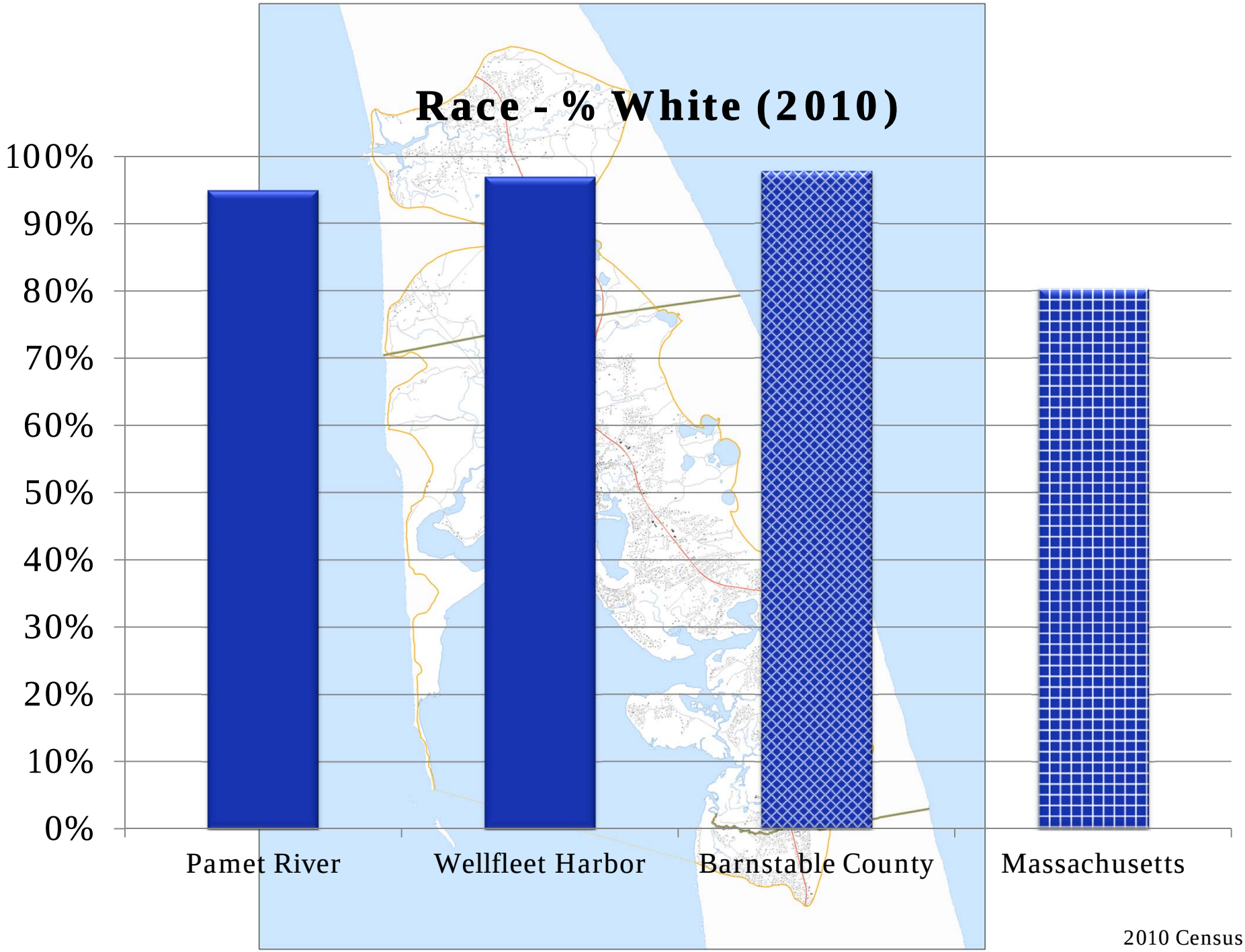


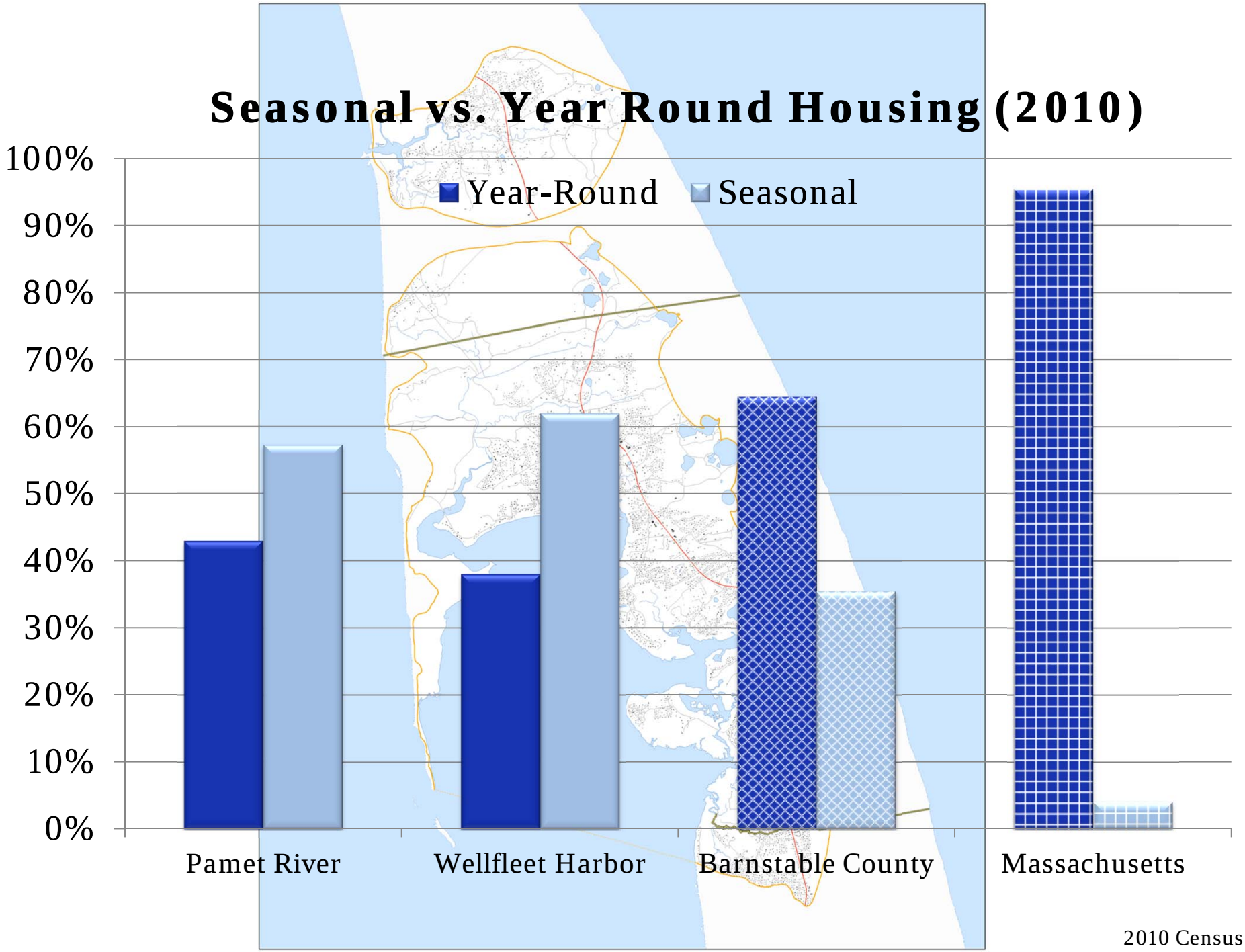
2% of the Total Cape Cod Population

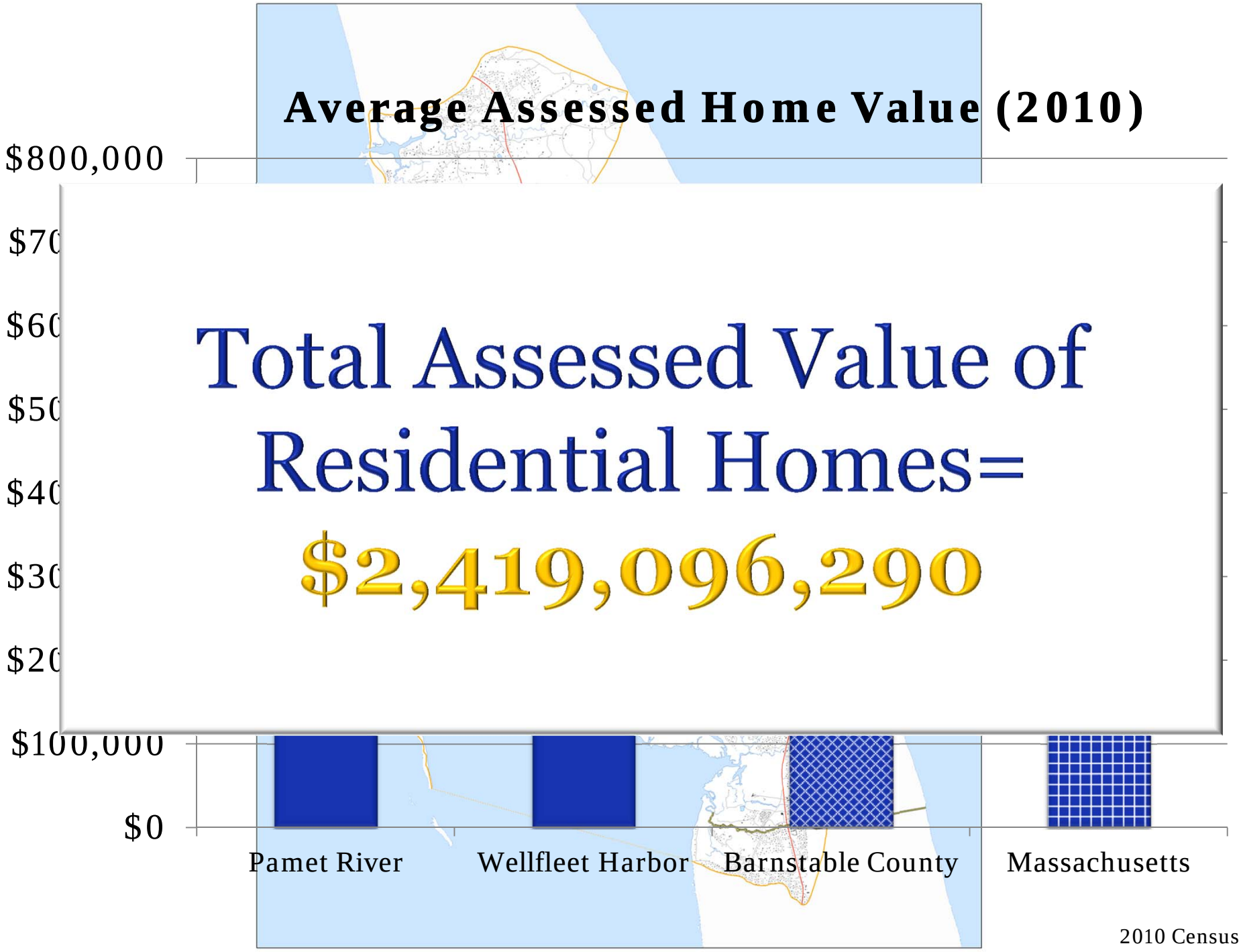
2010 Census


Median Age (2010)
70
60
50
40
30
20
10
0
Pamet River
Wellfleet Harbor
Barnstable County
Massachusetts
2010 Census


Median Income (2010)
$100,000
$90,000
$80,000
