

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

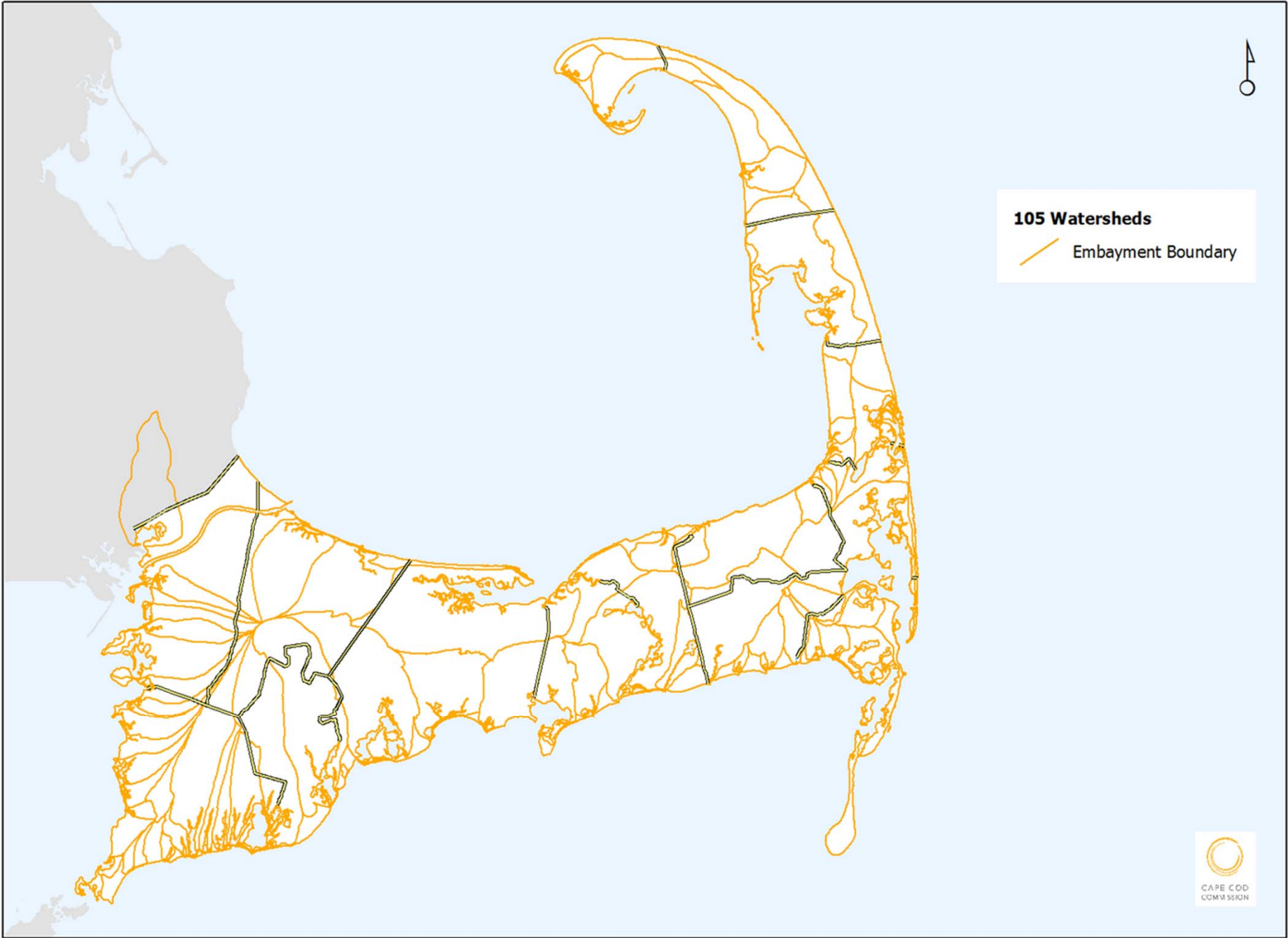
Focus on 21st Century Problems



Nitrogen:
Saline Waters

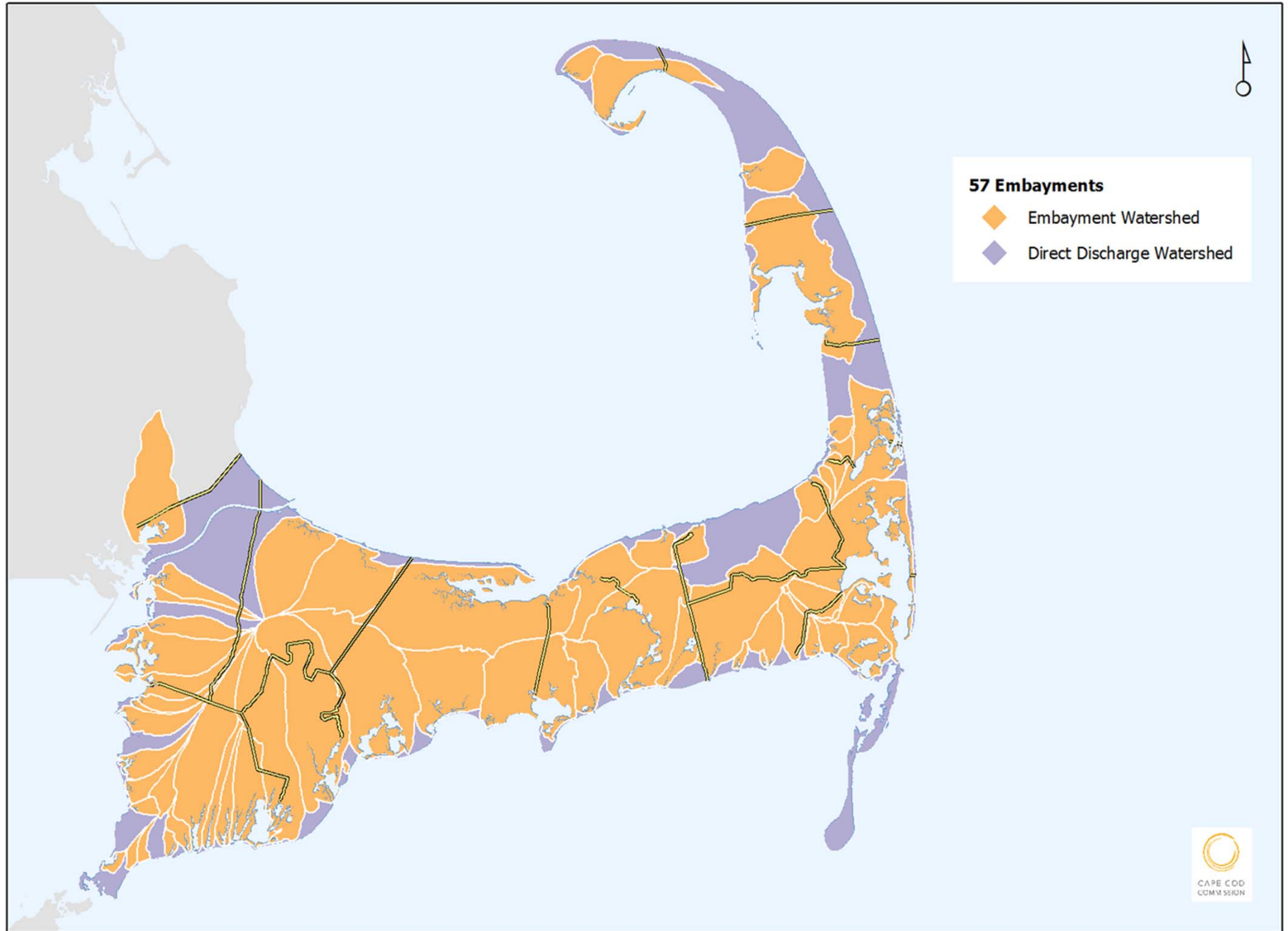
Phosphorus:
Fresh Waters

Growth &
Title 5
Limitations



105 Watersheds
— Embayment Boundary





57 Embayments

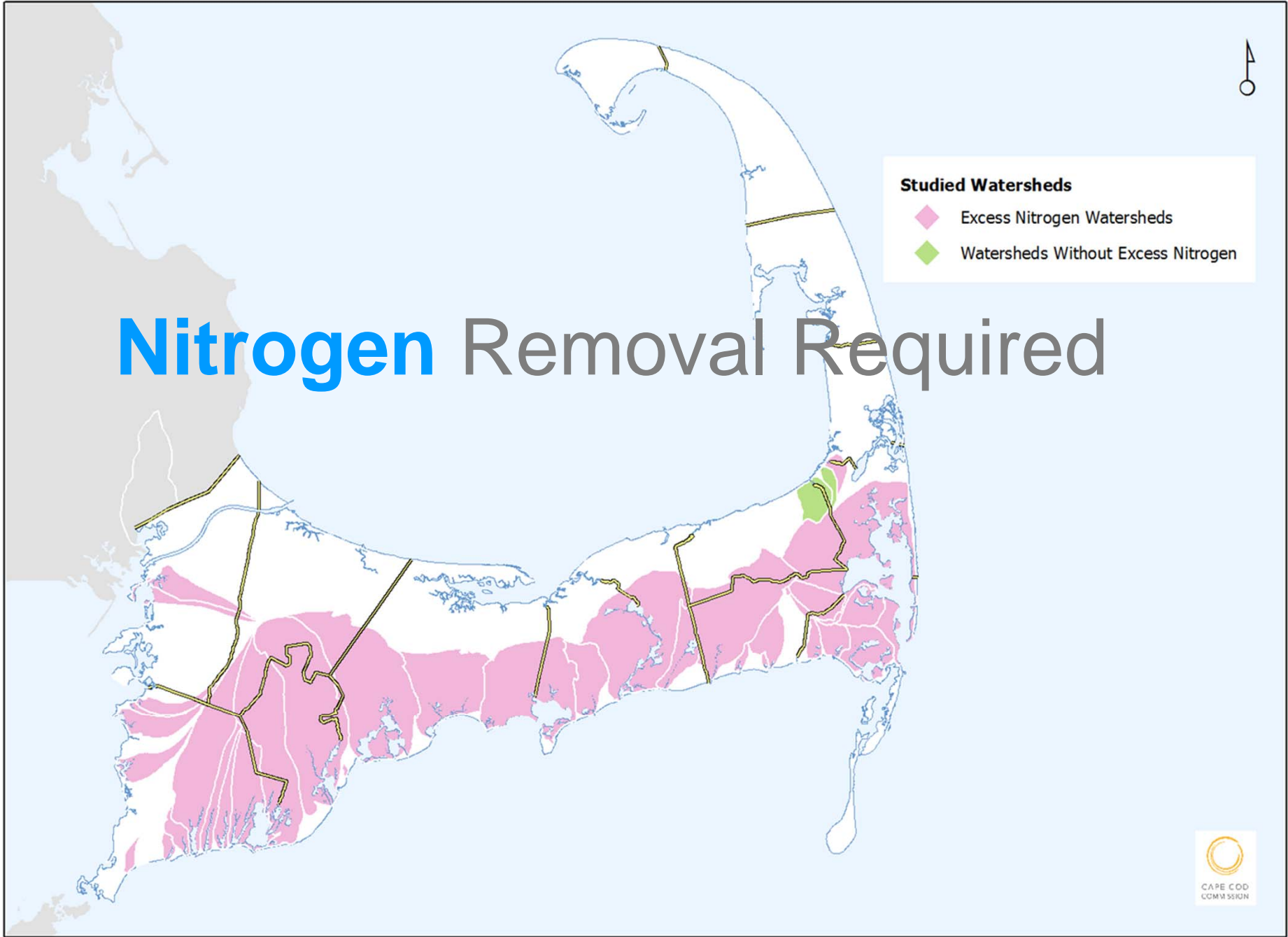
- ◆ Embayment Watershed
- ◆ Direct Discharge Watershed

