Dennis, Harwich, and Yarmouth

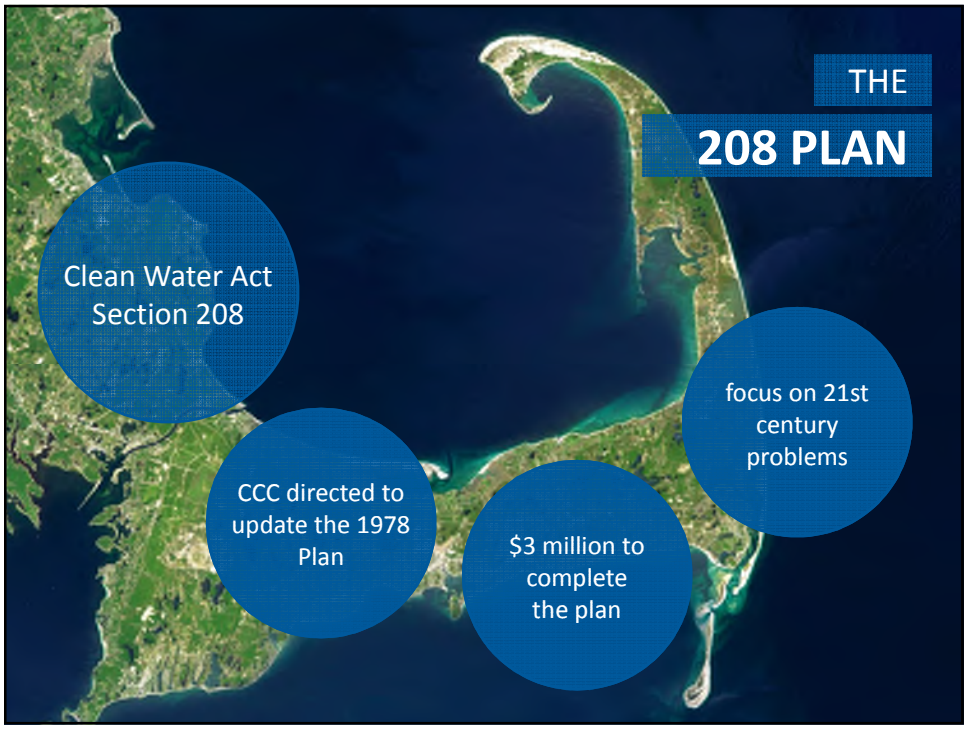
Community Partnership for Wastewater

David F. Young, P.E.
Vice President

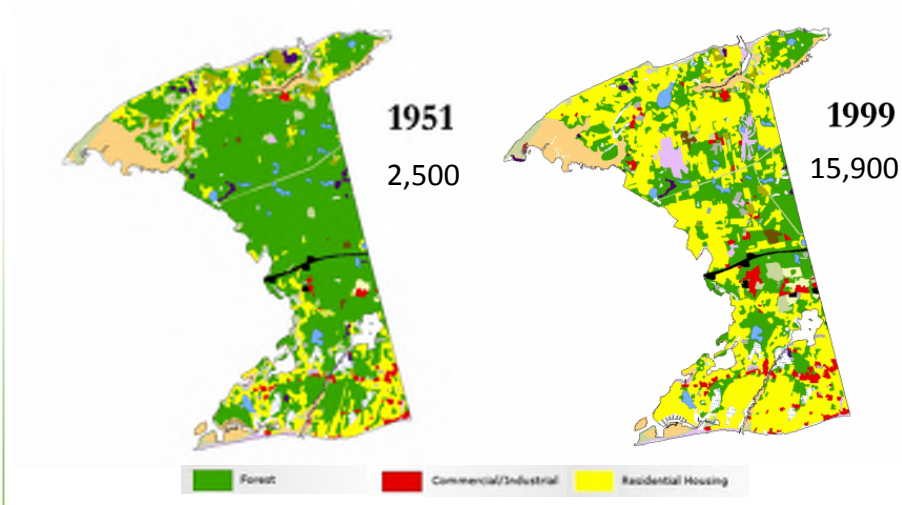
March 8, 2017

Presentation

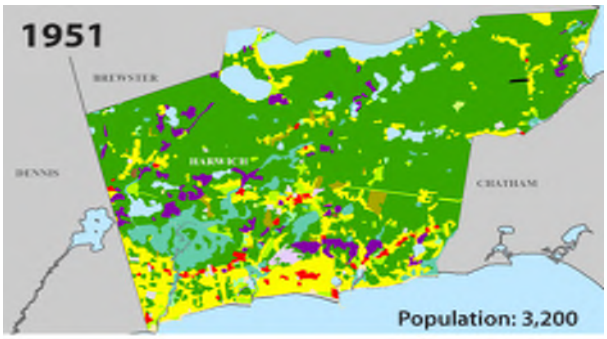
- Background on wastewater planning and 208 Plan
- Status of wastewater planning in each community.
- Community partnership concept.
- Preliminary results.
- Timeline for implementation.
- Summary.
- Questions/ Comments?