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Pamet River
Wellfleet Harbor
Barnstable County
Massachusetts
American Community Survey

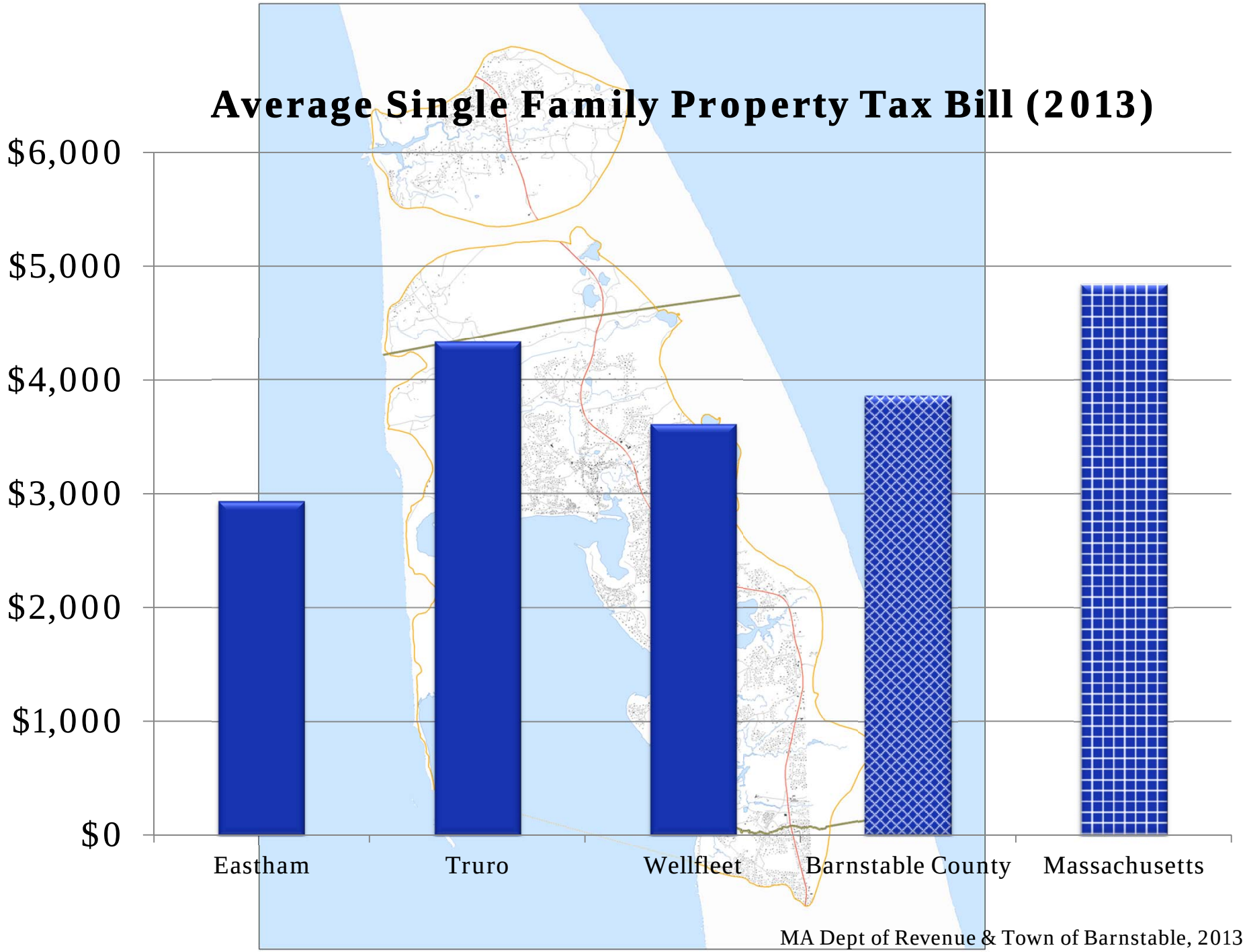

Race - % White (2010)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Pamet River
Wellfleet Harbor
Barnstable County
Massachusetts
2010 Census