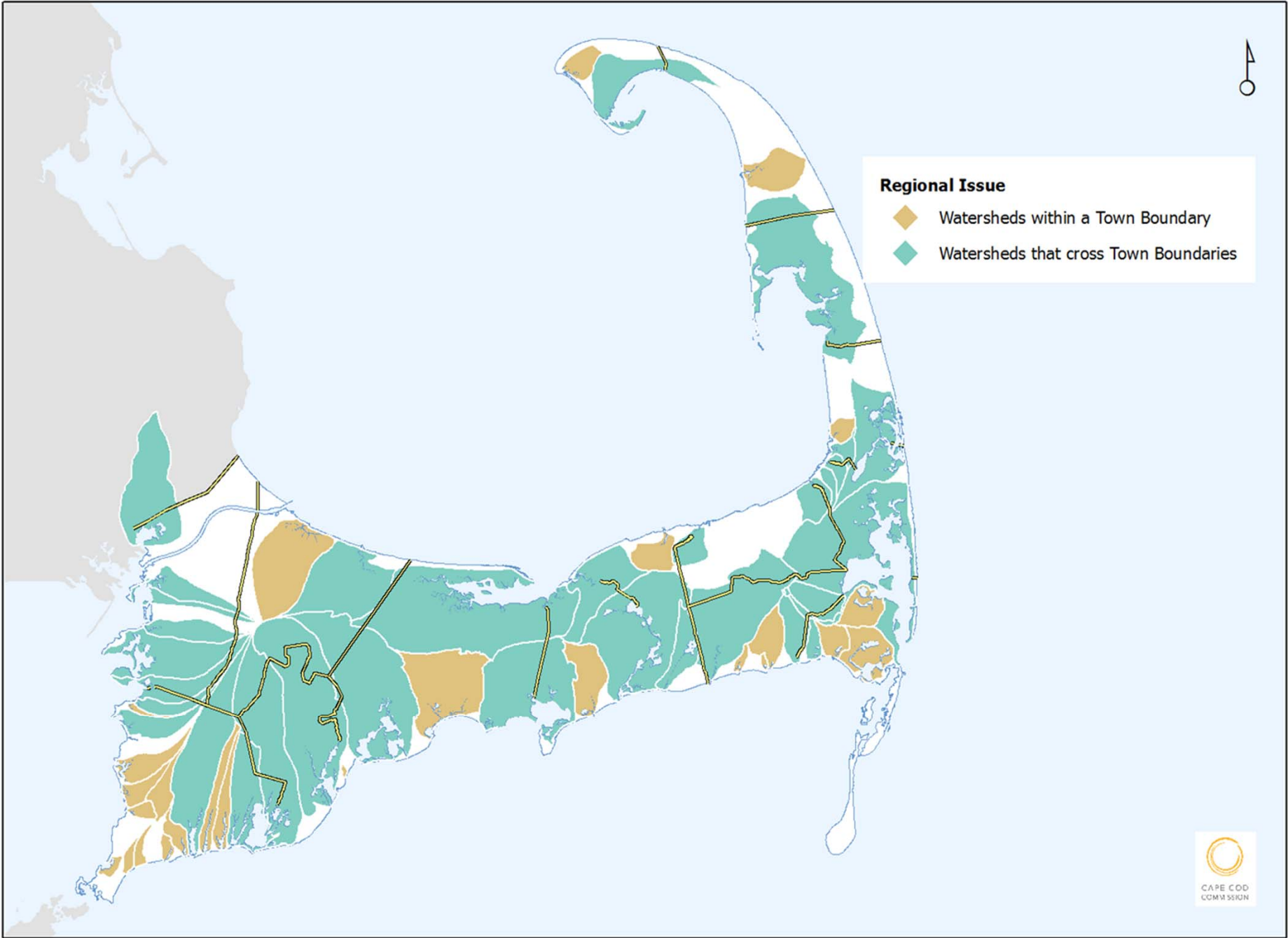


Nitrogen Removal Required

Studied Watersheds

- ◆ Excess Nitrogen Watersheds
- ◆ Watersheds Without Excess Nitrogen



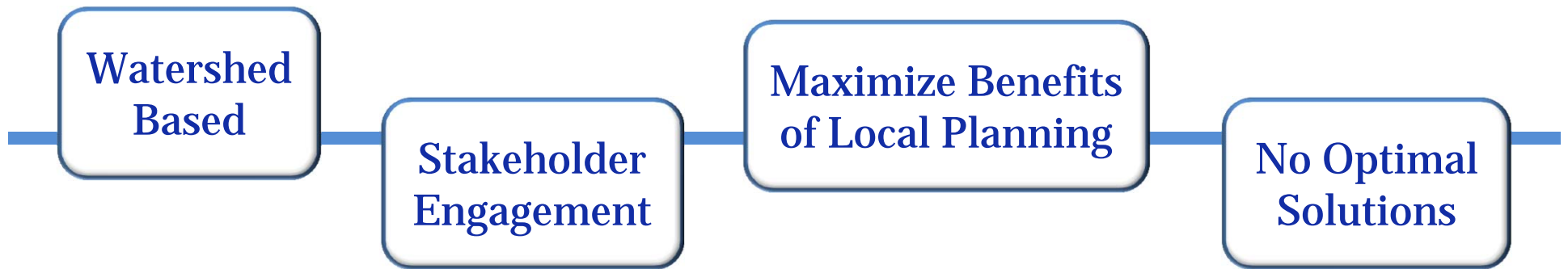


Regional Issue

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



Approach to the 208 Plan Update

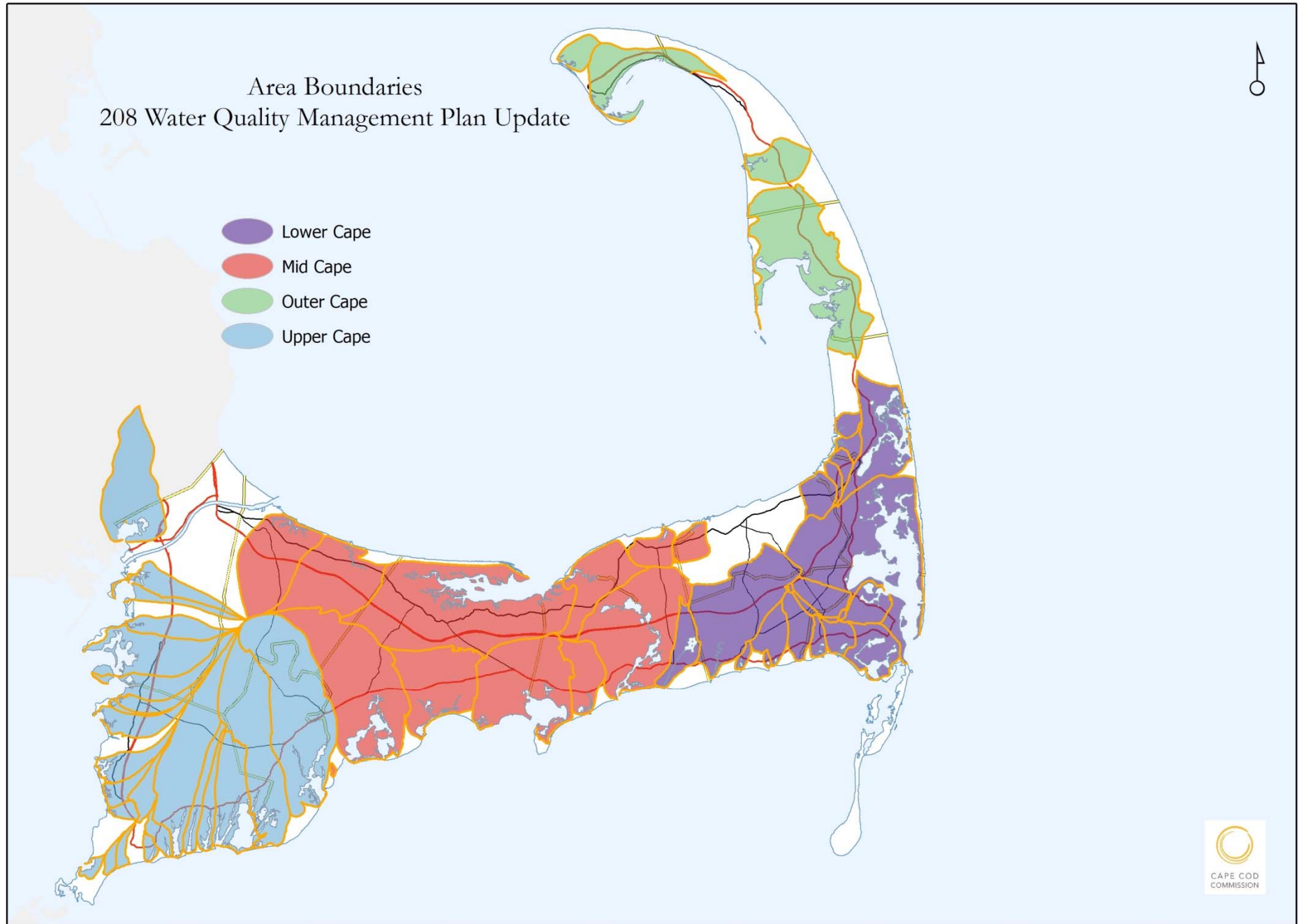


Goal:

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

Area Boundaries
208 Water Quality Management Plan Update

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



Subgroup Boundaries 208 Water Quality Management Plan Update



Lower Cape

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

Mid Cape

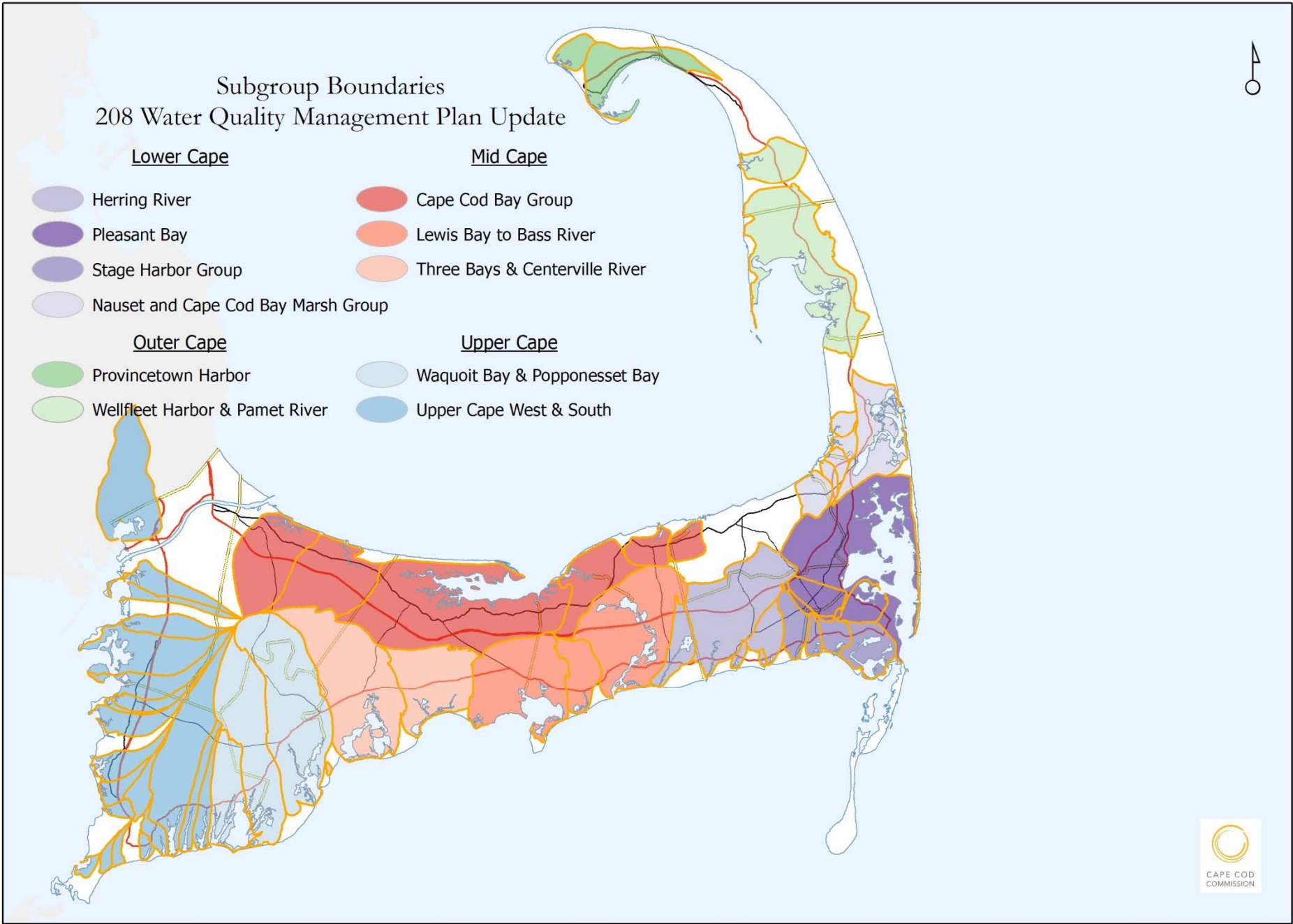
- Cape Cod Bay Group
- Lewis Bay to Bass River
- Three Bays & Centerville River

Outer Cape

- Provincetown Harbor
- Wellfleet Harbor & Pamet River

Upper Cape

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



What is the stakeholder process?

Public Meetings

Watershed Working Groups



July

August

September

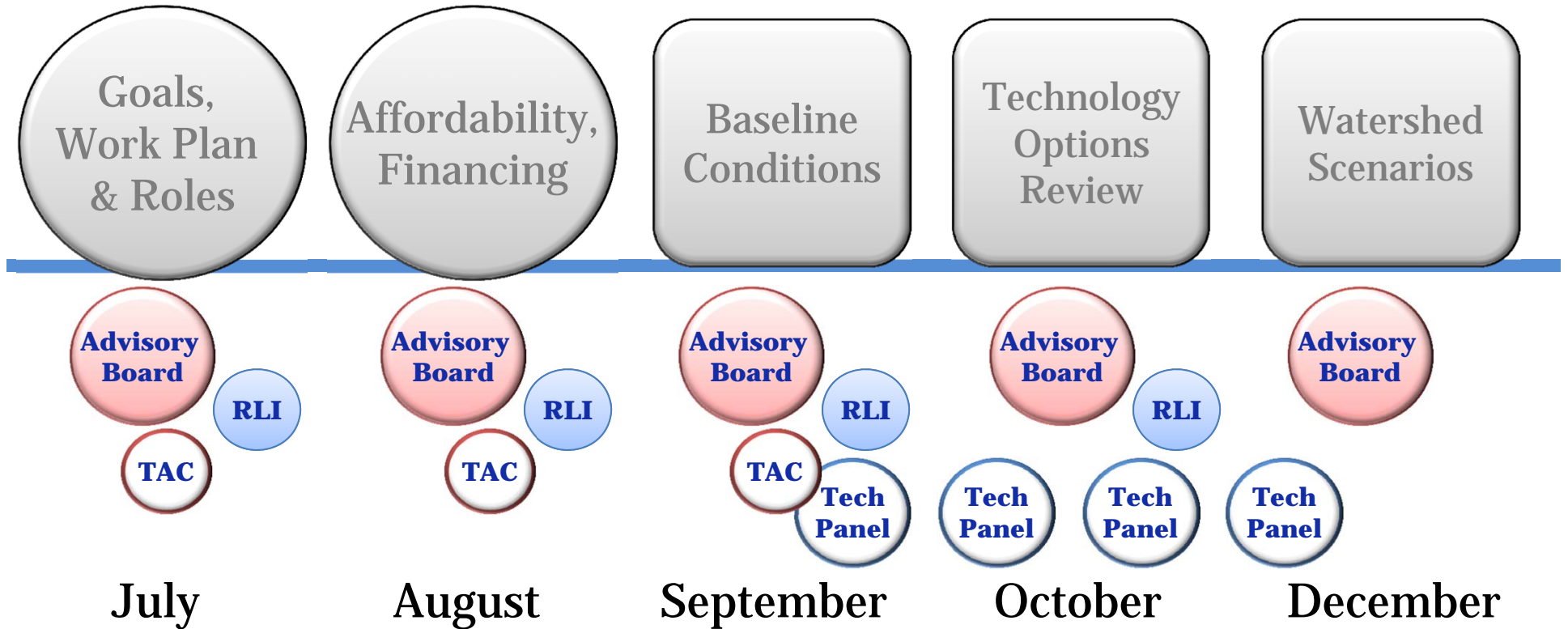
October

December

208 Planning Process

Public Meetings

Watershed Working Groups



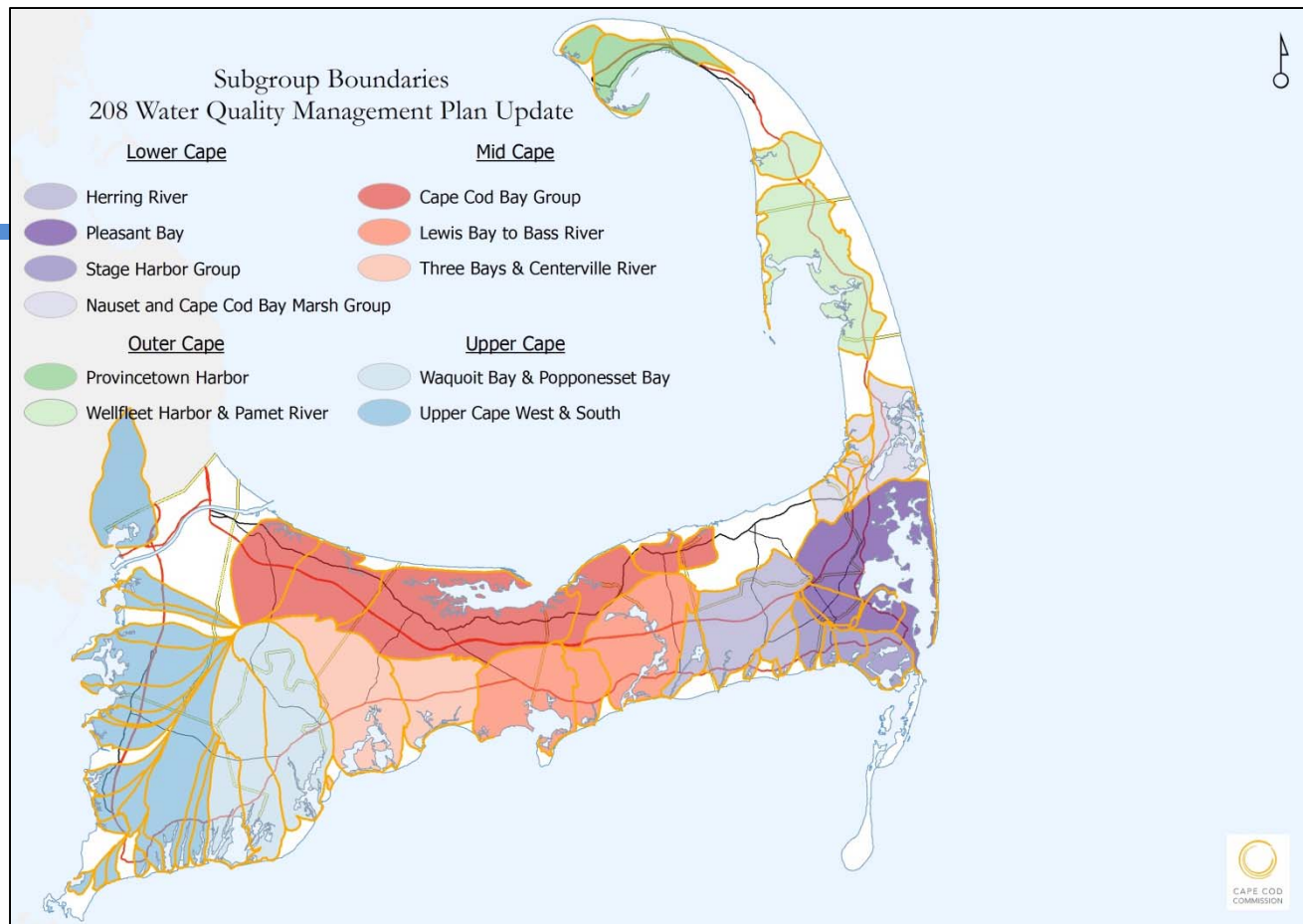
RLI Regulatory, Legal & Institutional Work Group