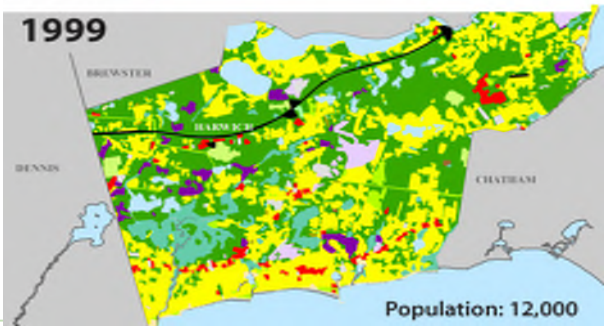


Dennis Population Increase: 600% over 50 years



Harwich Population Increase: 400% over 50 years





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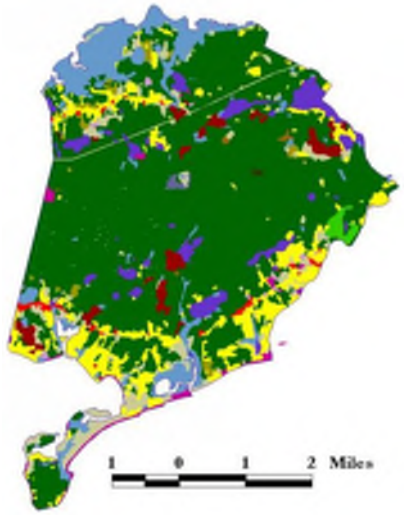
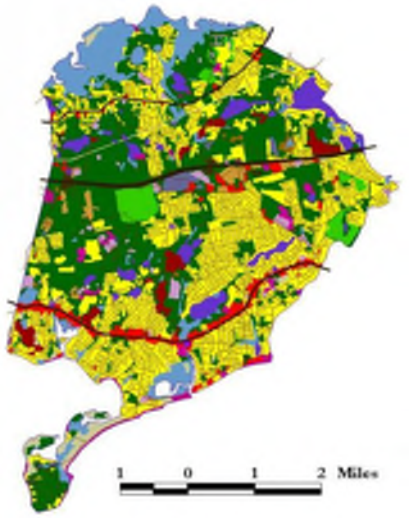
Yarmouth Population Increase: 700% over 50 years



1951 – Pop. 3,297



2010 – Pop. 23,793

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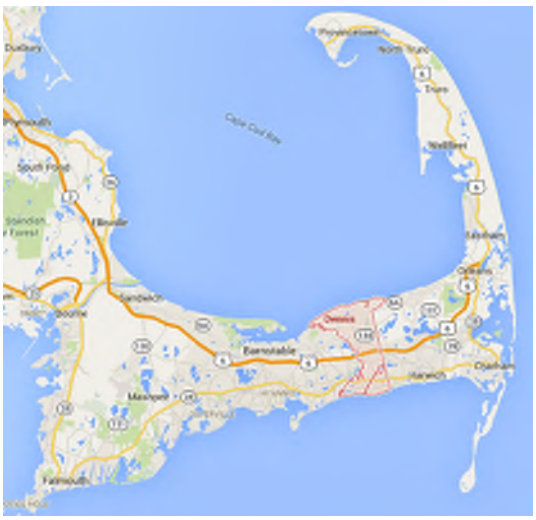
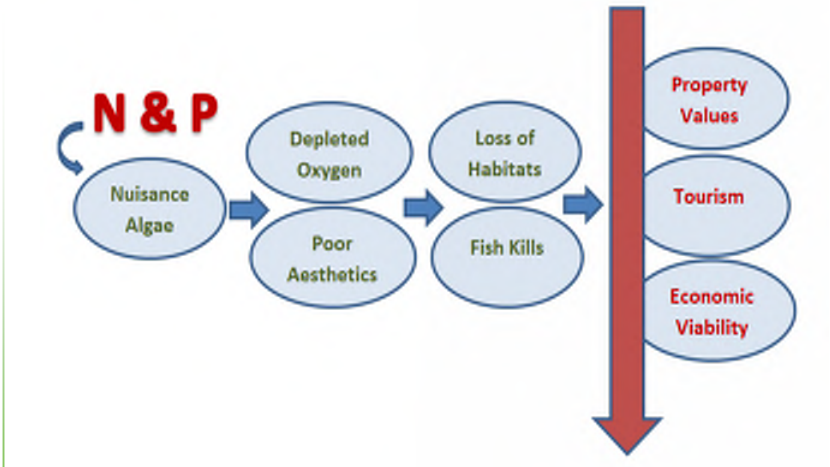
Cape Cod represents 4% of the state's population, but 20% of the state's septic systems.