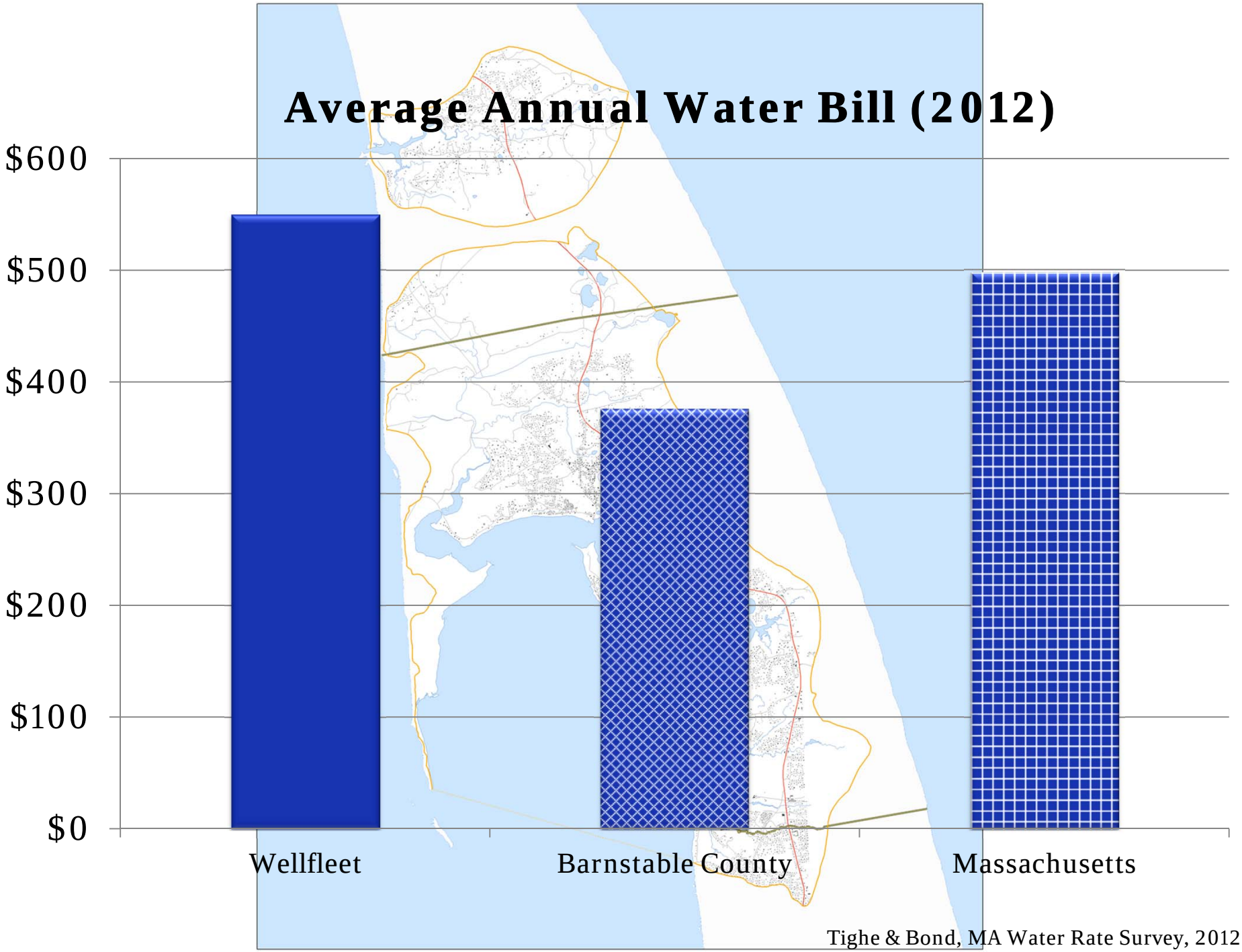

Seasonal vs. Year Round Housing (2010)
Year-Round
Seasonal
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Pamet River
Wellfleet Harbor
Barnstable County
Massachusetts
2010 Census

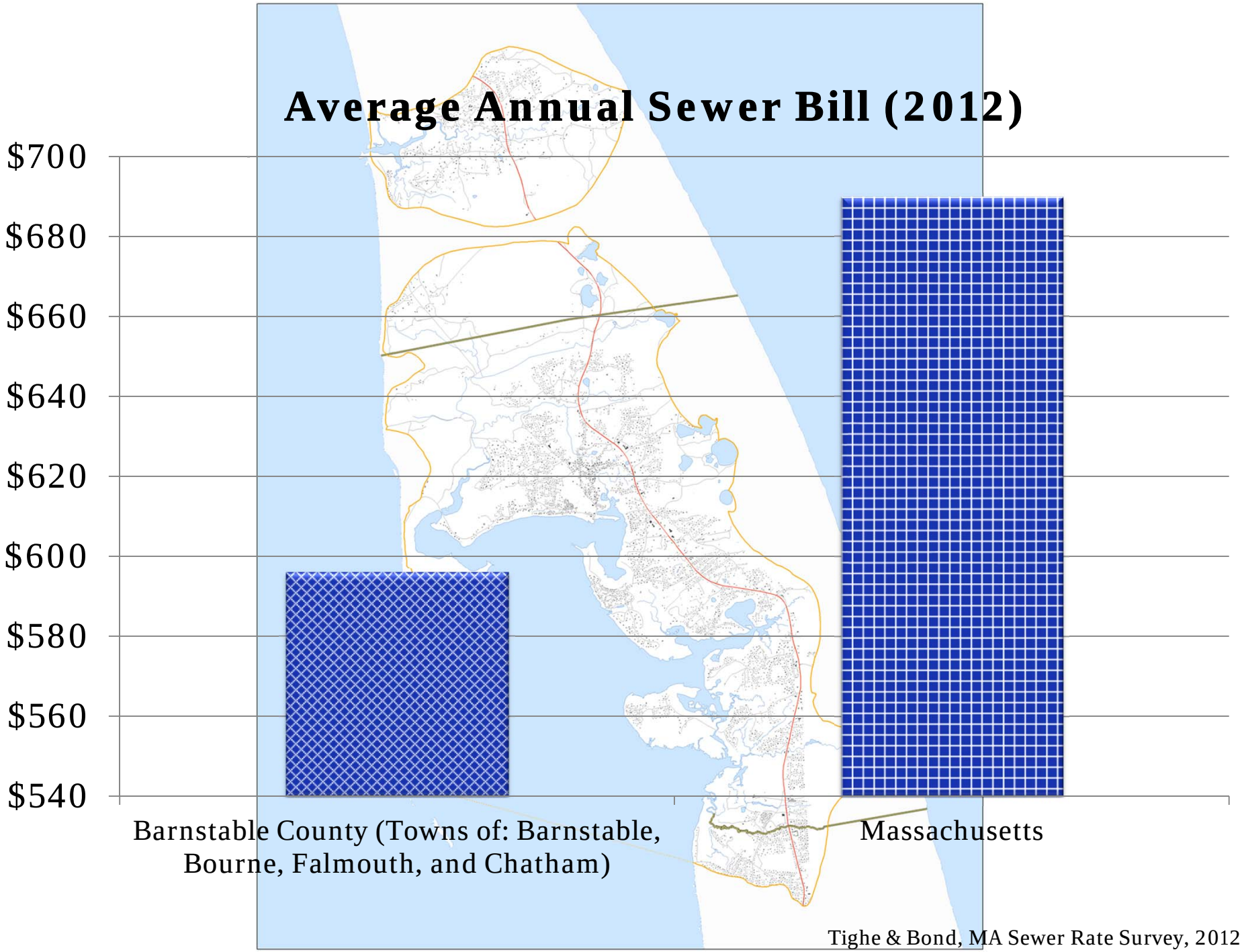

Average Assessed Home Value (2010)
$800,000
$70
$60
$50
$40
$30
$20
$100,000
$0
Total Assessed Value of Residential Homes=
$2,419,096,290
Pamet River
Wellfleet Harbor
Barnstable County
Massachusetts
2010 Census