TAC Technical Advisory Committee of Cape Cod Water Protection Collaborative

208 Planning Process

Baseline Conditions

11 Working Group Meetings:
Sept 18-27



208 Planning Process

Baseline Conditions

11 Working Group Meetings:
Sept 18-27

Technology Options Review

11 Working Group Meetings:
Oct 21-Nov 5



- Wastewater
- Stormwater
- Existing Water Bodies
- Regulatory

208 Planning Process

**Baseline
Conditions**

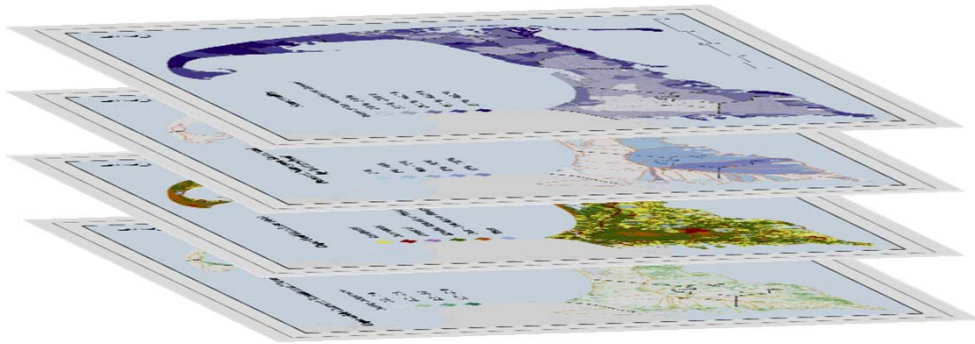
11 Working
Group Meetings:
Sept 18-27

**Technology
Options
Review**

11 Working
Group Meetings:
Oct 21-Nov 5

**Watershed
Scenarios**

11 Working
Group Meetings:
Dec 2-11



208 Planning Process

**Baseline
Conditions**

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

Goal of Today's Meeting:

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

208 Planning Process

Local Progress to Date

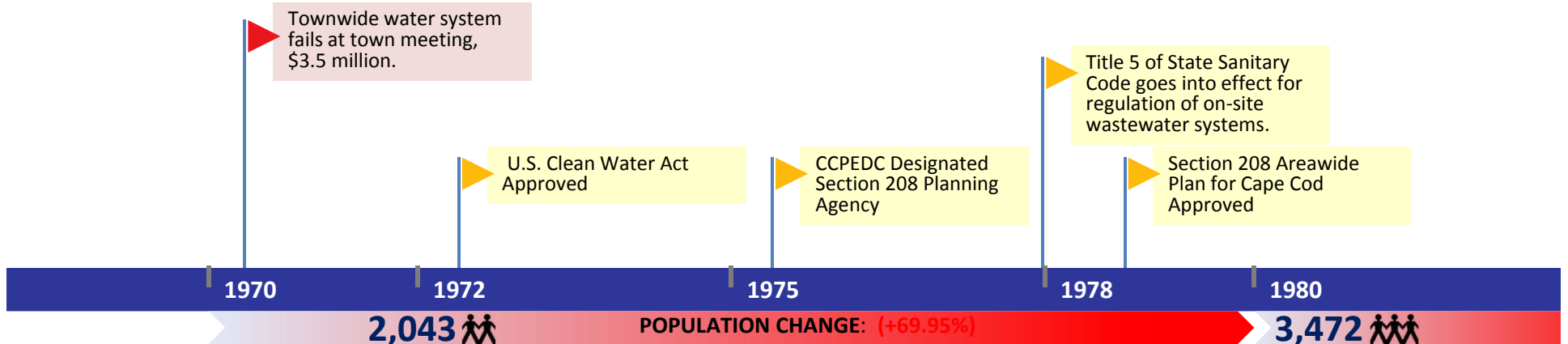


**Pamet River
Wellfleet Harbor**

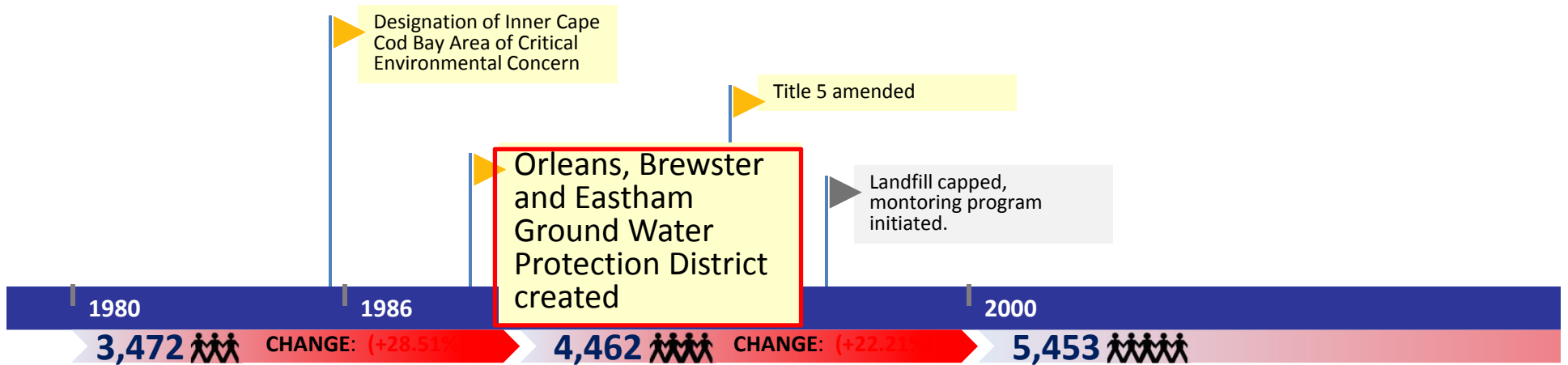
Eastham

From 1978 Section 208 Plan

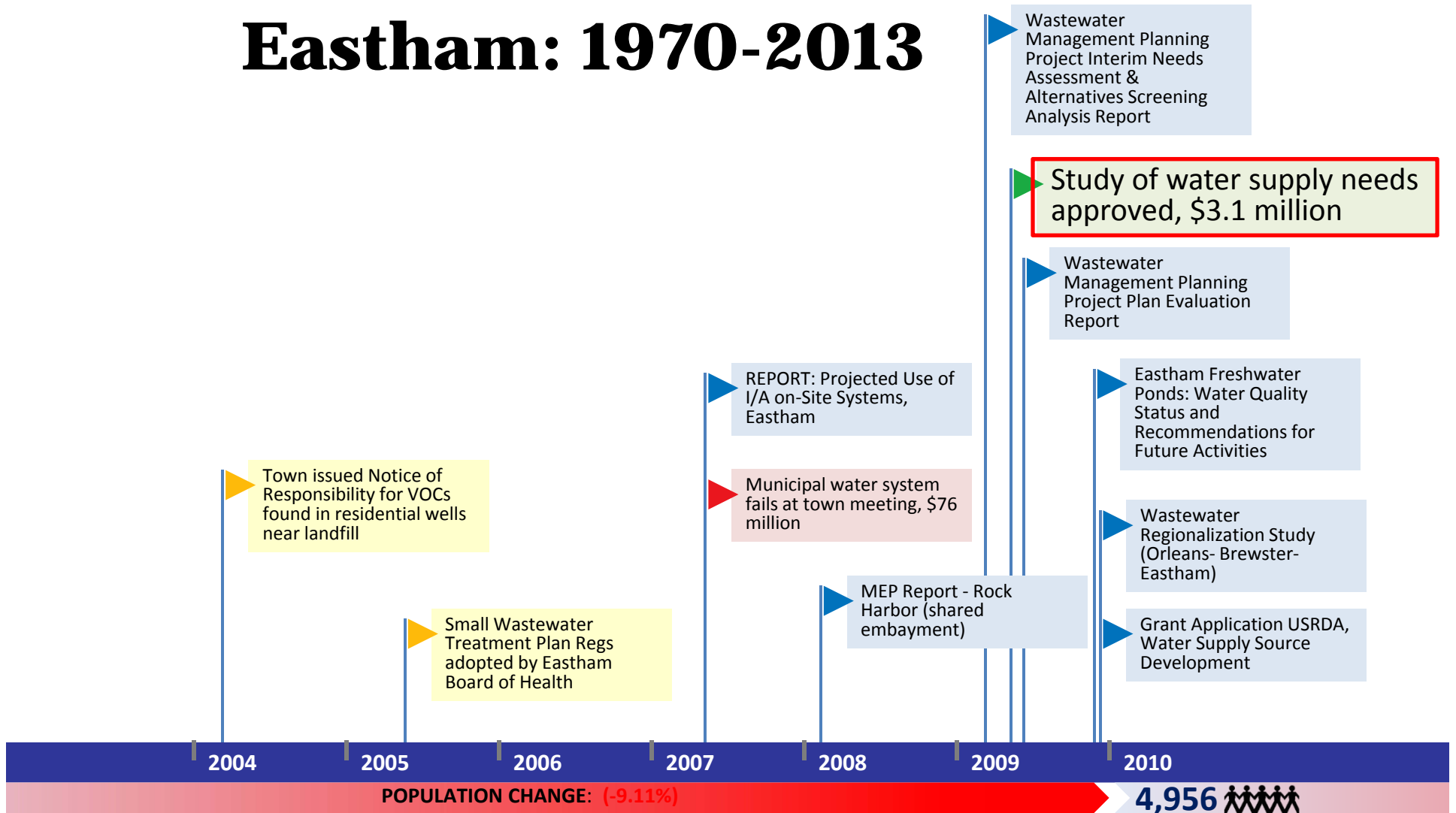
- ▶ Eastham should give priority to improving Title 5 enforcement and controlling conversion of seasonal dwellings.
- ▶ The town should work with CCPEDC to implement a Seasonal Residential District for the western shore of Eastham.
- ▶ Water supply is also of concern in Eastham. The high density areas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



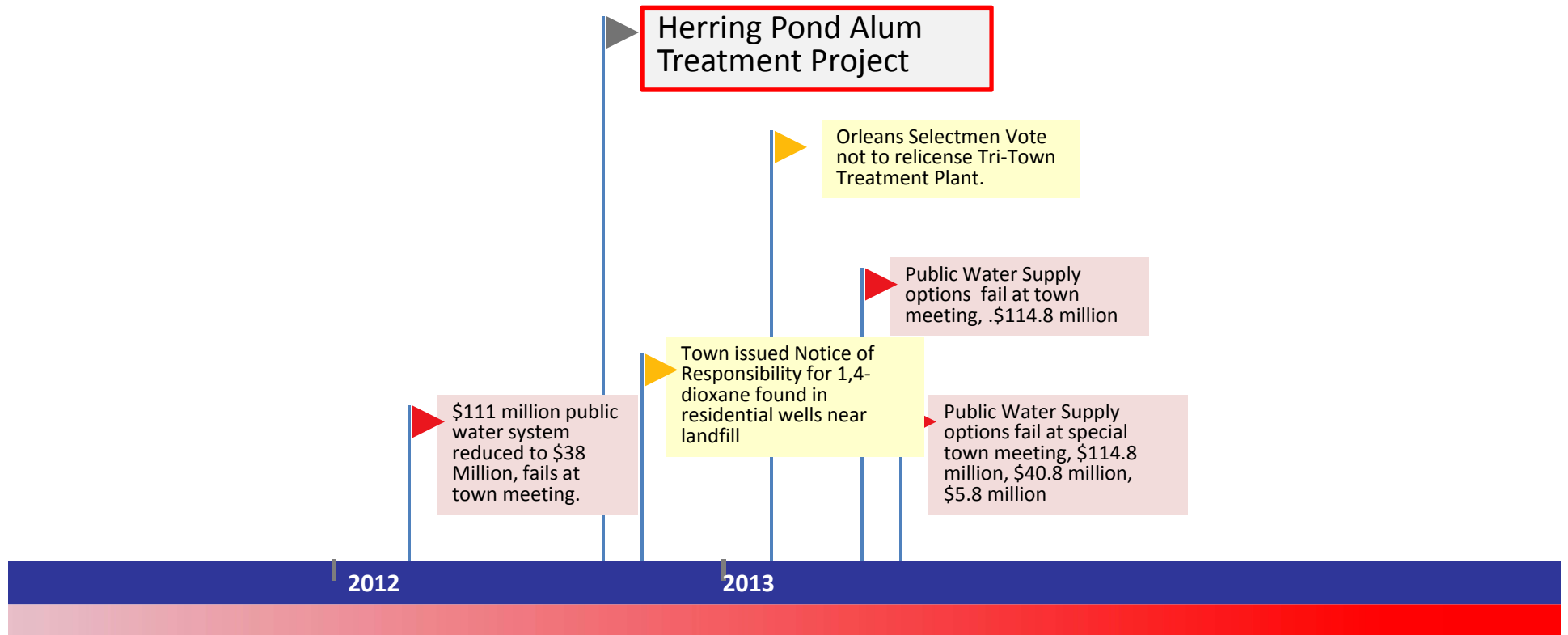
Eastham: 1970-2013



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.