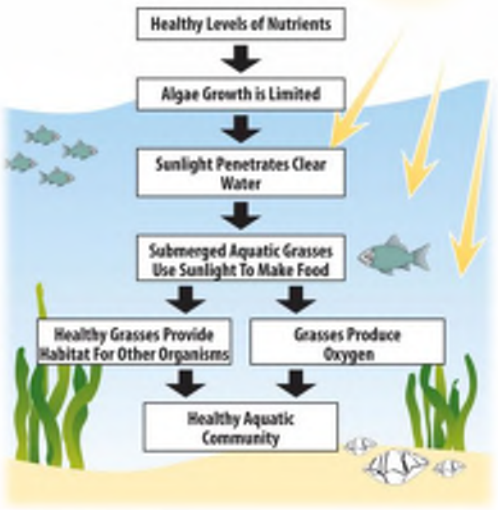


The Issue…



Beaches, Rivers, Harbors, and Ponds Are Severely Impacted By Nutrients

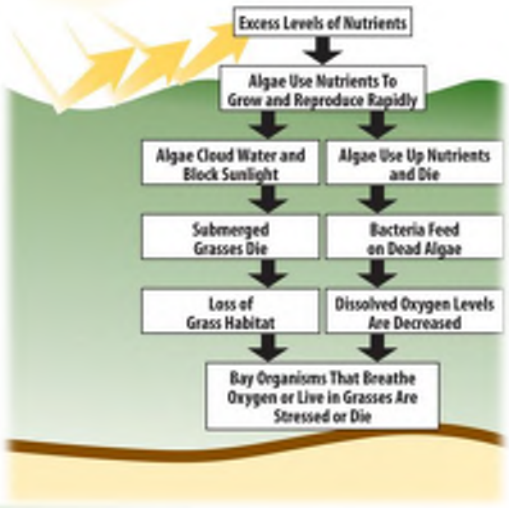
Healthy Nitrogen and Phosphorus Levels



Beaches, Rivers, Harbors, and Ponds Are Severely Impacted By Nutrients

Unhealthy Nitrogen and Phosphorus Levels

Algae in Swan Pond, Dennis



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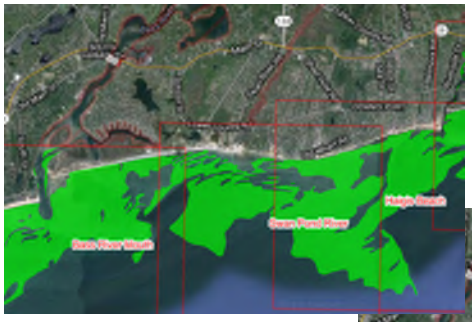
Eelgrass Loss in Dennis



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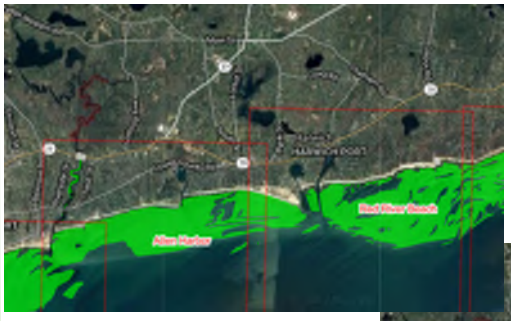
2010-13