Your Government & Taxes

Pamet River
Wellfleet Harbor


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

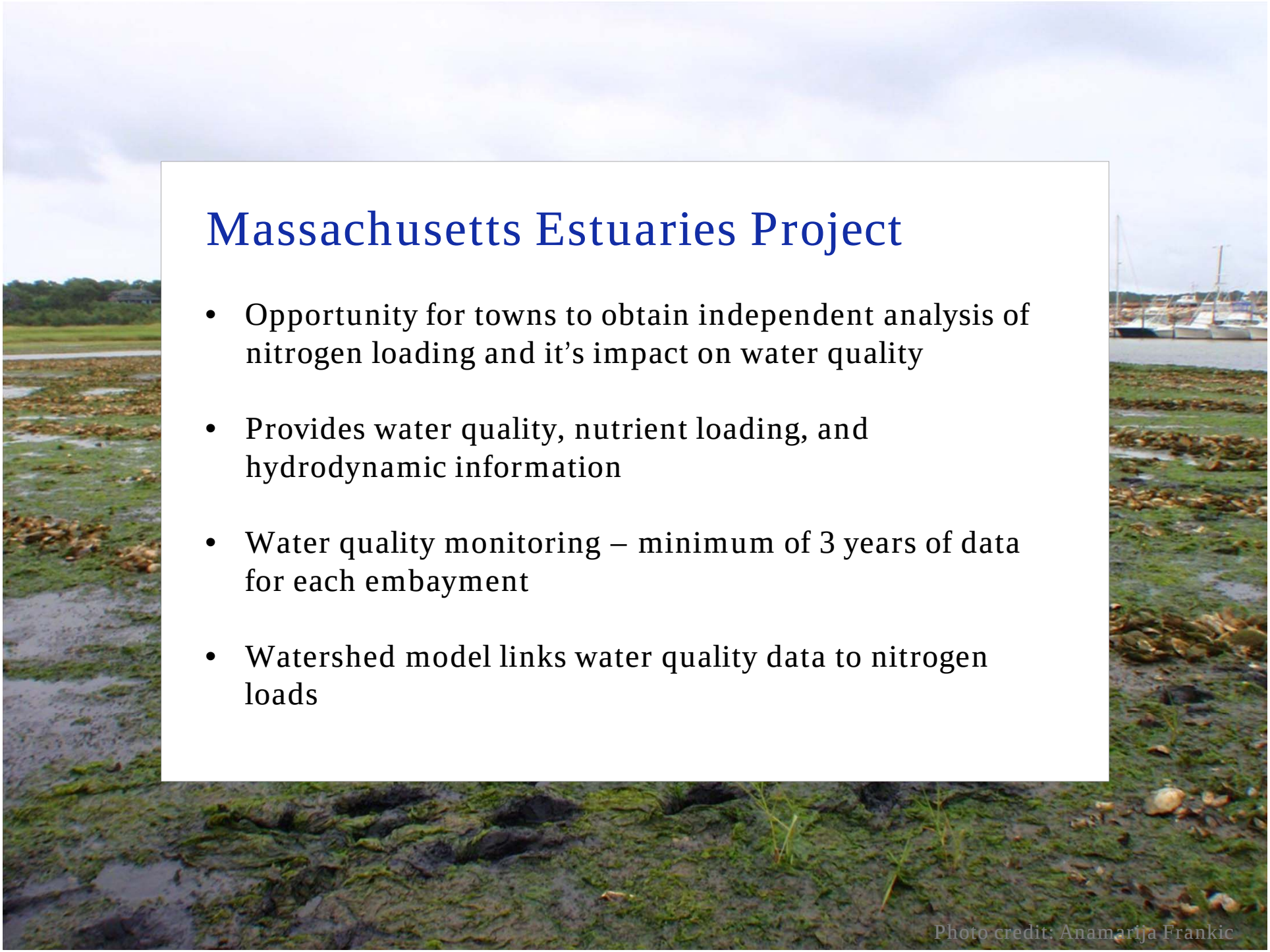

Average Annual Water Bill (2012)
$600
$500
$400
$300
$200
$100
$0
Wellfleet
Barnstable County
Massachusetts
Tighe & Bond, MA Water Rate Survey, 2012


Average Annual Sewer Bill (2012)
$700
$680
$660
$640
$620
$600
$580
$560
$540
Barnstable County (Towns of: Barnstable, Bourne, Falmouth, and Chatham)
Massachusetts
Tighe & Bond, MA Sewer Rate Survey, 2012

The Problem

Pamet River
Wellfleet Harbor

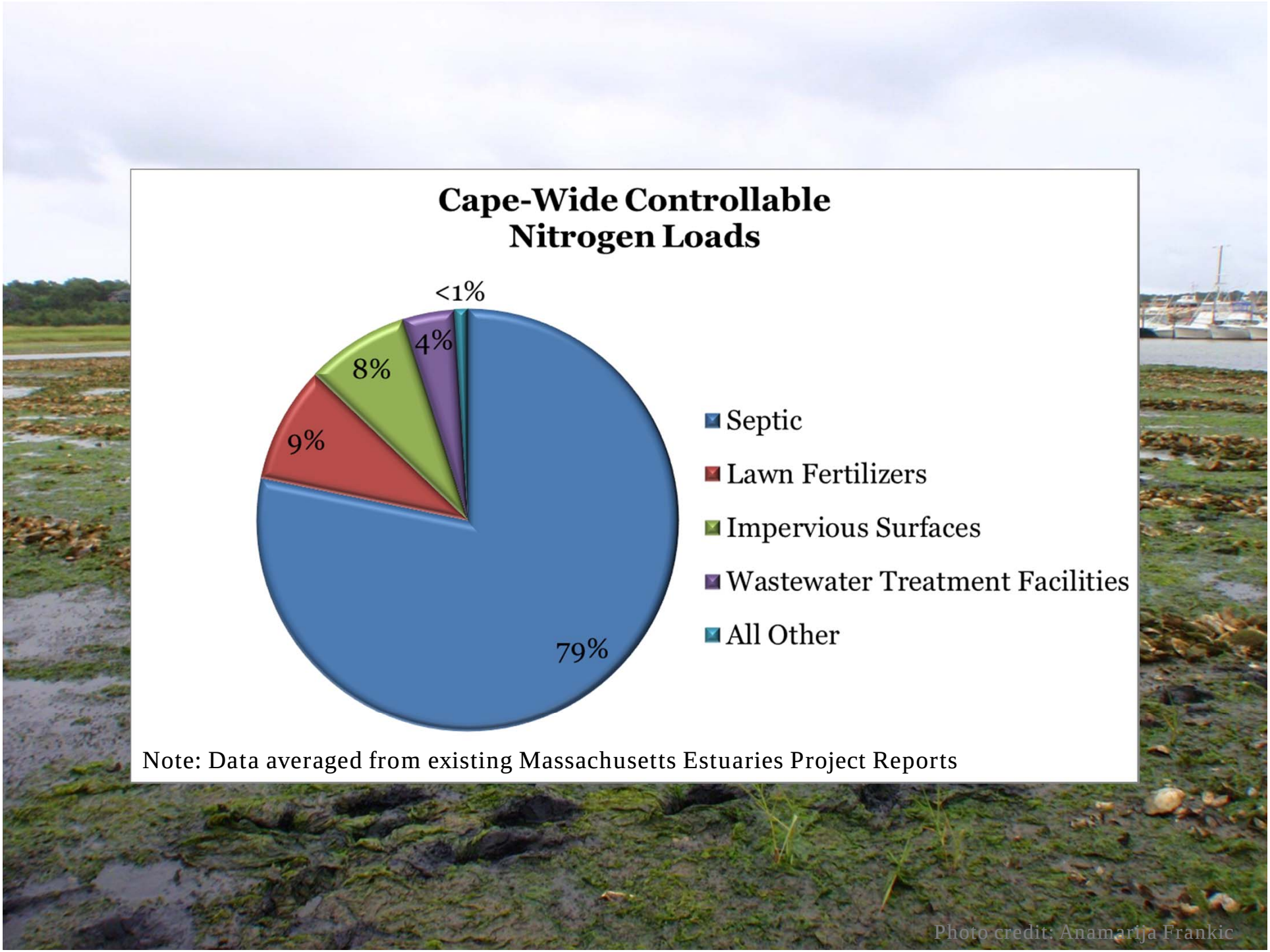
"Watershed Working Group - Wellfleet Harbor/Pamet River - Workshop 1"