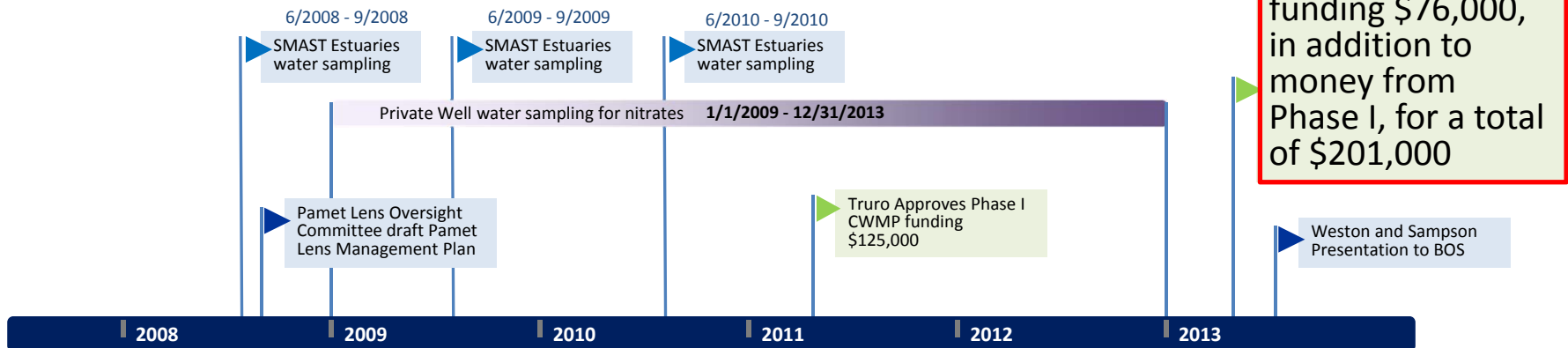
- ▶ Growth controls and water conservation must be given full consideration in such a planning effort to assure that the groundwater resource is not overdeveloped.
- ▶ With Truro's naturally sandy soils, the town's wastewater problems are limited to a small strip of commercial development along a low-lying barrier beach known as Beach Point.

This area of was included in the Sewer Service Areas Map on the basis of the

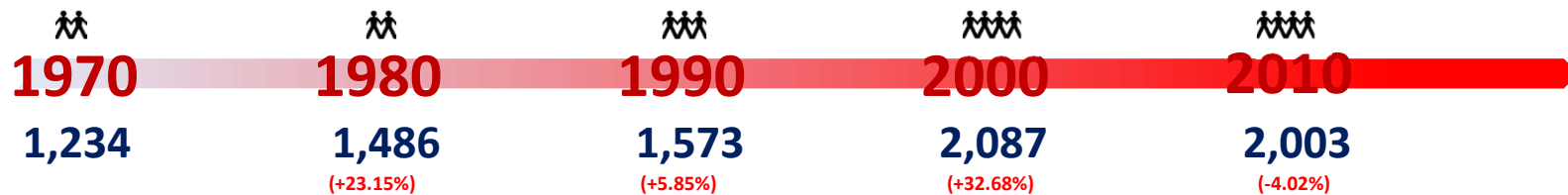
likely cost-effectiveness if a sewer is built for Provincetown.

- ▶ Local officials of Truro expressed concern over possible growth impacts of sewerage. 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.



Truro approves CWMP phase II funding \$76,000, in addition to money from Phase I, for a total of \$201,000



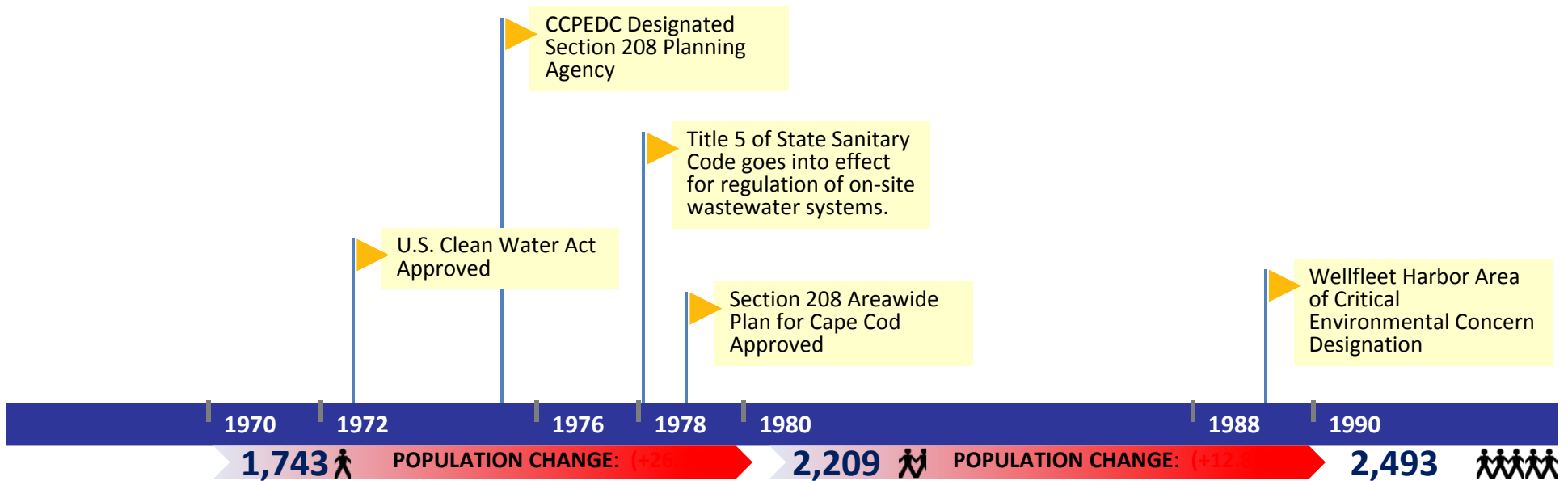
Wellfleet:

From 1978 Section 208 Plan

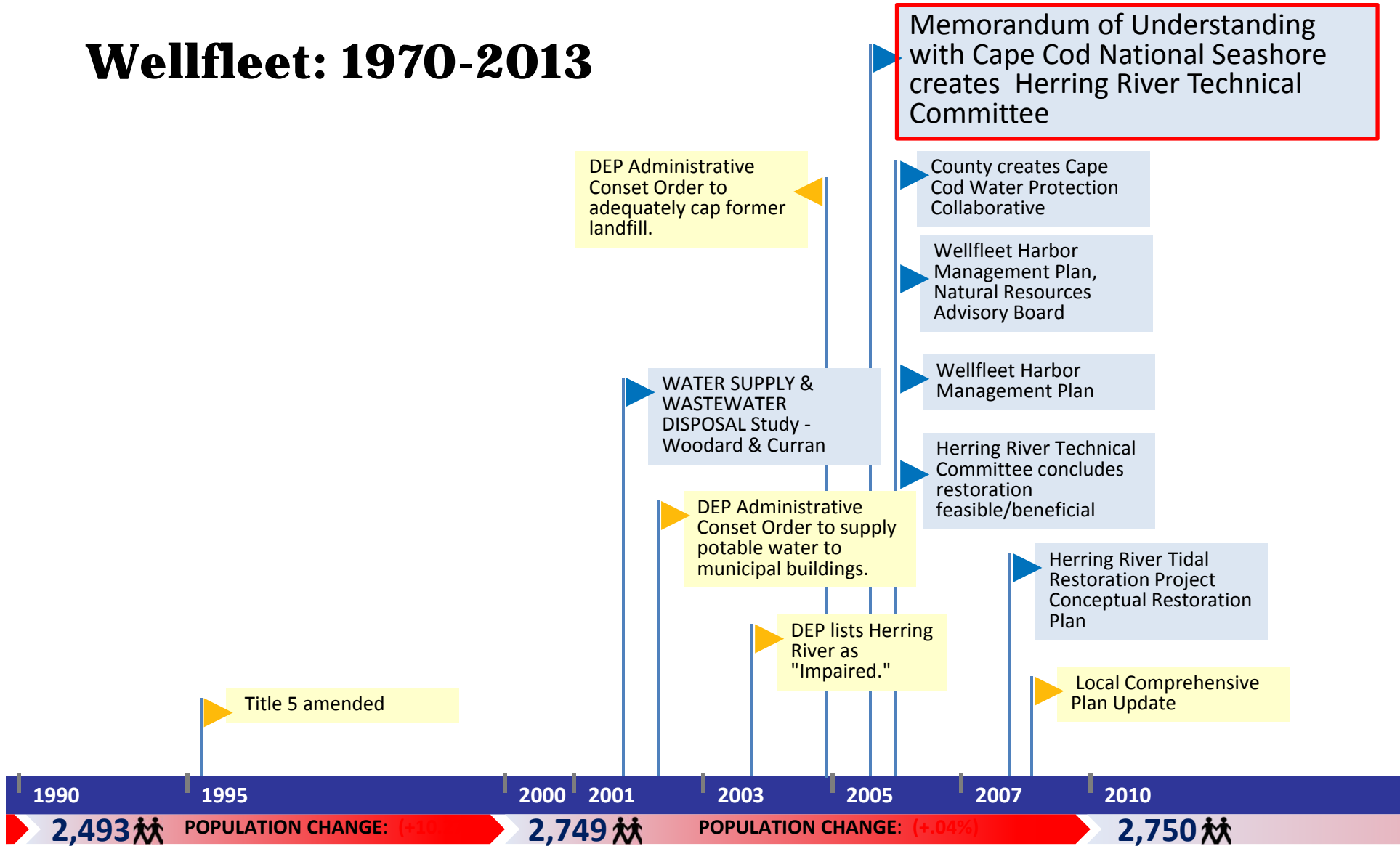
- ▶ The Town of Wellfleet is similar to Eastham and Truro in that it has a high influx of summer population and has no municipal water or sewer system.
- ▶ Wellfleet has a relatively densely populated downtown area which is indicated in the Wastewater Problem Areas Map
- ▶ It is recommended that the town regionalize with Truro for construction of a septicage 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.

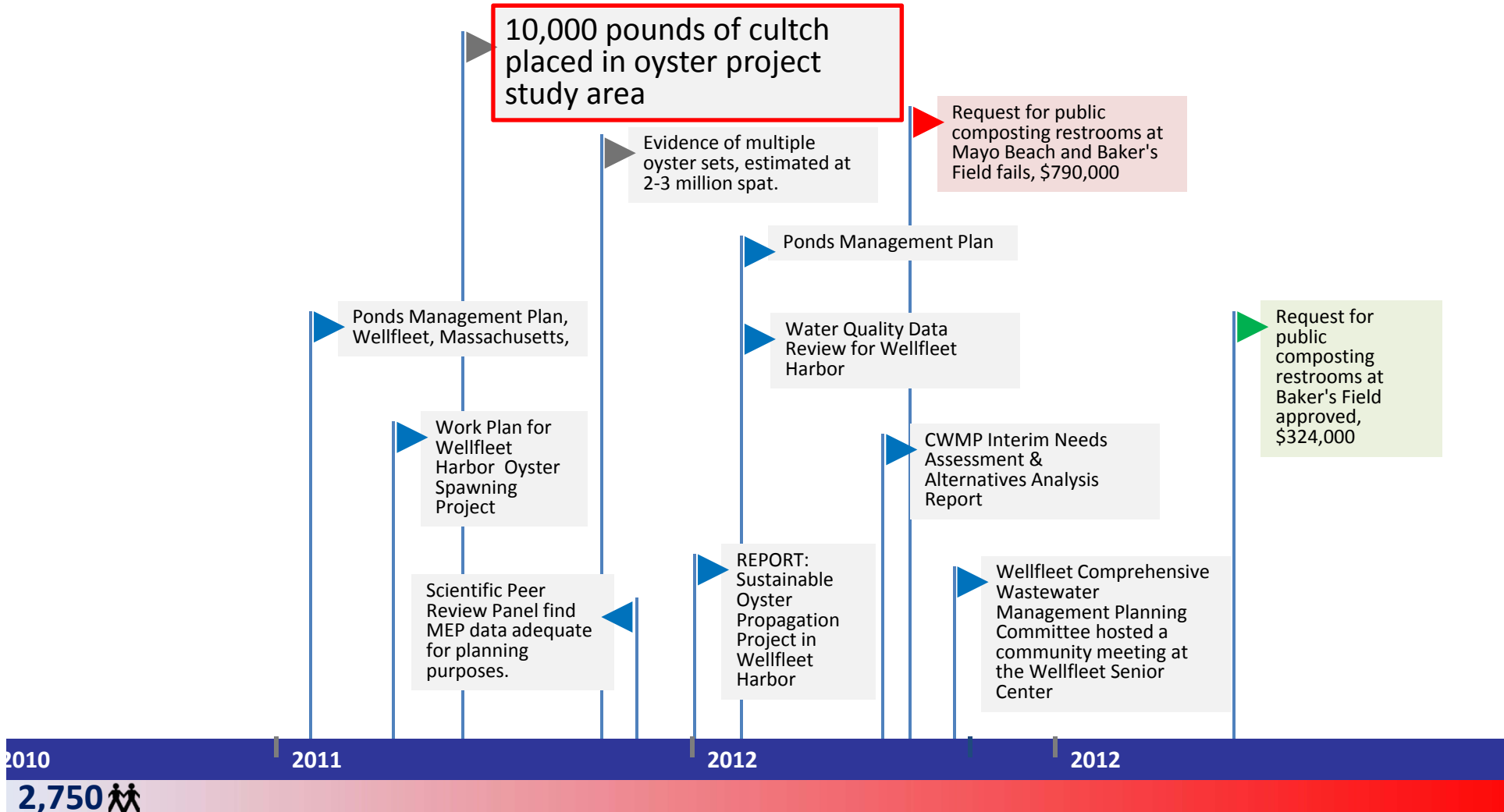
- ▶ Since Wellfleet is one of the few Cape Cod towns which has no water supply engineering plan, a combined water and sewer study would be desirable.
- ▶ The town planning board is presently revising its master plan. Water quality should be a priority consideration, and should be coordinated through the establishment of a water quality advisory committee.