MassDEP Eelgrass Mapping Project Viewer

Eelgrass Loss in Harwich



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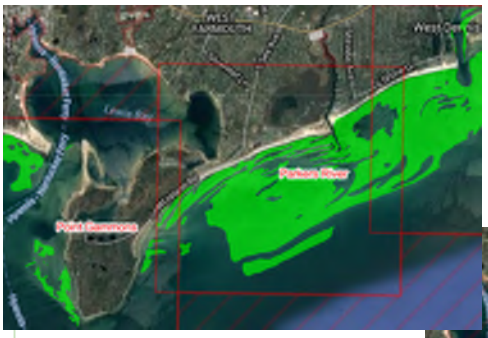
MassDEP Eelgrass Mapping Project Viewer

Eelgrass Loss in Yarmouth



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MassDEP Eelgrass Mapping Project Viewer

Dennis – Swan Pond Algae Bloom (Summer 2009)

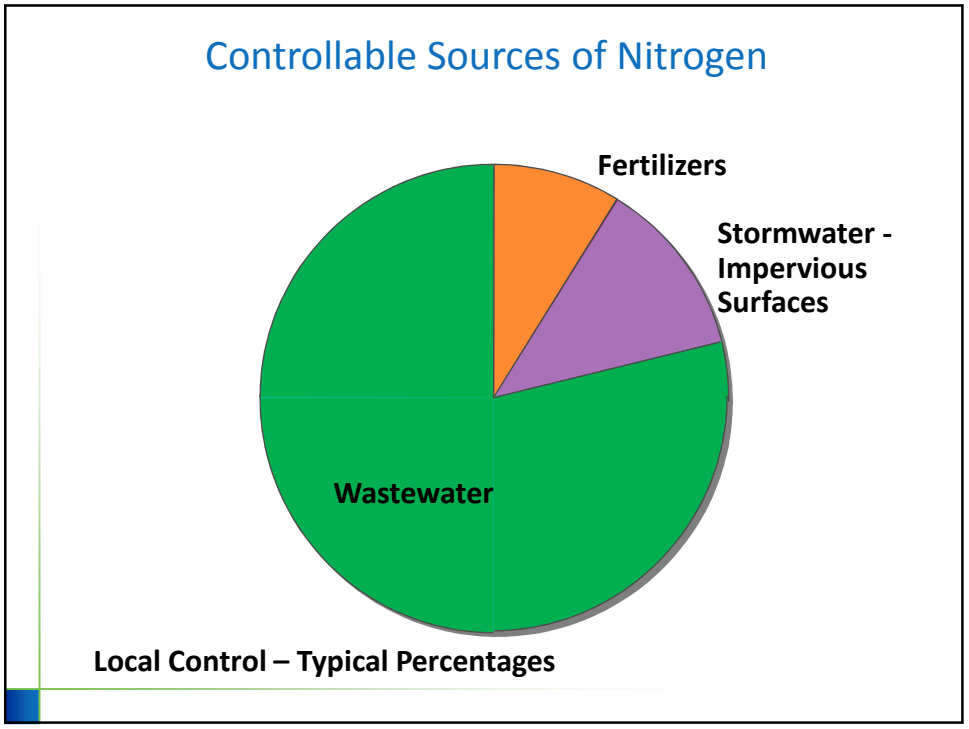
Harwich – Allen Harbor Algae Bloom (Summer 2007)

Yarmouth – Mill Creek Algae Bloom (2011) and Parkers River Fish Kill (2009)