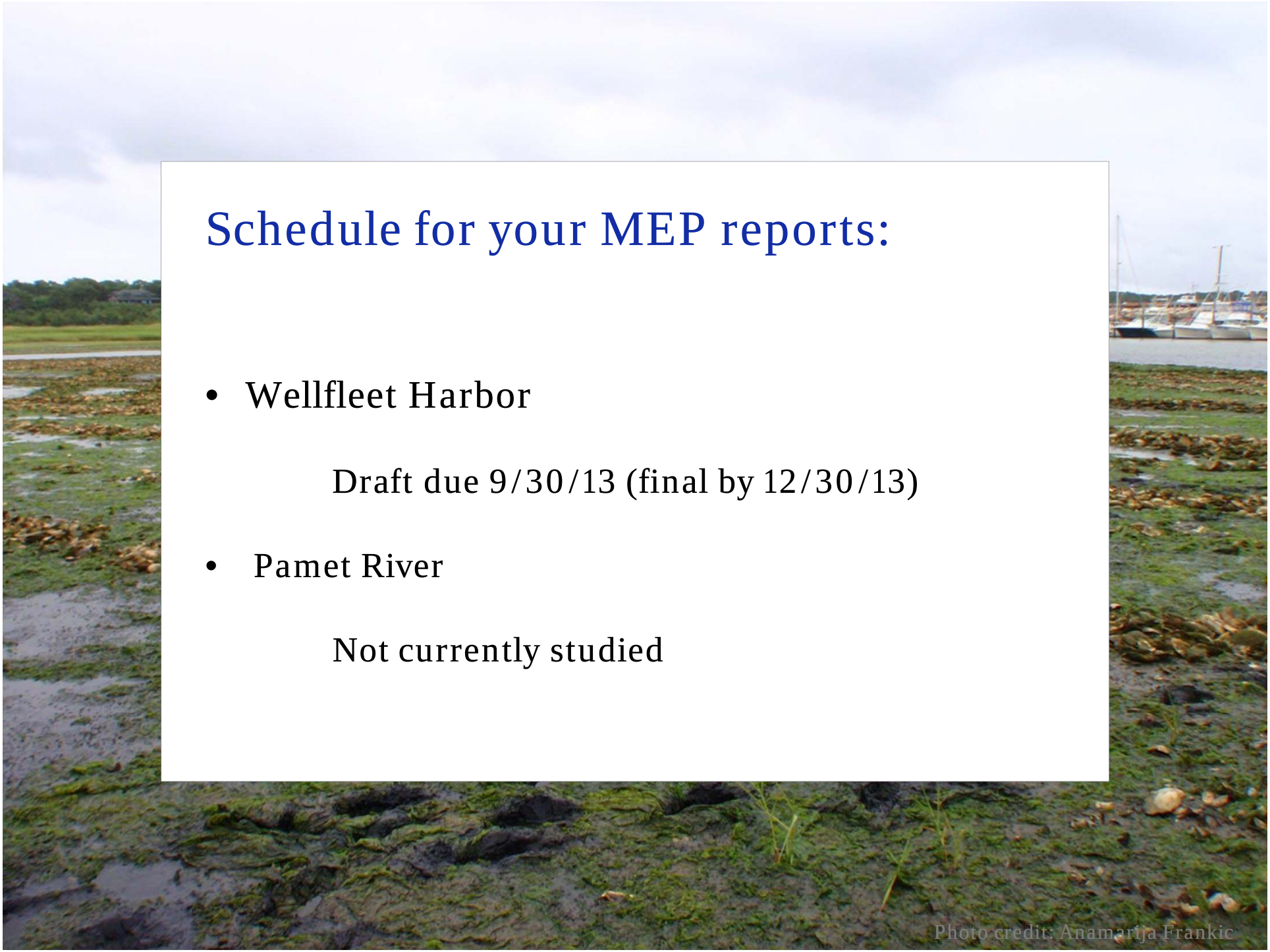


Massachusetts Estuaries Project

- 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

Photo credit: Anamarija Frankic


Cape-Wide Controllable Nitrogen Loads
<1%
4%
8%
9%
79%
Septic
Lawn Fertilizers
Impervious Surfaces
Wastewater Treatment Facilities
All Other
Note: Data averaged from existing Massachusetts Estuaries Project Reports
Photo credit: Anamarija Frankic



Schedule for your MEP reports:

- Wellfleet Harbor

  Draft due 9/30/13 (final by 12/30/13)