Wellfleet: 1970-2013



Wellfleet: 1970-2013

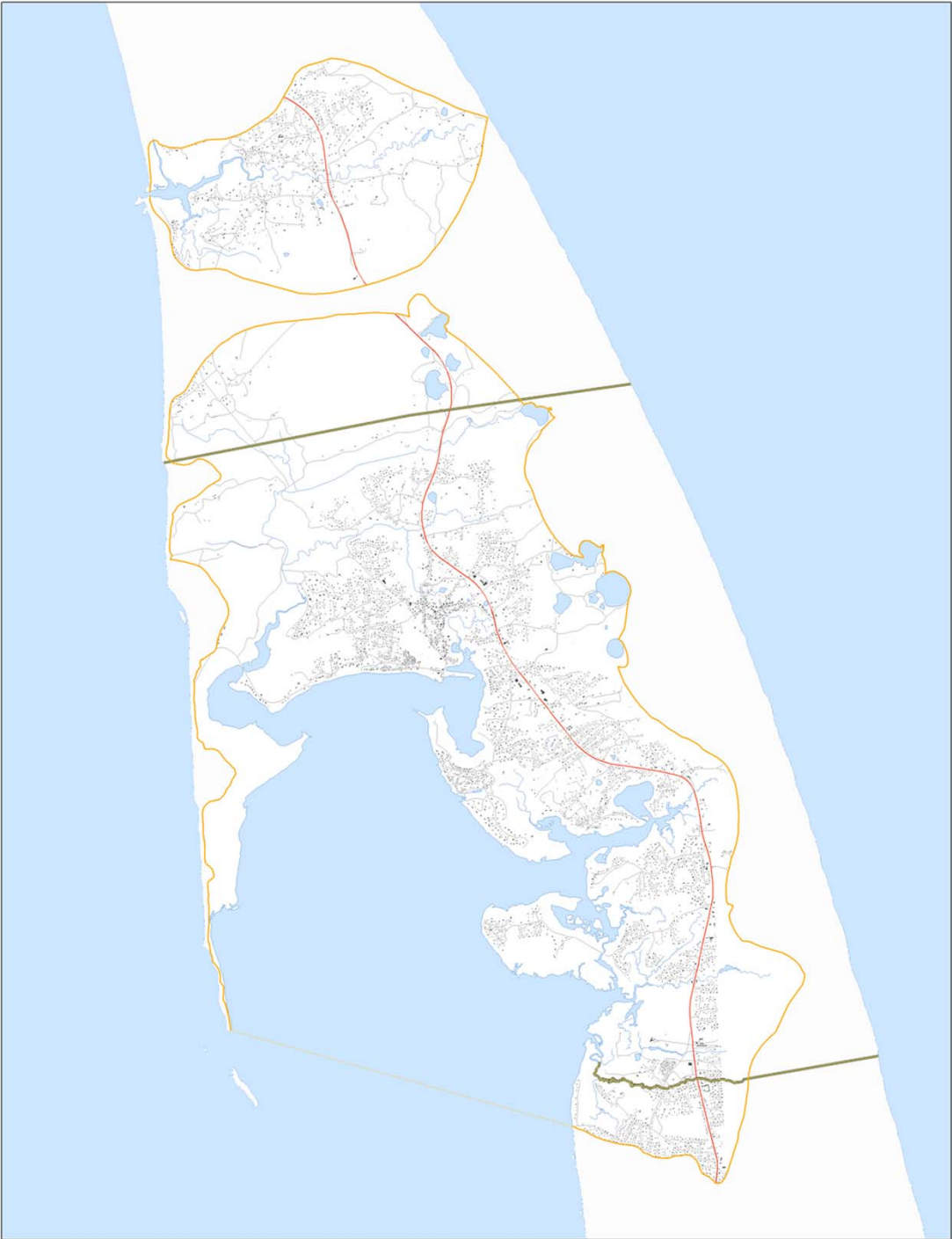


Did we miss anything?

Your Watersheds

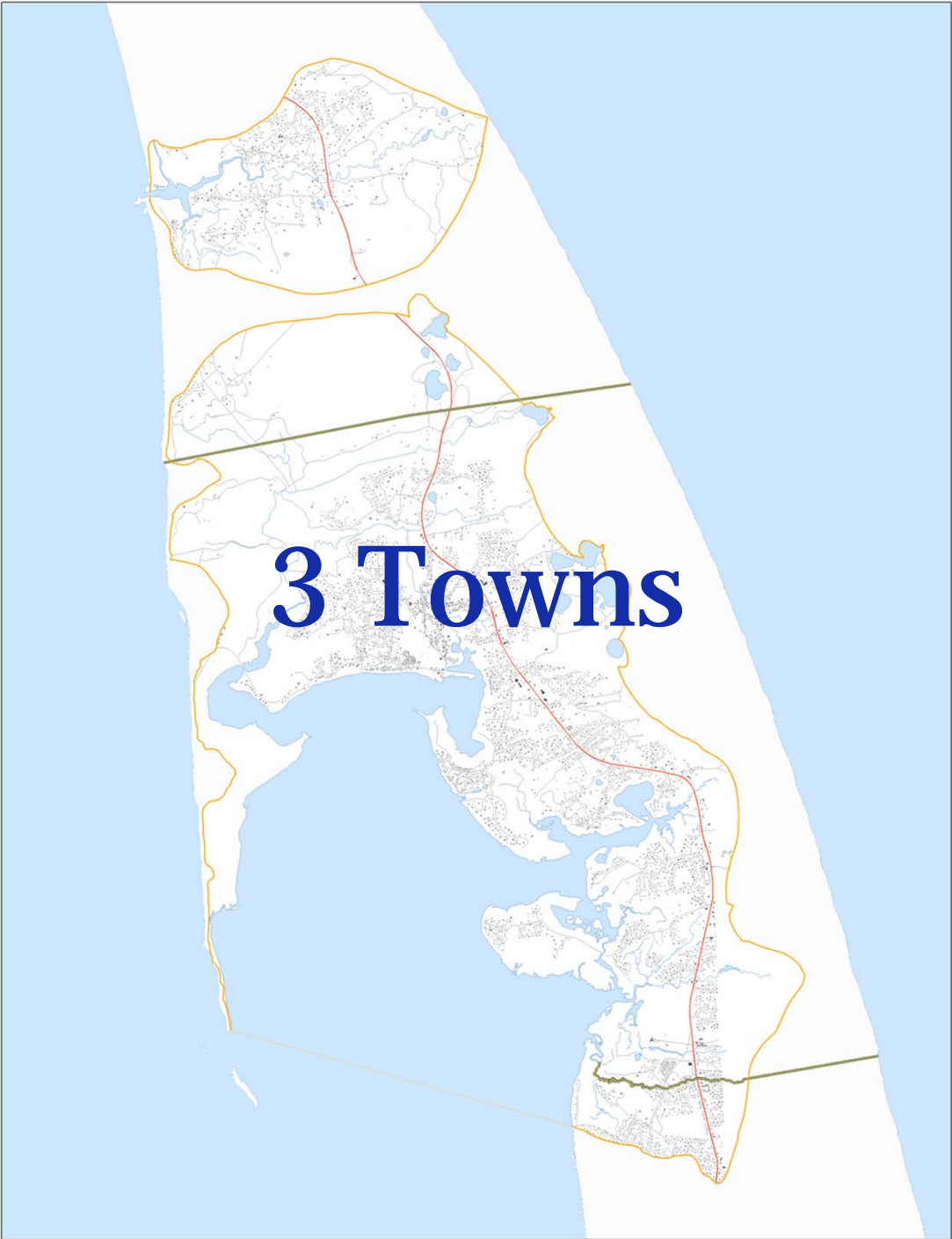


**Pamet River
Wellfleet Harbor**






22.4 square miles




Natural Features


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures

 Ponds


Natural Areas


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

 Water Table Contours

 Cranberry Bogs


 Wetlands

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

 Preliminary FEMA Flood Insurance Rate Map (FIRM) Zones 2013


Managed Surfaces


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures


 Ponds

Managed Surfaces

 Approximate Managed Ground Surfaces

 Approximate Residential Managed Lawns

 Approximate Managed Golf Courses

 Approximate Municipal Managed Natural Surfaces


Regulatory


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures

 Ponds


Regulatory


 Areas of Critical Environmental Concern

 DEP Approved Wellhead Protection Areas (Zone IIs)