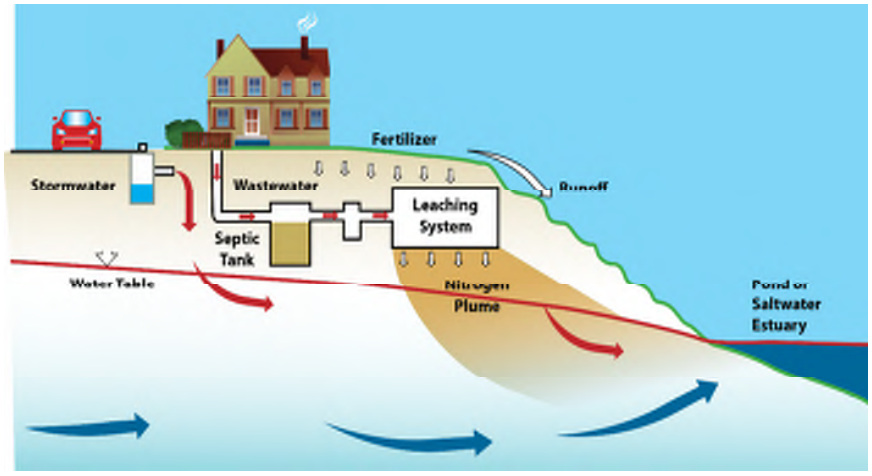
Mill Creek Algae Bloom May 2011

Parkers River Fish Kill July 2009


Site Scale
Neighborhood
Watershed
Cape-Wide
Nitrogen Removal Possibilities
Prevention
Reduction
Remediation
Remediation of Existing Development
Fertilizer Management
Transfer of Development Rights
Stormwater BMPs
Compact Development
Standard Title 5 Systems
Conventional Treatment
I/A Title 5 Systems
Cluster & Satellite Treatment Systems
Advanced Treatment
I/A Enhanced Systems
Wastewater Collection Systems
Effluent Disposal Systems
Toilets: Urine Diverting
Constructed Wetlands: Surface Flow
Toilets: Composting
Constructed Wetlands: Subsurface Flow
Toilets: Packaging
Stormwater: Bioretention / Soil Media Filters
Toilets: Incinerating
Stormwater: Wetlands
Phytoirrigation
Eco-Machines & Living Machines
Phytobuffers
Fertigation Wells
Permeable Reactive Barrier
Shellfish and Salt Marsh Habitat Restoration
Aquaculture/Shellfish Farming
Inlet / Culvert Widening
Pond and Estuary Dredging


Controllable Sources of Nitrogen
Fertilizers
Stormwater - Impervious Surfaces
Wastewater
Local Control – Typical Percentages

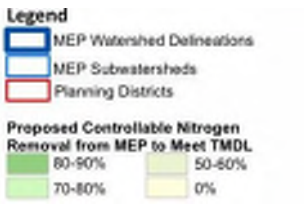
Nitrogen Entering Our Groundwater from Title 5 Septic Systems is Our Biggest Issue

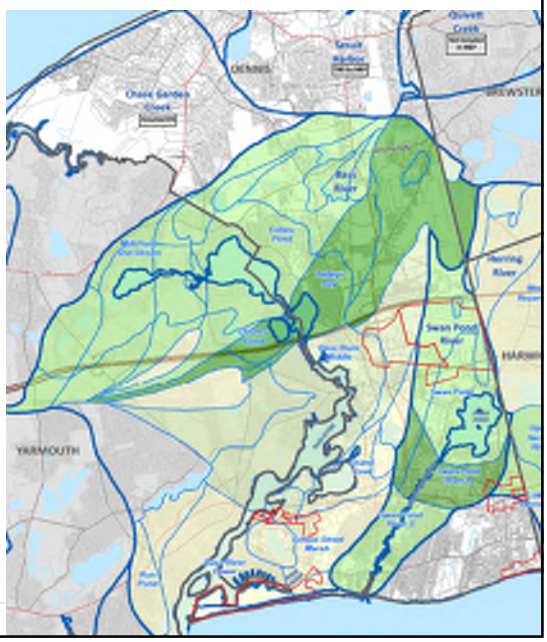


Dennis – Septic Nitrogen Removal Required

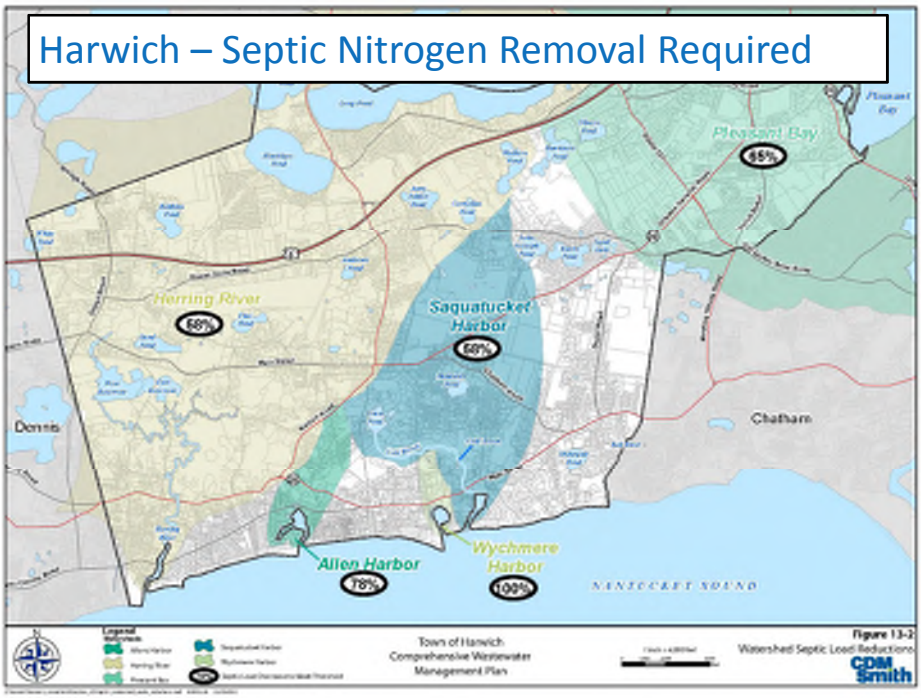
MEP Summary:
Required Nitrogen Removal by Sub-watershed