- Pamet River

  Not currently studied

Photo credit: Anamarija Frankic

Wellfleet Harbor Sampling

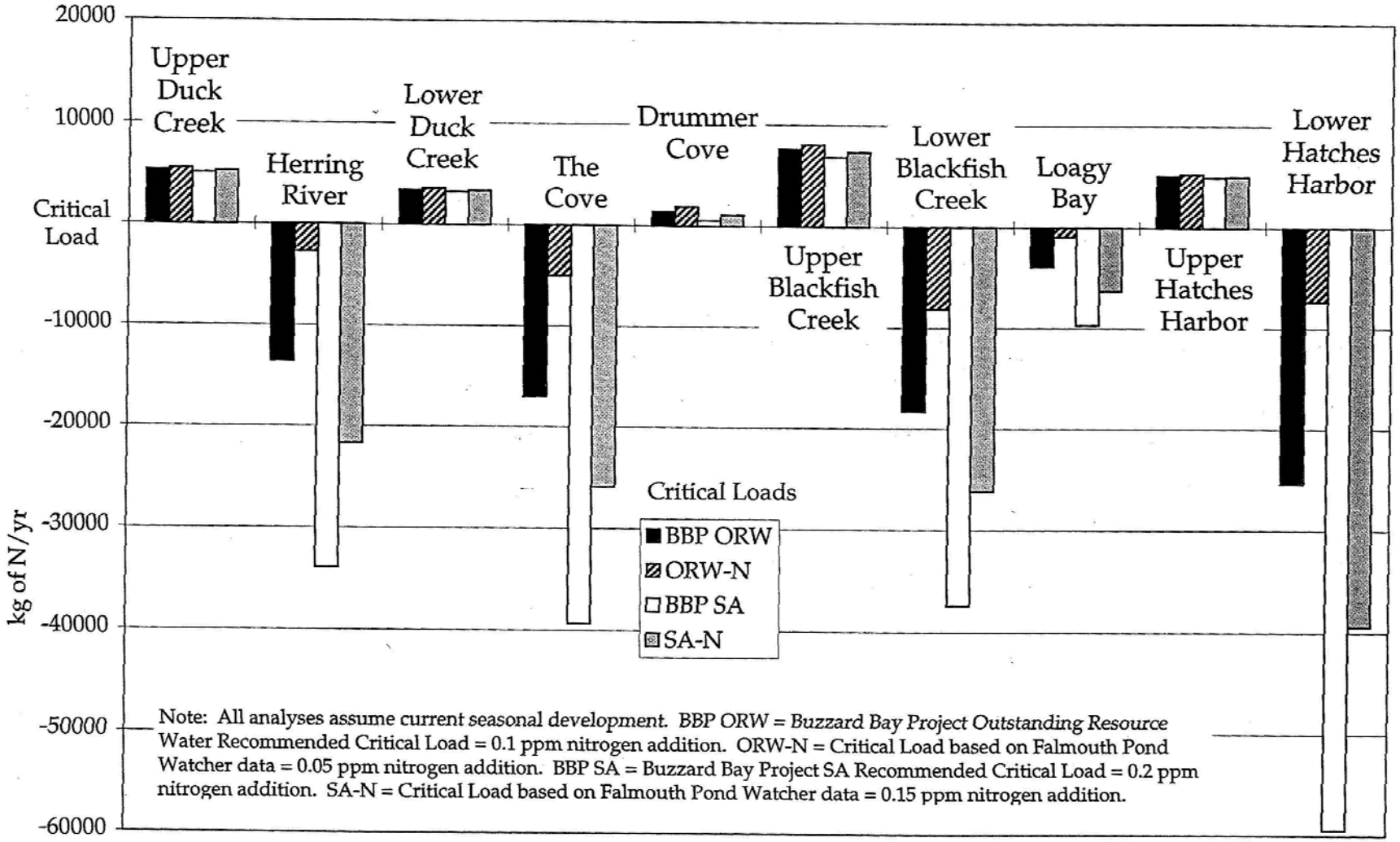
Photo credit: UMass Boston

Figure 22.

Buildout Nitrogen Loading

Wellfleet Harbor System, MA

Adjusted Nitrogen Loads/System Residence Time Nitrogen Limits



Cape Cod Commission, 1998

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%

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

Pamet River
Wellfleet Harbor

Existing Infrastructure

Base Map

- Town Lines
- Rivers

Embayment Boundary

- On Land
- On Sea

Major Roads

- US Highway
- State Highway
- Roads

- Structures
- Ponds

Existing Conditions

- Approx. Locations of Loans Issued for Title 5 Repair
- Potential Title 5 Compliance Issues
- Wastewater Treatment Facility
- Groundwater Discharge Points
- Sewered Parcels

Enhanced Attenuation Sites

- Pipe
- Stormwater

Public Supply Wells

- Public Water Supply Well
- Small Volume Wells, Non-Transient
- Proposed Public Water Supply Well
- Surface Water Supply
- Small Volume Wells, Transient

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

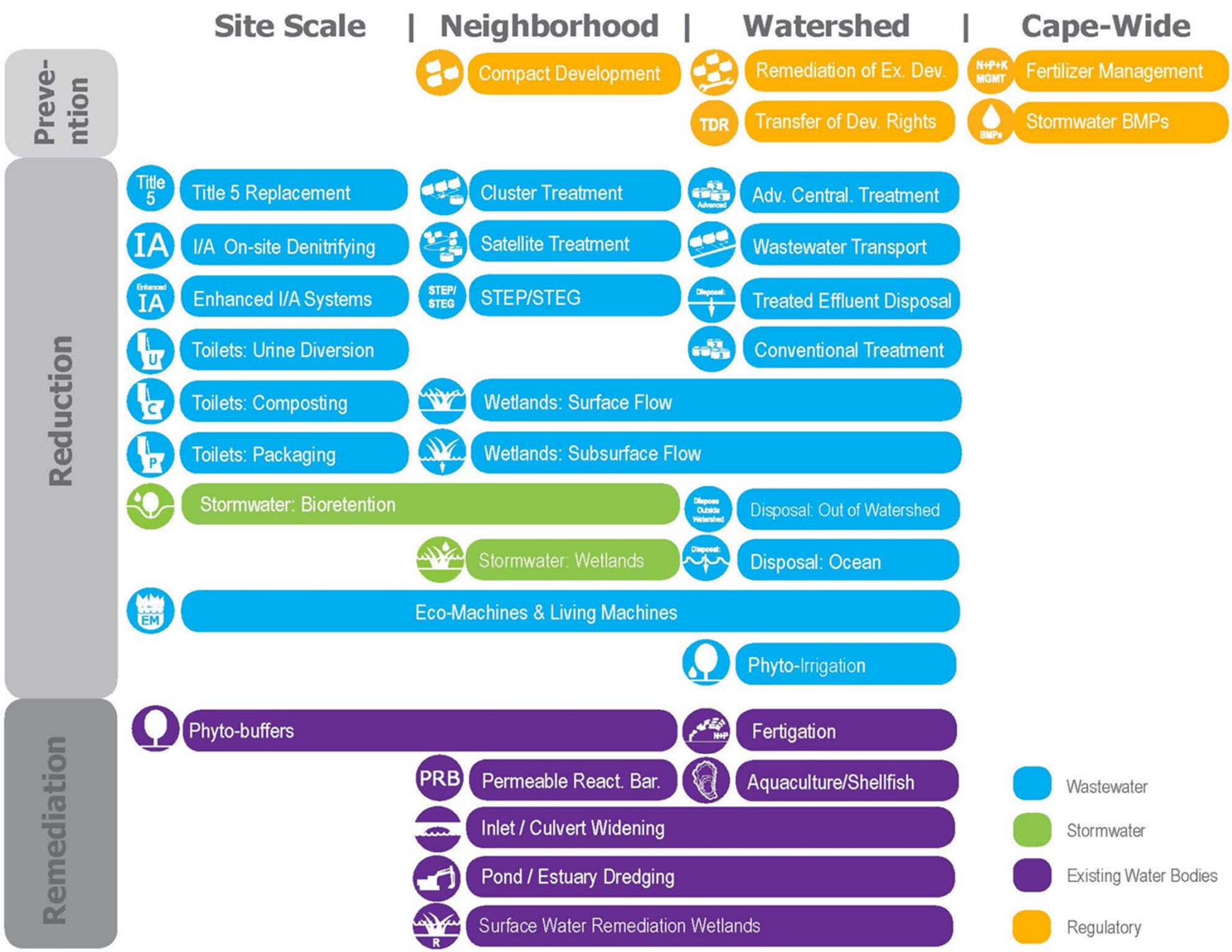
Phase Date

- 2001 - 2010
- 2011 - 2020
- 2021 - 2030
- 2031 - 2040
- 2041 - 2050

Sources: MassGIS, MassDOT, CCC

Framework for Addressing Solutions Moving Forward

Pamet River
Wellfleet Harbor


Site Scale | Neighborhood | Watershed | Cape-Wide
Preve-ntion
Compact Development
Remediation of Ex. Dev.
N+P+K MGMT
Fertilizer Management
TDR
Transfer of Dev. Rights
BMPs
Stormwater BMPs
Reduction
Title 5
Title 5 Replacement
Cluster Treatment
Adv. Central. Treatment
IA
I/A On-site Denitrifying
Satellite Treatment
Wastewater Transport
Enhanced IA
Enhanced I/A Systems
STEP/ STEG
STEP/STEG
Disposal:
Treated Effluent Disposal
U
Toilets: Urine Diversion
Conventional Treatment
C
Toilets: Composting
Wetlands: Surface Flow
P
Toilets: Packaging
Wetlands: Subsurface Flow
Stormwater: Bioretention
Disposal: Out of Watershed
Stormwater: Wetlands
Disposal: Ocean
EM
Eco-Machines & Living Machines
Phyto-Irrigation
Remediation
Phyto-buffers
Fertigation
PRB
Permeable React. Bar.
Aquaculture/Shellfish
Inlet / Culvert Widening
Pond / Estuary Dredging
R
Surface Water Remediation Wetlands
Wastewater
Stormwater
Existing Water Bodies
Regulatory