 Growth Incentive Zone


OpenSpace: Level of Protection


 In Perpetuity

 Limited


 None

Landuse Vision Map


 Economic Center

 Industrial and Service Trade Area

 Village


 Resource Protection Area

 Other

 Undesignated


Land Use Change


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads


 Structures


 Ponds


LandUse Change

 Residential

 Commercial

 Industrial

 Wooded, Natural, or Wetlands

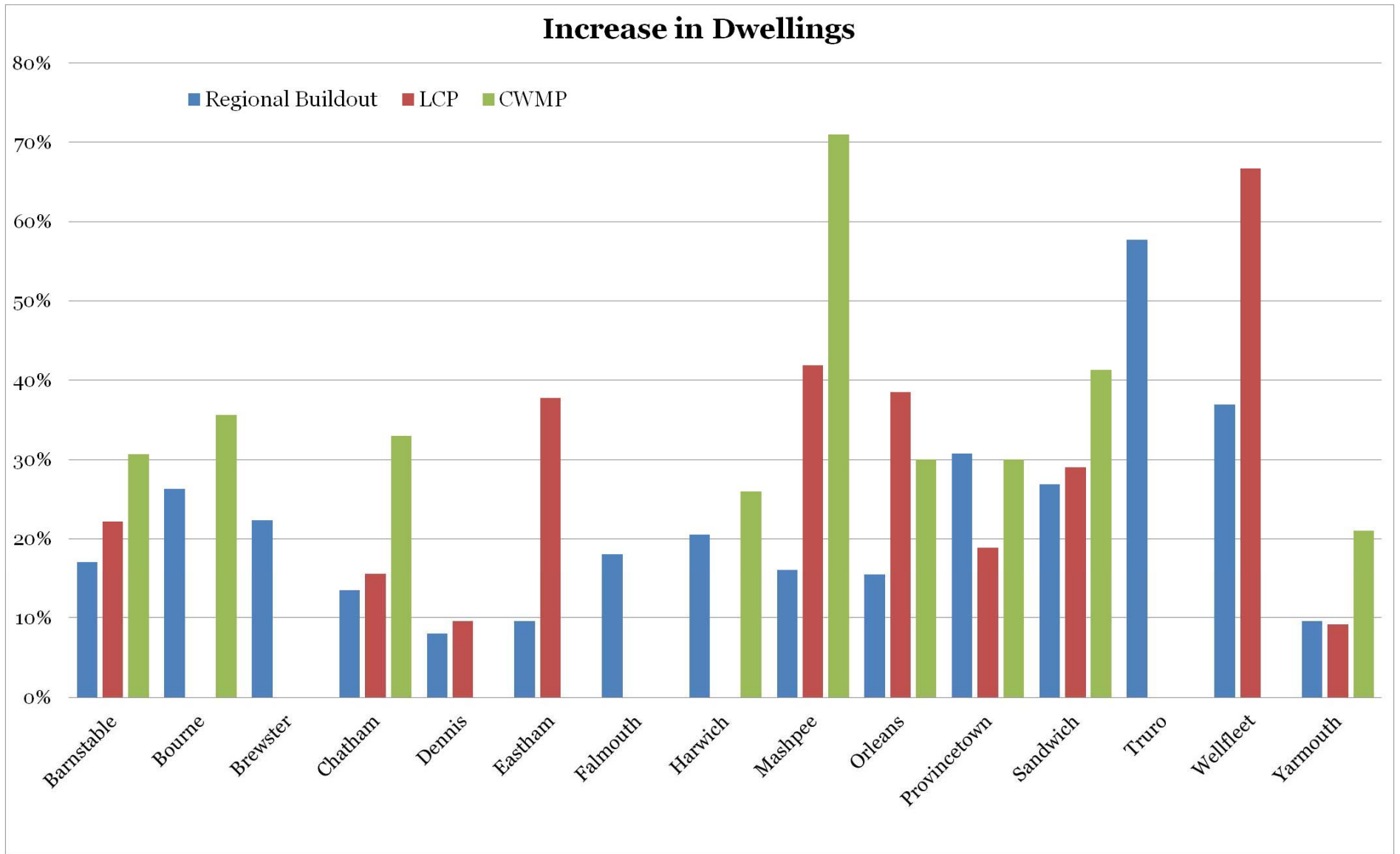
 Open - Disturbed or Managed

 Water

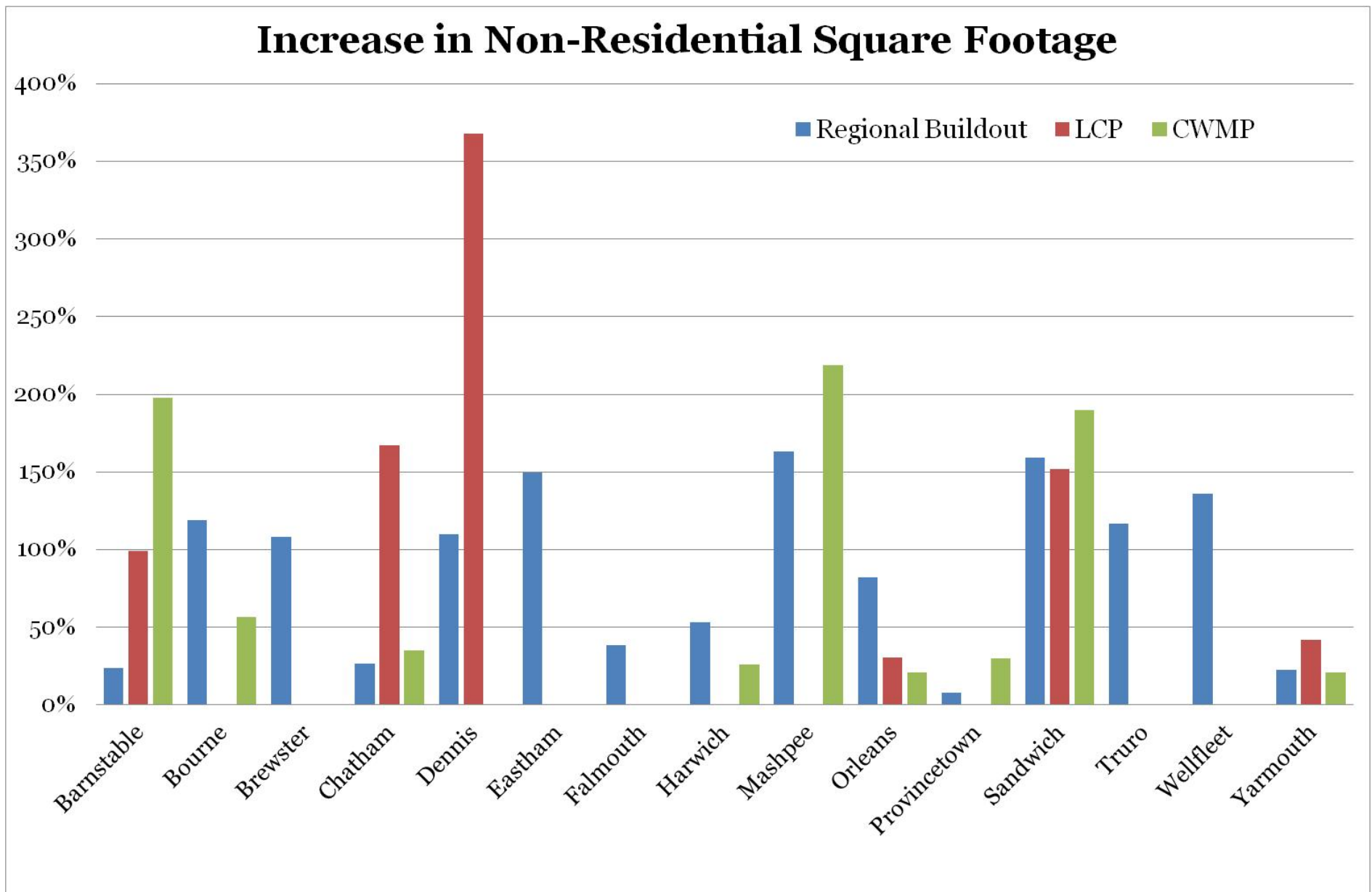
Density

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

Buildout



Buildout



The People



**Pamet River
Wellfleet Harbor**

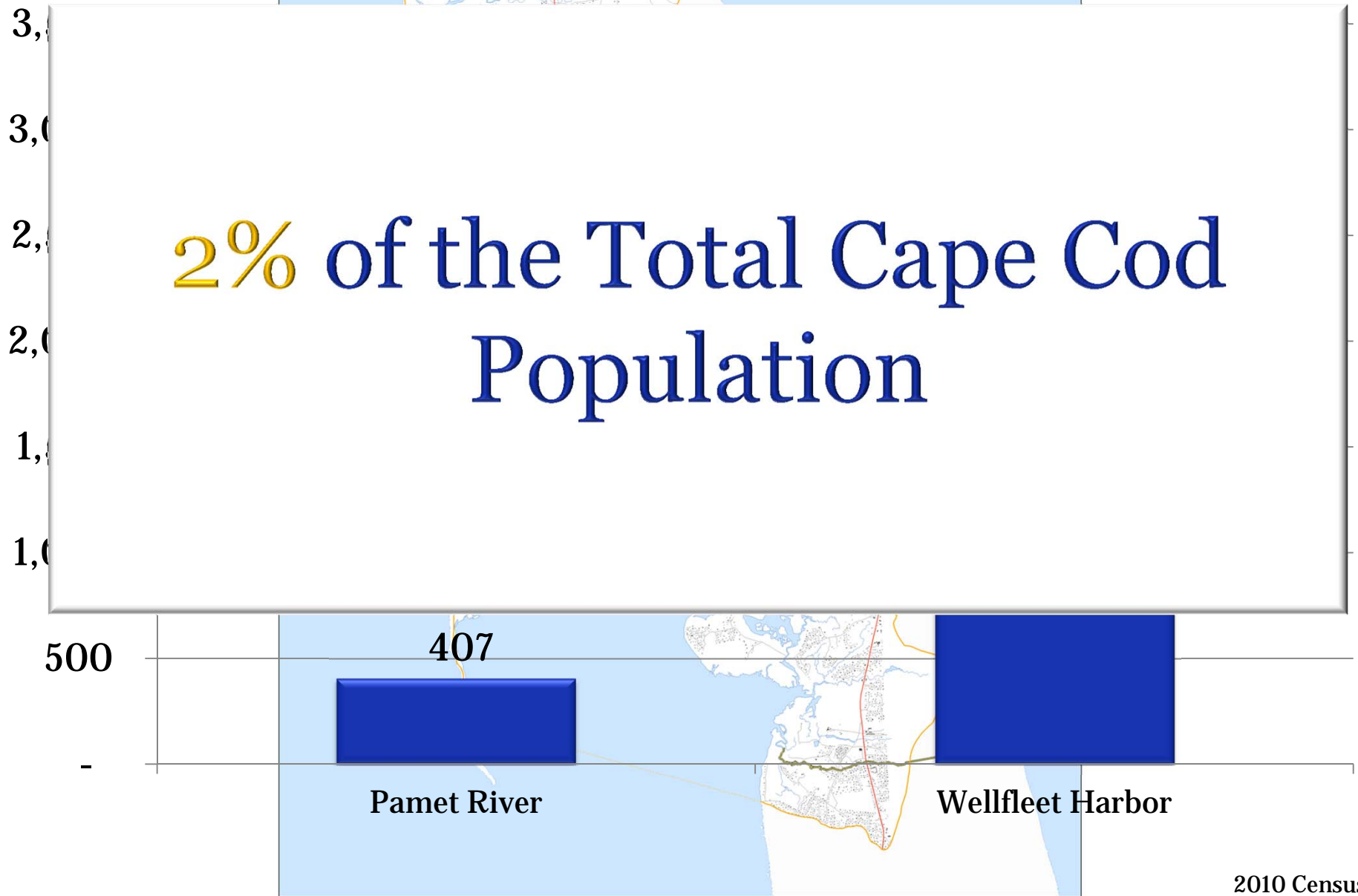
A map of a coastal area, possibly a bay or inlet, showing population points as small grey dots. The land is white, and the water is light blue. There are several orange and red lines outlining different sections of the land. A green line runs horizontally across the middle of the land. The text "Total Population (2010) = 3,447" is overlaid in the center of the map.

Total Population (2010) = 3,447

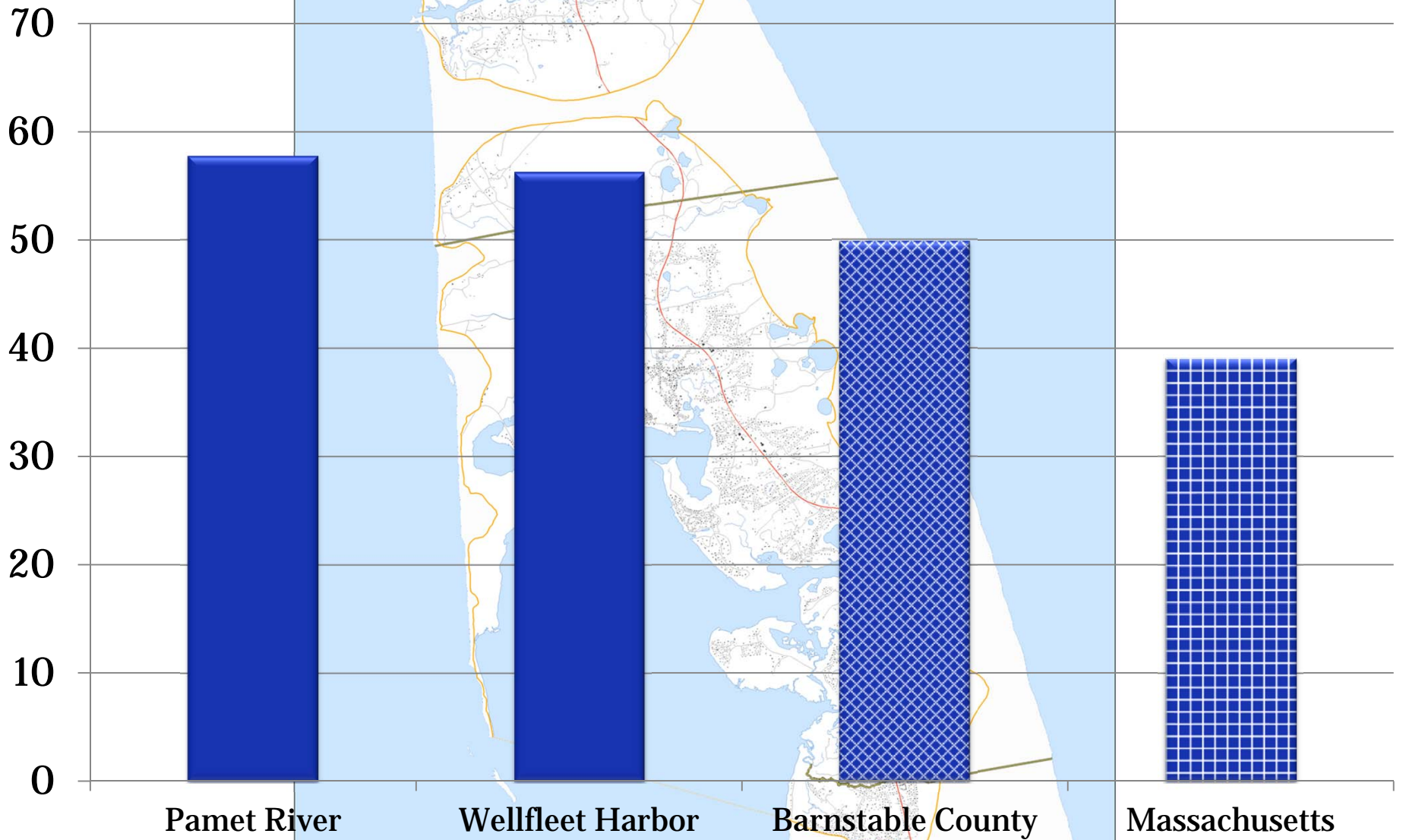


Population (2010)

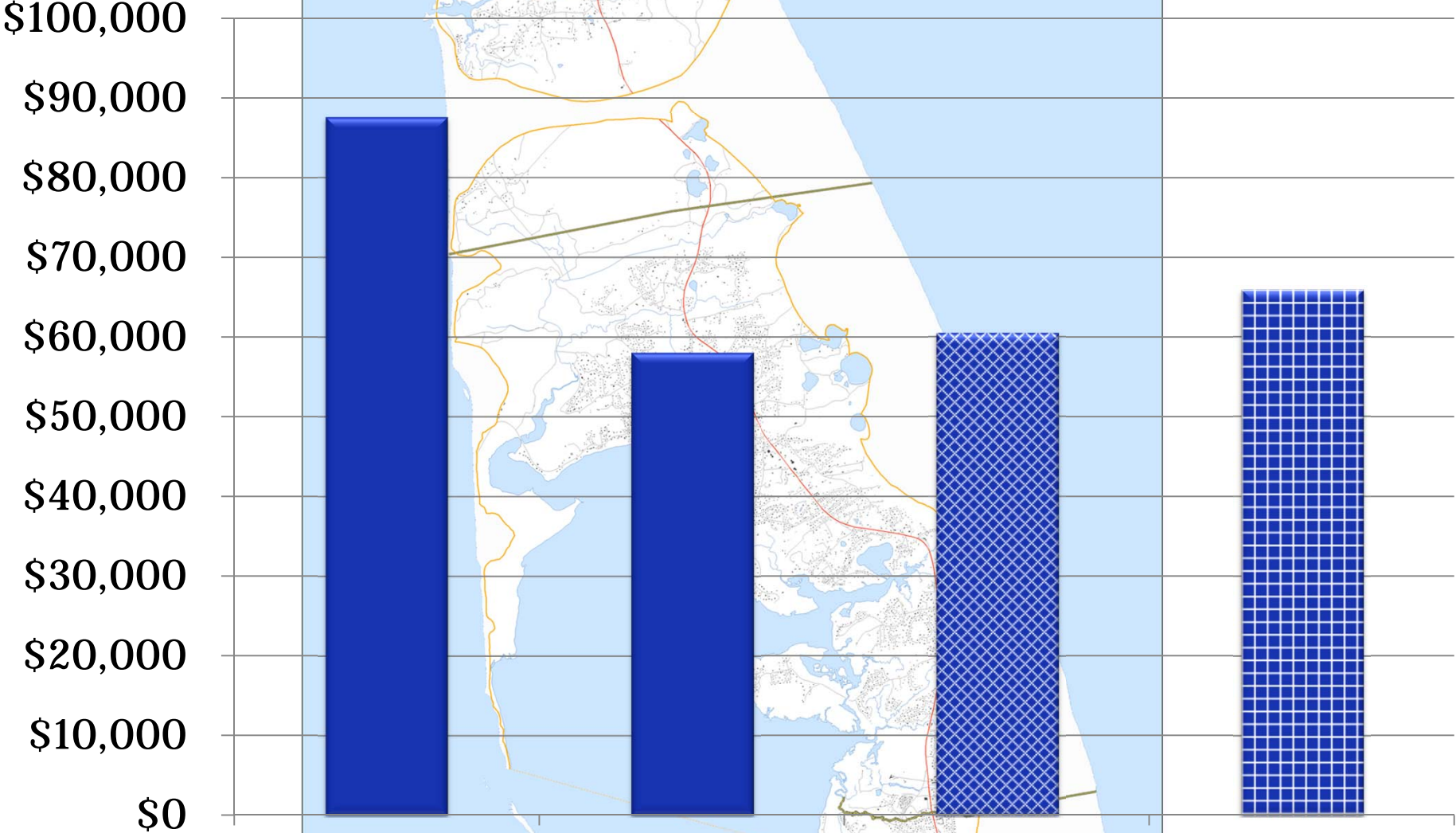
2% of the Total Cape Cod Population



Median Age (2010)



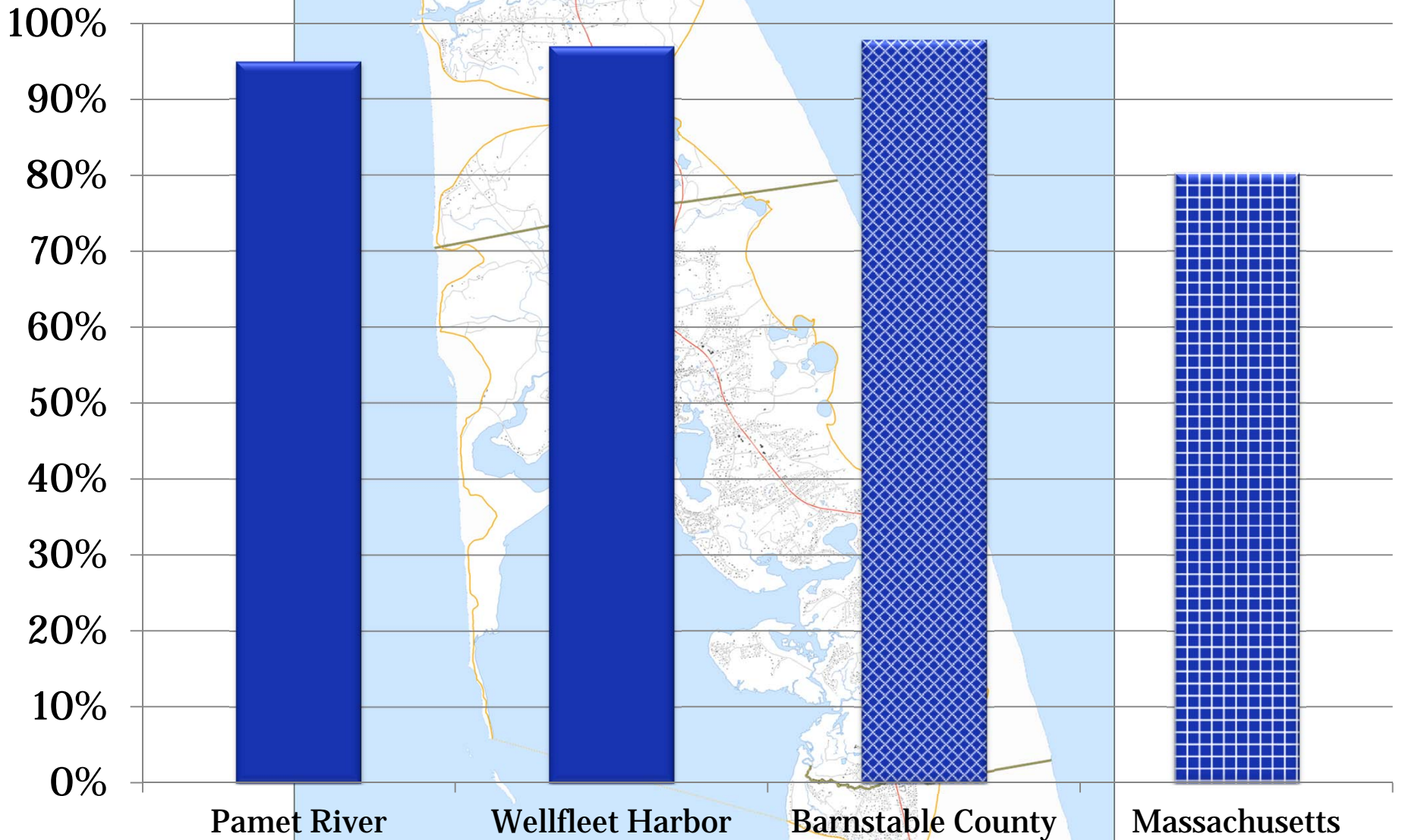
Median Income (2010)