Wastewater
Existing Water Bodies
Regulatory
Alternatives: Screening Method
1
2
3
4
5
6
7
Targets/ Goals
Present Load:
X kg/day
Target:
Y kg/day
Reduction Required:
N kg/day
Composite Target Areas
A. High Nitrogen Reduction Areas
B. Pond Recharge Areas
C. Title 5 Problem Areas
Low Barrier to Implementation
A. Fertilizer Management
B. Stormwater Mitigation
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 Wellfleet Harbor and Pamet River Group will be available on the Cape Cod Commission website:

http://watersheds.capecodcommission.org/index.php/watersheds/outer-cape/wellfleet-harbor-pamet-river

Pamet River
Wellfleet Harbor

Cape Cod 208 Area Water Quality Planning
Wellfleet Harbor and Pamet River Watershed Working Group

Meeting One
Wednesday, September 25, 2013
1:00 to 5:00 pm
Wellfleet Council on Aging
715 Old King's Highway, Wellfleet, MA 02667

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 were captured during the meeting:

Next Meeting: Wednesday, October 30, 2013
1:00 pm - 5:00 pm
Wellfleet Council on Aging

- Watershed 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 (see pages 3-4 for discussion of chronologies and Working Group suggestions).
  - Review technology fact-sheets in advance of the October 30 meeting. (Technology fact sheets will be distributed in early October).
- Cape Cod Commission
  - Contact Charlene Greenhalgh to obtain Truro specific data on residential managed lawns.
  - Obtain salt marsh and aquaculture layers from the towns.
  - Include on the GIS layers the private lands located within the Cape Cod National Seashore boundaries.
  - Check to see if the Cape Cod National Seashore areas were excluded from the buildout and density layers.
  - Ask the Cape Cod National Seashore for ponds and lake data from the Kettle Pond Atlas of 2001 and other pond monitoring programs.
  - Share dates of the finance committee meetings.
- CBI
  - Distribute the link to the slides and notes from the Cape Cod Commission's affordability/financial presentation.
  - Distribute September meeting summary.
  - Distribute meeting materials for October meeting: fact sheets and agendas
  - Coordinate a discussion with the Wellfleet Comprehensive Wastewater Management Committee, the Commission, and CBI about how to interface with the CWMC during the 208 Plan Update process.

WELCOME AND INTRODUCTIONS

Ms. Erin Perry, Special Projects Coordinator, Cape Cod Commission welcomed the members of the Wellfleet Harbor and Pamet River Watershed Working Group. Appendix A contains a list of the group members who were in attendance. All meeting documents and presentations for the Wellfleet Harbor and Pamet River Watershed Working Group are located here: http://watersheds.capecodcommission.org/index.php/watersheds/outer-cape/wellfleet-harbor-pamet-river

Ms. Kate Harvey, Facilitator from the Consensus Building Institute (CBI), described CBI's role and the member selection process.[1] She then described the role of Mr. Scott Horsely, Area Manager for the Outer Cape. Mr. Horsely will attend the stakeholder workshops and prepare materials for subsequent workshops. In Spring 2014, he will work with the Cape Cod Commission staff to draft a comprehensive Cape-wide plan that combines the specific recommendations from the Wellfleet Harbor and Pamet River Working Group with the recommendations of the other 11 watershed working groups on the Cape.

She 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.

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.

[1] CBI's role and the participant selection process are described in detail in the Draft Process Protocols located on the Wellfleet Harbor and Pamet River Watershed Working Group website: http://watersheds.capecodcommission.org/index.php/watersheds/outer-cape/wellfleet-harbor-pamet-river

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 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.[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 Corps 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

On three separate chronologies, Mr. Horsley highlighted past actions that had been taken in Eastham, Wellfleet, and Truro that would either protect or inhibit water quality in the Pamet River and Wellfleet Harbor.[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 member reflected on lessons learned from reviewing the chronologies.

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

- Include the pond-monitoring program from the Cape Cod National Seashore.
- Add the adoption of a local comprehensive plan and harbor management plan in 1995.
- Include the municipal water approval in phases. Phase 1 started in 2010. Phase 2 started in 2012. Bids are currently open for Phase 3.
- Indicate the increase in minimum residential lot size from 20,000 square feet to 30,000 square feet in 1984.
- Include the preliminary results of nitrogen reduction fro the oyster project between 2011-2012.
- A third MOU and a three million dollar grant from NOAA for redesign of the dike could also be included.

[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 Wellfleet Harbor and Pamet River Baseline Data Presentation located here: http://watersheds.capecodcommission.org/index.php/watersheds/outer-cape/wellfleet-harbor-pamet-river

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

- Include information about when the town changed minimum lot sizes in the 1980s.
- Noting the connection between groundwater and freshwater ponds, a participant suggested including information about the commencement of freshwater pond monitoring.

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

- Add culvert reconstructions on Herring Brook and at Coles Beach. Other potential items to include are the moving of a dike to increase flushing of the salt marsh, and correction of a stormwater runoff situation by installing permeable asphalt.
- Include the vote to approve funding for an alum treatment in Great Pond in 2013.
- Include the commencement of PALs testing in 2003.
- Add the failure to pass in 2007 town meeting an article to establish a Municipal Water District.

Reflecting on the chronologies, the members identified the following lessons learned to keep in mind while beginning the evaluation process of the 208 Plan Update:

- The cost will increase the longer we wait.
- Remember the seaside impacts: the ocean is a nitrogen sink, but it also has a limited capacity. Once we pass the threshold, impacts will occur in the ocean too.
- New infrastructure should be located in places where it will not be vulnerable to flooding, storm surge impacts, or climate change.
- Use real examples to create context for public education. For example, the break through of the Atlantic Ocean into the Pamet River served as an educational tool to inform people about the freshwater aquifer feeding the Pamet.
- Monitor the closed Truro landfill.
- Consider alternative technologies.

BASELINE CONDITIONS

Mr. Horsely 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 Wellfleet Harbor and Pamet River. 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.

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.

[4] Data used for modeling and analysis is available here: [LINK]

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

Regulatory Layer – The regulatory layer illustrates Areas of Critical Environmental Concern, MassDEP Approved Wellhead Protection Areas, and Growth Incentive Zones. OpenSpace data is displayed in three levels of land protection: land protected in perpetuity, limited protection, and no protection. Land Use Vision Map data delineates economic centers; industrial and service trade areas, village boundaries, resource protection areas, other designations, and undesignated lands.

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 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. He explained that the Cape Cod Commission's approach to the buildout analysis enables comparison of potential buildout across the entire Cape, but eliminates some detail on the local level. Mr. Horsely noted that density is a critical component to the 208 Update Plan since 30% growth will increase capital costs by 40%.