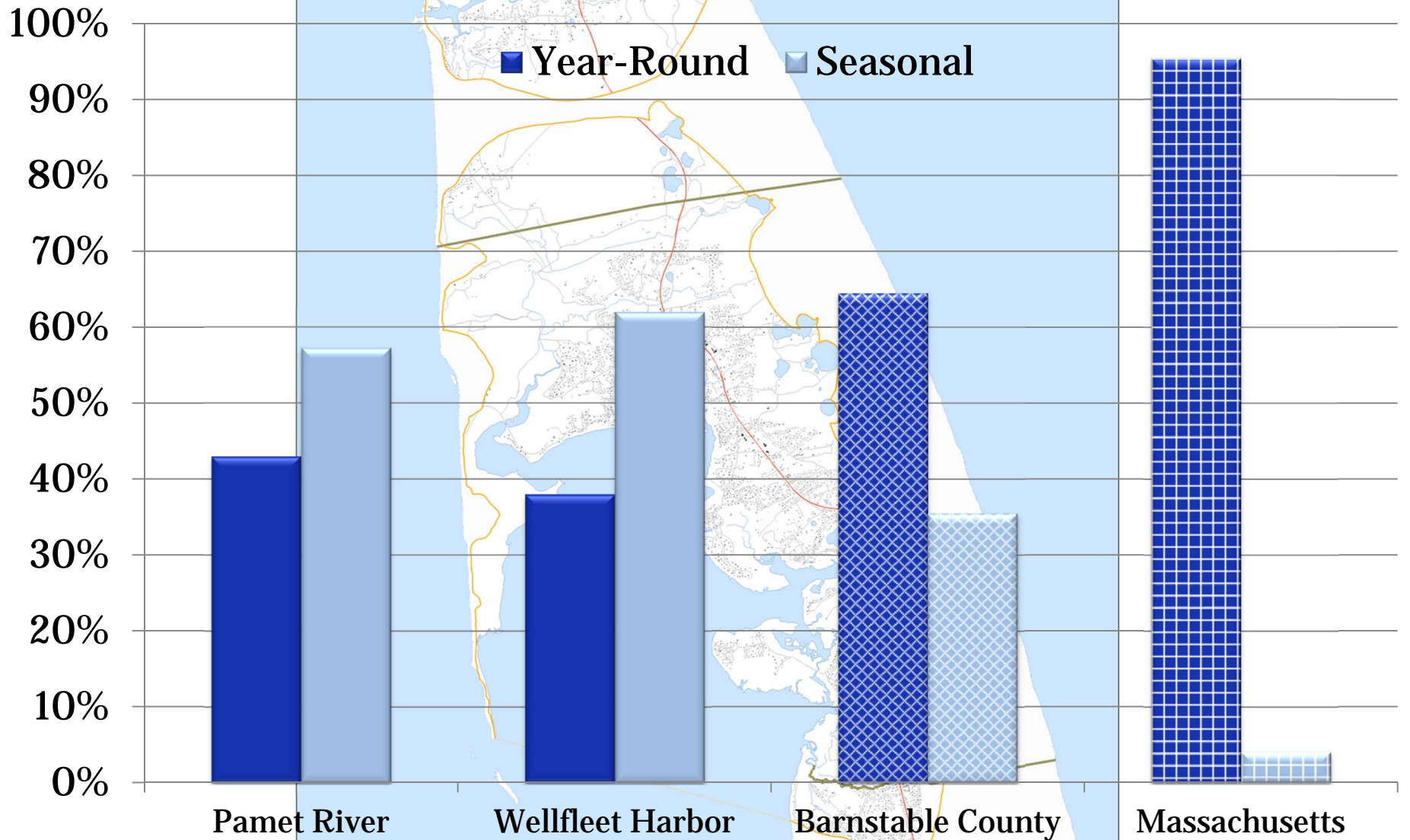
Pamet River Wellfleet Harbor Barnstable County Massachusetts

American Community Survey

Race - % White (2010)



Seasonal vs. Year Round Housing (2010)



Average Assessed Home Value (2010)

\$800,000

\$700,000

\$600,000

\$500,000

\$400,000

\$300,000

\$200,000

\$100,000

\$0

Total Assessed Value of Residential Homes =

\$2,419,096,290

Pamet River

Wellfleet Harbor

Barnstable County

Massachusetts

2010 Census

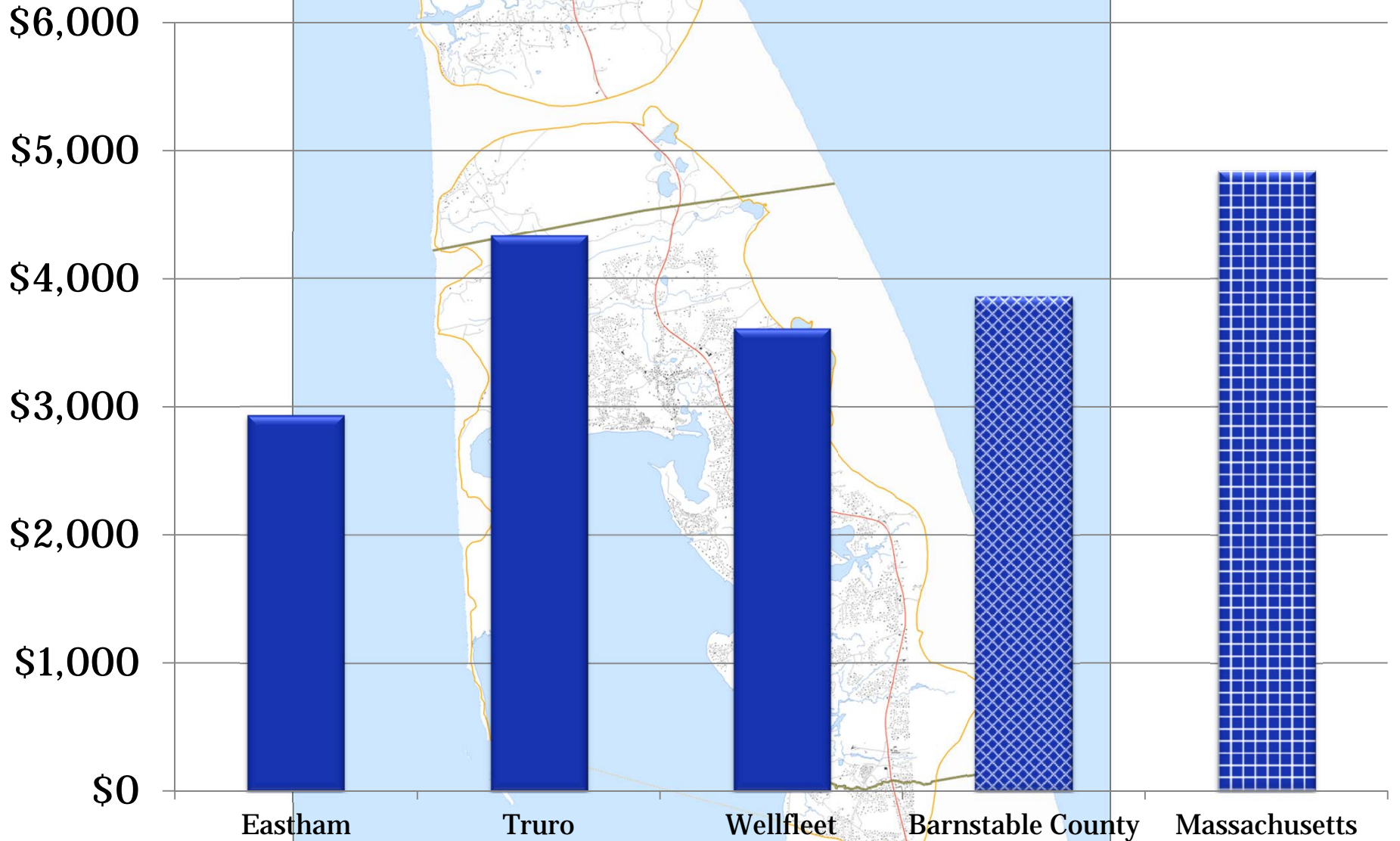
Your Government & Taxes



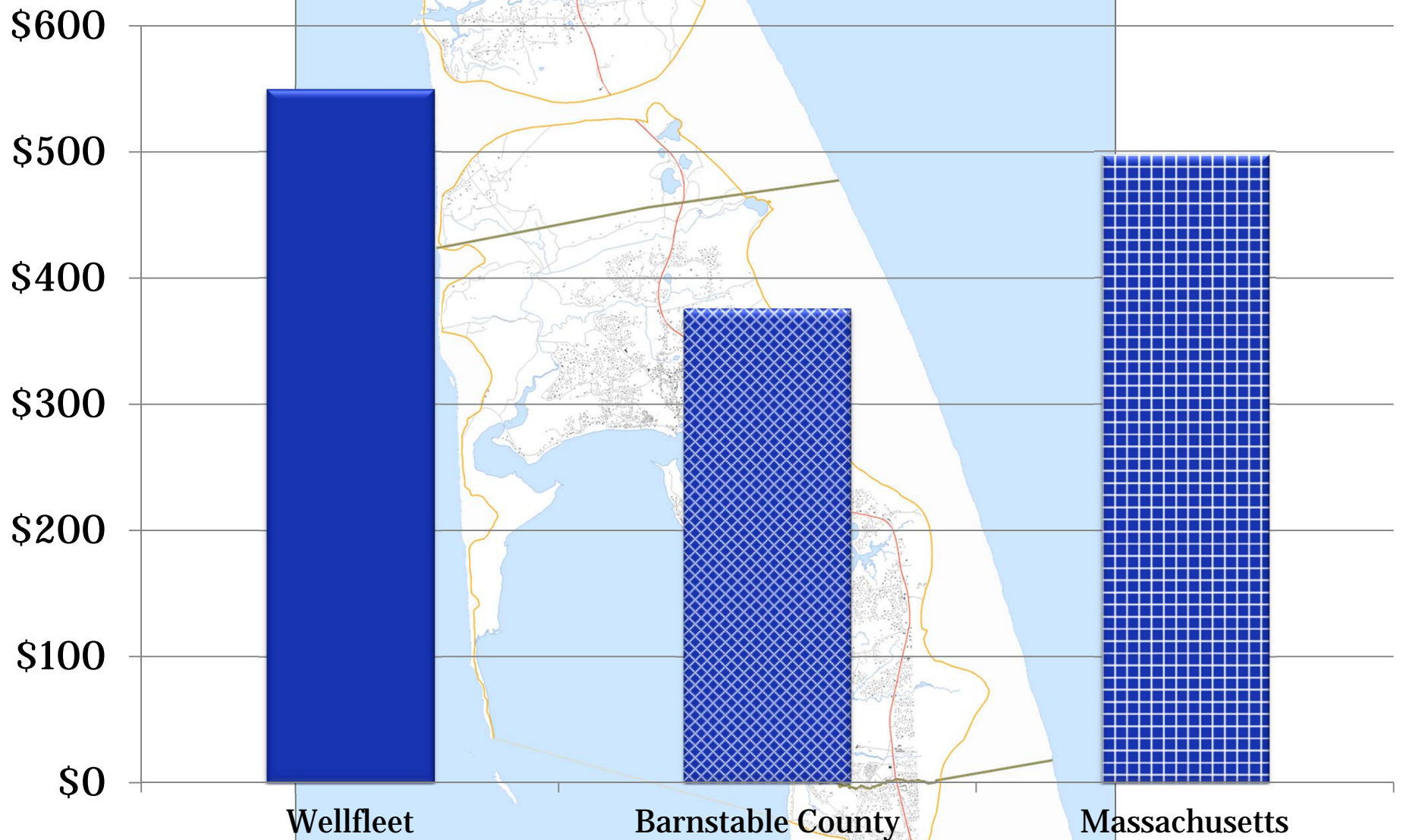
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**Pamet River
Wellfleet Harbor**

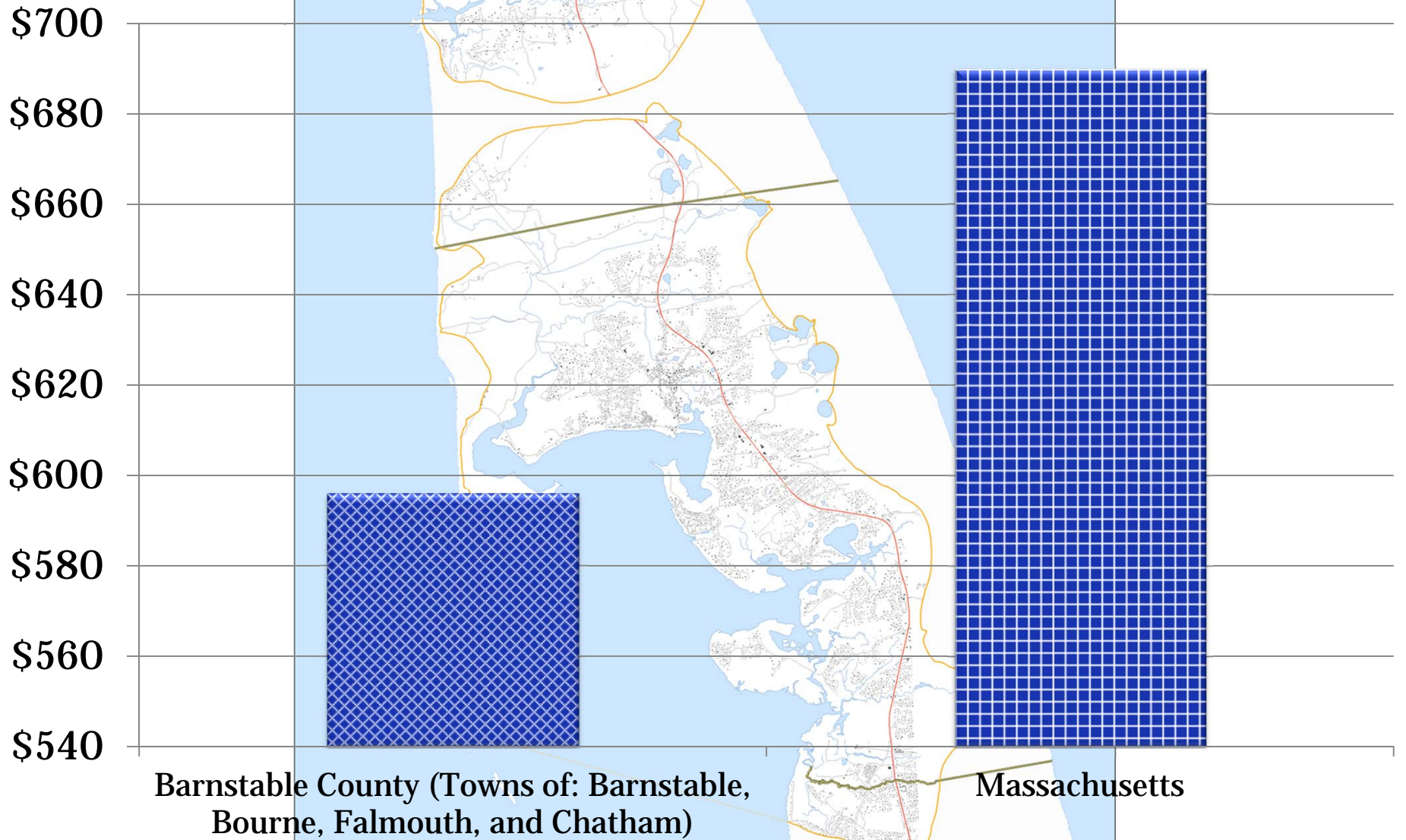
Average Single Family Property Tax Bill (2013)



Average Annual Water Bill (2012)



Average Annual Sewer Bill (2012)



The Problem



**Pamet River
Wellfleet Harbor**

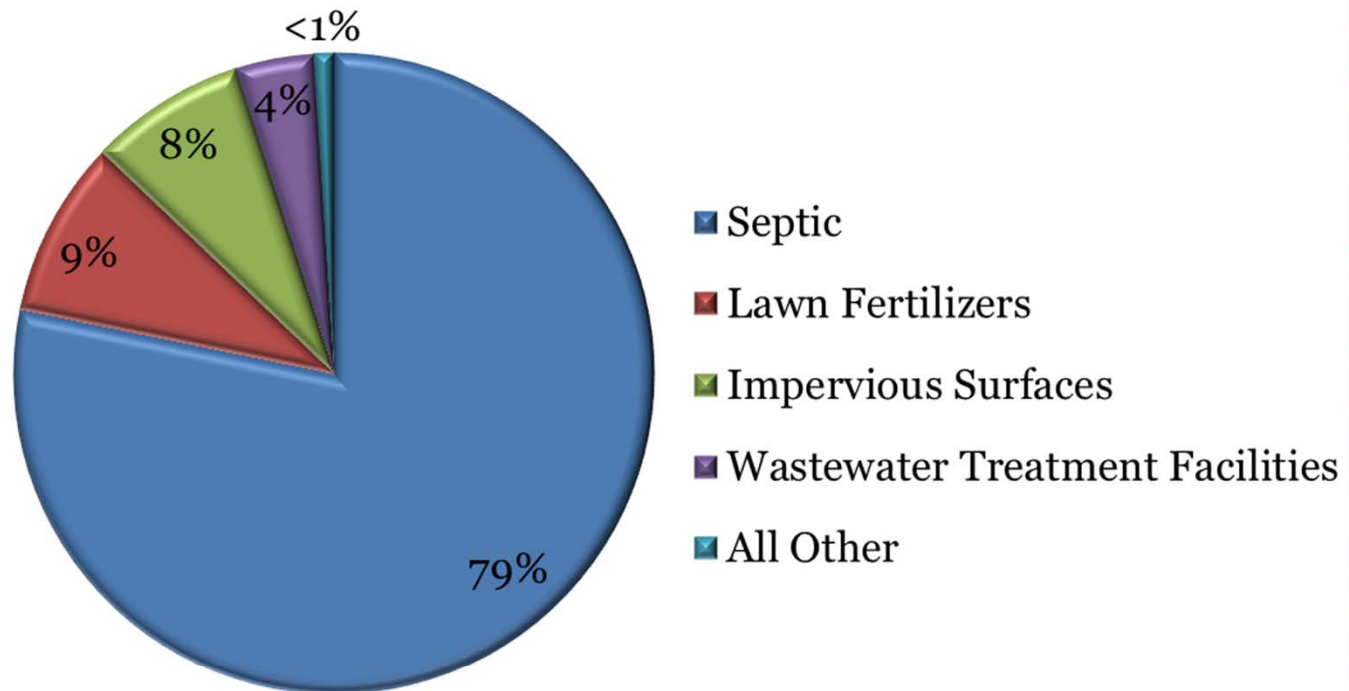


Photo credit: Anamarija Frankic

Massachusetts Estuaries Project

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

Cape-Wide Controllable Nitrogen Loads



Note: Data averaged from existing Massachusetts Estuaries Project Reports



Schedule for your MEP reports:

- **Wellfleet Harbor**

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

- **Pamet River**

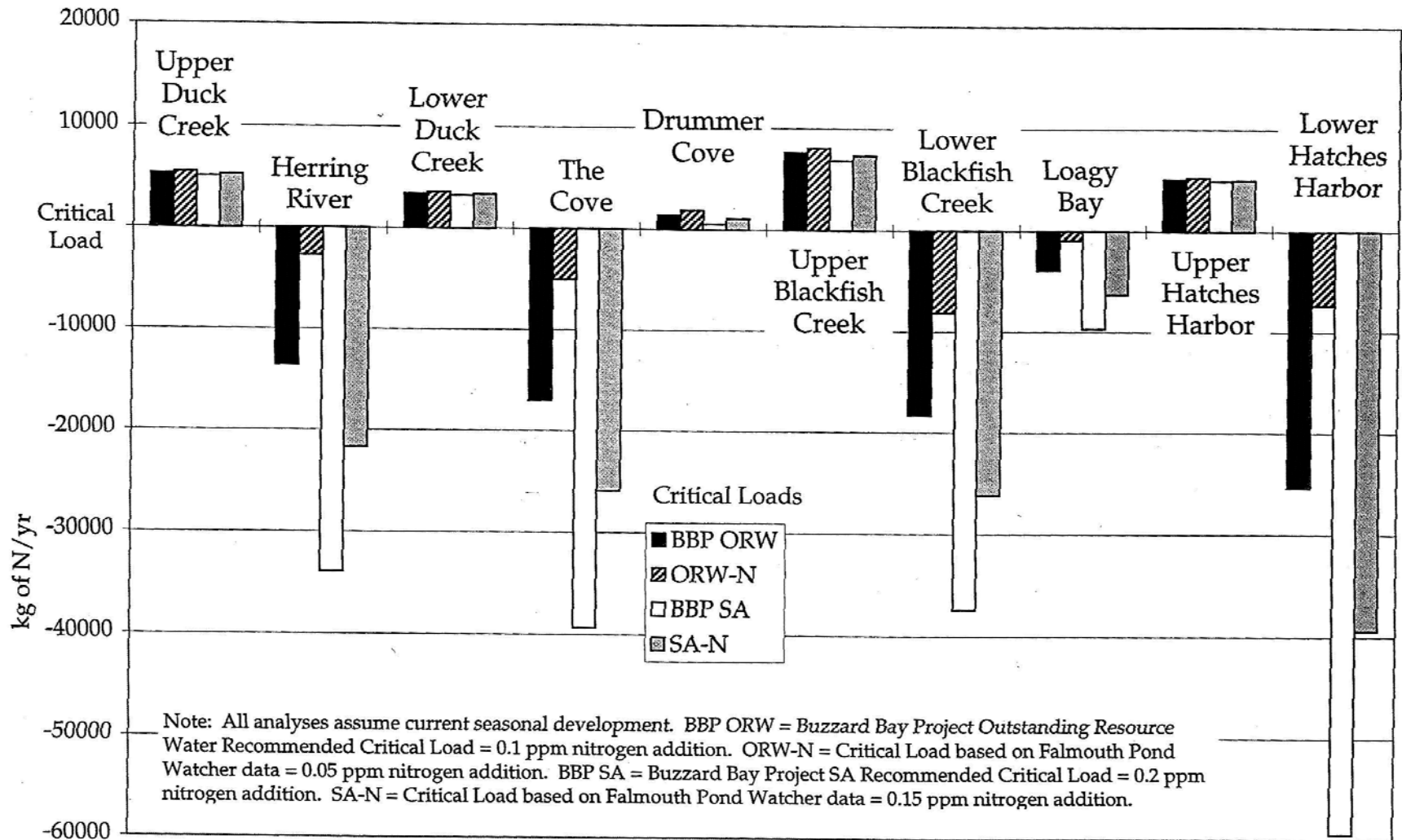
Not currently studied

Wellfleet Harbor Sampling



Photo credit: UMass Boston

Figure 22.
Buildout Nitrogen Loading
 Wellfleet Harbor System, MA
 Adjusted Nitrogen Loads/System Residence Time Nitrogen Limits




Nitrogen Problem


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway

 State Highway




 Roads

 Structures

 Ponds

Nitrogen

Ecological Indicators

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


Yearly Nitrate Concentration Averages


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


Embayments with Removal Target


Total NLoad Percent Removal

0 %

 1 - 52 %


 53 - 72 %


 73 - 86 %


 87 - 100 %


Subwatersheds with Removal Target


Total NLoad Percent Removal

 0.1 % - 9%

 9.1 % - 38 %


 38.1 % - 62 %

 62.1 % - 86 %

 86.1 % - 100%


Eelgrass Extent


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway


 State Highway

 Roads

 Structures


 Ponds

Eelgrass

 Eelgrass Extent


Phosphorus Problem


Base Map

 Town Lines


 Rivers


Embayment Boundary

 On Land


 On Sea

Major Roads

 US Highway

 State Highway

 Roads

 Structures


 Ponds


Phosphorus


Priority Ponds

Trophic Status

 Eutrophic *Most Impacted*


 Mesotrophic

 Oligotrophic *Least Impacted*

 Not Interpreted


Title 5 Compliance Issues


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea

Major Roads

 US Highway


 State Highway


 Roads

 Structures


 Ponds


Existing Conditions

 Approx. Locations of Loans Issued for Title 5 Repair

 Potential Title 5 Compliance Issues

 Wastewater Treatment Facility

 Groundwater Discharge Points

 Sewered Parcels


Existing & Proposed Solutions



**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


Proposed Infrastructure


Base Map

 Town Lines


 Rivers


Embayment Boundary


 On Land


 On Sea

Major Roads

 US Highway

 State Highway

 Roads


 Structures

 Ponds

Proposed Conditions


Natural Attenuation Sites


 Bridge

 Culvert


 Inlet

 Pipe


 Sewer Alternatives


 Stormwater


CWMP Sewershed Phasing


 No Date Set


Phase Date

 2001 - 2010

 2011 - 2020

 2021 - 2030

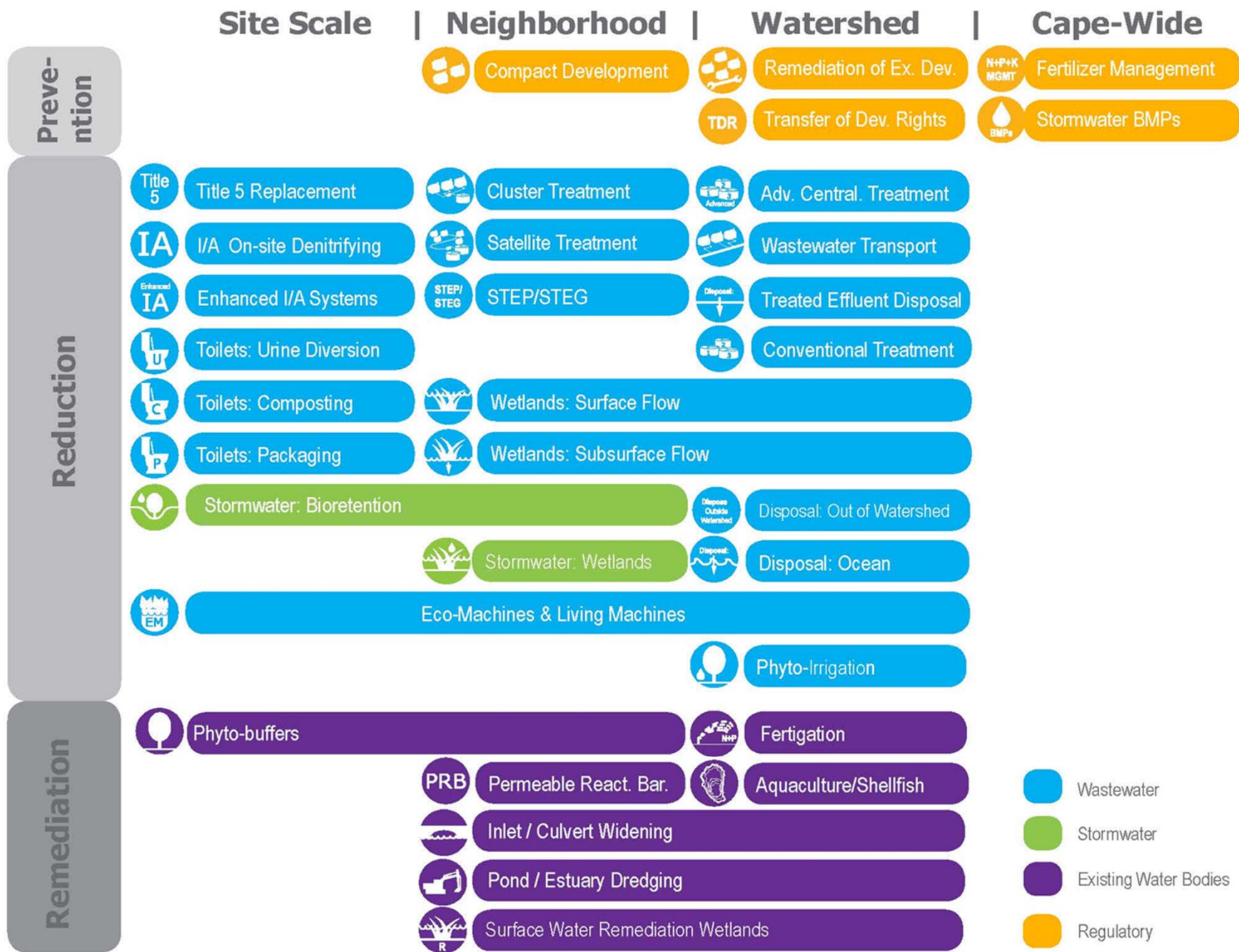
 2031 - 2040

 2041 - 2050



Framework for Addressing Solutions Moving Forward

**Pamet River
Wellfleet Harbor**



- Wastewater
- Stormwater
- Existing Water Bodies
- Regulatory

Alternatives: Screening Method

1
2
3
4
5
6
7



Wastewater



Existing Water Bodies



Regulatory

Targets/ Goals

Present Load: X kg/day **—** **Target:** Y kg/day **=** **Reduction Required:** N kg/day

Composite Target Areas

- A. High Nitrogen Reduction Areas
- B. Pond Recharge Areas
- C. Title 5 Problem Areas

Low Barrier to Implementation

- A. Fertilizer Management
- B. Stormwater Mitigation



Watershed/Embayment Options

- A. Permeable Reactive Barriers
- B. Inlet/Culvert Openings
- C. Constructed Wetlands
- D. Dredging



Alternative On-Site Options

- A. Eco-toilets (UD & Compost)
- B. I/A Technologies
- C. Enhanced I/A Technologies
- D. Shared Systems



Priority Collection/High-Density Areas

- A. Greater Than 1 Dwelling Unit/acre
- B. Village Centers
- C. Economic Centers
- D. Growth Incentive Zones



Supplemental Sewering



**All materials and resources for the 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