Working group members made the following comments or posed the following questions after the data layer presentation. *Responses from the Commission or the Consensus Building Institute are italicized.*

- One member asked about the maintenance required with porous pavement. A representative of the Commission said vacuuming is one of the maintenance actions. But, after approximately 20 years the pours are filled and the roadway essential acts as a normal roadway.
- A group member said there is a cranberry bog off of North Pamet Road in Truro.
- A member asked if the assumption is that all lawns receive fertilizer. The member said there are many homes with 'wild cape' landscaping, which is not managed, so the area estimated in residential managed lawns may be overly conservative. *Mr. Horsely commented that the Commission would like to ground truth fertilizer application estimates, but this is not included in the current scope.*

- Another member said Truro estimated the group cover that would receive fertilizer and ground-truthed the data while completing Phase 1 of the CWMP.
- One member asked if the Commission has data layers to indicate the locations of private lands within the Cape Cod National Seashore boundaries. *Mr. Detjens said the Commission has this data, but it is not yet included.* Another member said Truro and Wellfleet have 211 and 256 parcels, respectively, located within the Seashore boundaries.
- A participant suggested obtaining salt marsh and aquaculture layers from the towns as well.
- One discussant cautioned the use of buildout in place of population forecast since the two parameters will create very different outcomes in a model.
- Some members said the projected buildouts do not look accurate. They mentioned that in Truro and Wellfleet, the zoning is three acres in the seashore district; but this is not possible by the looks of these projections. Members also asked if the seashore zone was demarcated as a no growth zone in the GIS layers.

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. Approximately 3.447 people, or 2% of Cape Cod's total population, live in the Wellfleet Harbor and Pamet River watersheds. Those living in Wellfleet Harbor watershed are approximately 56 years of age on average and their average median income is slightly less than $60,000. Those living in the Pamet River watershed are approximately 58 years of age on average and their median income is slightly less than $90,000. Over 90% of the population in the watersheds is white. Wellfleet Harbor has a year round population of approximately 38% and a seasonal population of approximately 62%. Pamet River has a year round population of approximately 42% and a seasonal population of approximately 58%. The total assessed value of residential homes in the study area is 2.4 billion dollars. The average single-family property tax bill (2013) is approximately $3,000 in Eastham, $4,400 in Truro, and $3,600 in Wellfleet. The annual water bill is approximately $550 in Wellfleet.

Working group members made the following comments on the people data inputs:

- The seasonal vs. year round housing estimate for the Pamet River appears correct.
- In Wellfleet, the seasonal to year round ration is closer to 7:1.
- One commenter suggested that state aid to the area is reduced because the residents in the area are perceived to be wealthy.
- A member asked why it is important to know the average cost of sewer bills. *Mr. Horsely said the sewer bills were just to give an indication of the annual cost to build and maintain sewer systems.*

THE PROBLEM

Mr. Horsely 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. However, site specific MEP reports for Wellfleet will not be final until December 30, 2013, so Cape-wide MEP data may be used in the analysis.

Mr. Horsely 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. He also reviewed buildout nitrogen loading estimates for Wellfleet Harbor that were produced by the Commission in 1998. This data shows that the Herring River can assimilate more nitrogen. Eelgrass data layers collected by aerial analysis can also be reviewed as an indicator of change; however, the accuracy of this data source is questionable.

To address the phosphorous problem, 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 ponds highlighted as 'priority' on the GIS layers have not been prioritized. Instead, they represent ponds that have been sampled.

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 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.

Group members made the following comments on the presentation of the problem:

- One commenter noted a gap in the MEP study design; the MEP does not consider the use of shellfish for nitrogen reduction.
- A group member said the Pamet River had been studied; but it is not part of a final MEP report.
- In regards to the slide on Cape Wide Nitrogen sources, a participant said the pie chart may only represent five percent of the total nitrogen in the environment, which could ultimately misrepresent the problem at hand. The group member said the assumption is that you can tackle the nitrogen issue; but other landscape features such as salt marsh restorations, eel grass plantings, and aquaculture projects could dramatically reduce nitrogen levels.
- Another group member said Roger may have more detailed eelgrass data to provide.
- A discussant suggested using the data in the Cape Cod National Seashore's 2001 Kettle Pond Atlas and requested clarification on the connection between groundwater and surface water.
- A participant said he had a data layer showing the locations of Title 5 failures
- A group member suggested using the 2011 LIDAR data to build the contour map.

EXISTING AND PROPOSED INFRASTRUCTURE

Mr. Horsely and Mr. Detjens 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. A group member said Provincetown has a list of areas planned for stormwater upgrades, which they are completing at a rate of one to two projects per year.

Group members made the following comments about the existing and proposed infrastructure layers:

- Charlene Greenhalgh has information about naturally widening flowways in the study area.

WORKING GROUP FEEDBACK

Ms. Harvey then asked group members to identify any key priorities, challenges, or needs they foresee in Wellfleet Harbor and Pamet River watersheds. The members suggested the following priorities, challenges and needs:

- One member suggested educating both the public and the regulators about potential alternative technologies would be both a challenge to overcome.
- A member suggested a need to map the kettle ponds and their connection to Title 5 systems. Referring to this comment, another member said the Title 5 solution addresses a different problem and that Title 5 systems do not contribute a lot of nitrogen to the system.
- Another member proposed the need to identify and force the closure of existing cesspools in the Pamet River watershed.
- A member said the MassDOT should be involved since the roadways are a large source of stormwater runoff. In response to this statement, another group member identified Route 6 as a priority area. The member said Route 6 hampers slat marsh restoration in the area.
- A participant said that the group must be well prepared and ensure the right people present the information at town meeting since this is where the solutions will ultimately be decided.
- A participant said a key challenge to using aquaculture or oyster bed restoration as a nitrogen removal technique is state regulations in the division of marine fisheries.
- One participant suggested adding contaminants of emerging concern as a challenge and priority.
- A group member suggested adding phytoremediation as a key priority.

NEXT STEPS

Mr. Horsely 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.

- A group member suggested adding aquaculture, salt marsh restoration, and bioremediation as potential options for reducing nitrogen concentration levels.

Mr. Horsley reiterated that the goal of the group is to develop at least two plans with different sets of remedial options that would achieve water quality targets. He then described the alternatives screening process the group will apply over the next two meetings to achieve the aforementioned goal. The process is 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 sewering or other grey infrastructure management options

OPERATING PROTOCOLS

Ms. Harvey 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.

PUBLIC COMMENTS

The facilitator opened the floor for public comments of three minutes or less each. There were no comments.

Appendix A
Attendance

Name	Affiliation
Curt Felix	Comprehensive Wastewater Planning Committee, Wellfleet
Deborah Freeman	Wellfleet Conservation Trust
Charleen Greenhalgh	Town Planner, Truro
Suzanne Grout Thomas	Beach Administrator, Wellfleet
Mike Guzowski	Water Management Committee, Eastham
Charles Harris	Water Management Committee, Eastham
Ned Hitchcock	Wastewater Committee, Wellfleet
Laura Kelly	Littlefield Landscaping
Lauren McKean	National Parks Service
John Morrissey	Selectman, Wellfleet
Patricia Pajaron	Health Agent, Truro
Tracey Rose	Real Estate Agent, Thomas D. Brown Real Estate Agency
May Ruth Seidel	Wellfleet Non-Resident Taxpayer Association
Harry Terkanian	Town Administrator, Wellfleet
Robert Weinstein	Planning Board, Truro
Bill Worthington	Planning Board, Truro
Staff	
Kate Harvey	Consensus Building Institute
Eric Roberts	Consensus Building Institute
Jay Detjens	Cape Cod Commission
Scott Horsley	Cape Cod Commission
Anne McGuire	Cape Cod Commission
Erin Perry	Cape Cod Commission
James Sherrand	Cape Cod Commission
Observers	
Dan Milz	PhD Candidate, University of Chicago