Includes:
- **Bass River**
- **Swan Pond River**
- **Herring River**

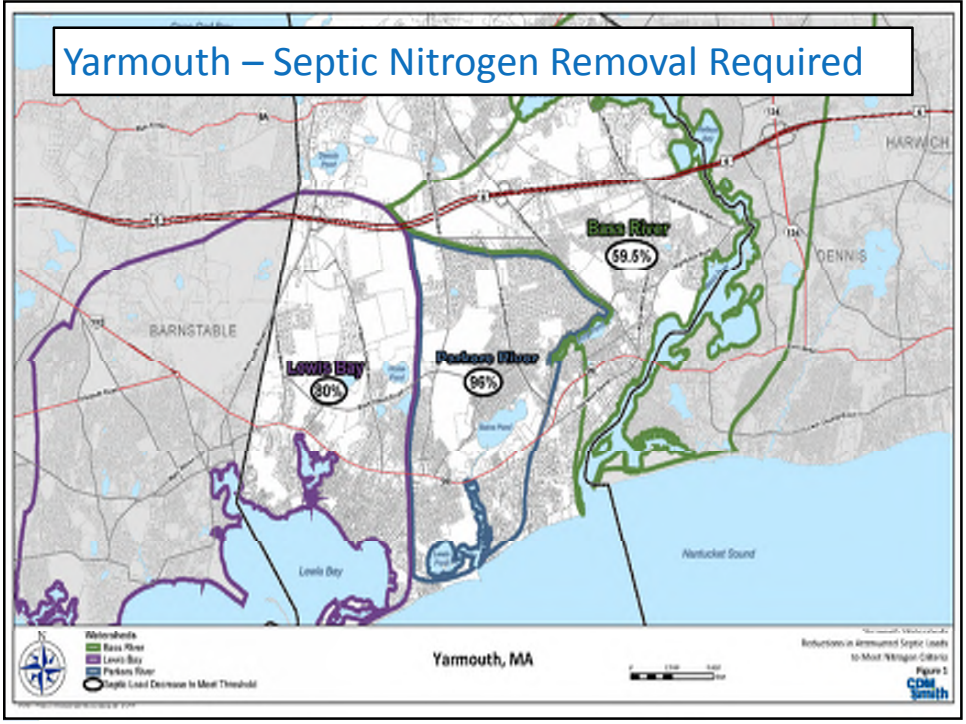




Harwich – Septic Nitrogen Removal Required



Yarmouth – Septic Nitrogen Removal Required



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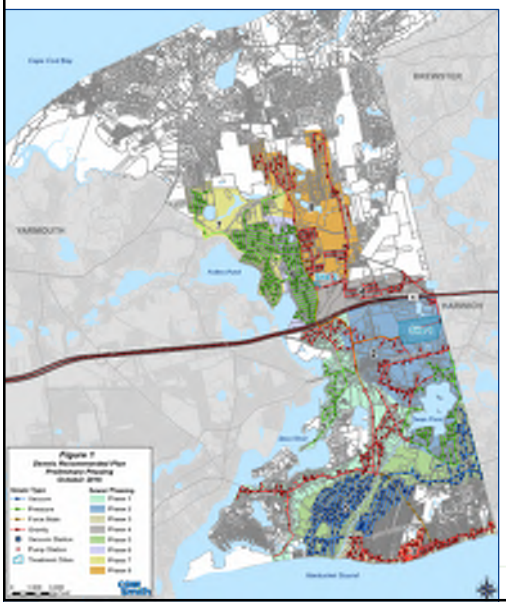
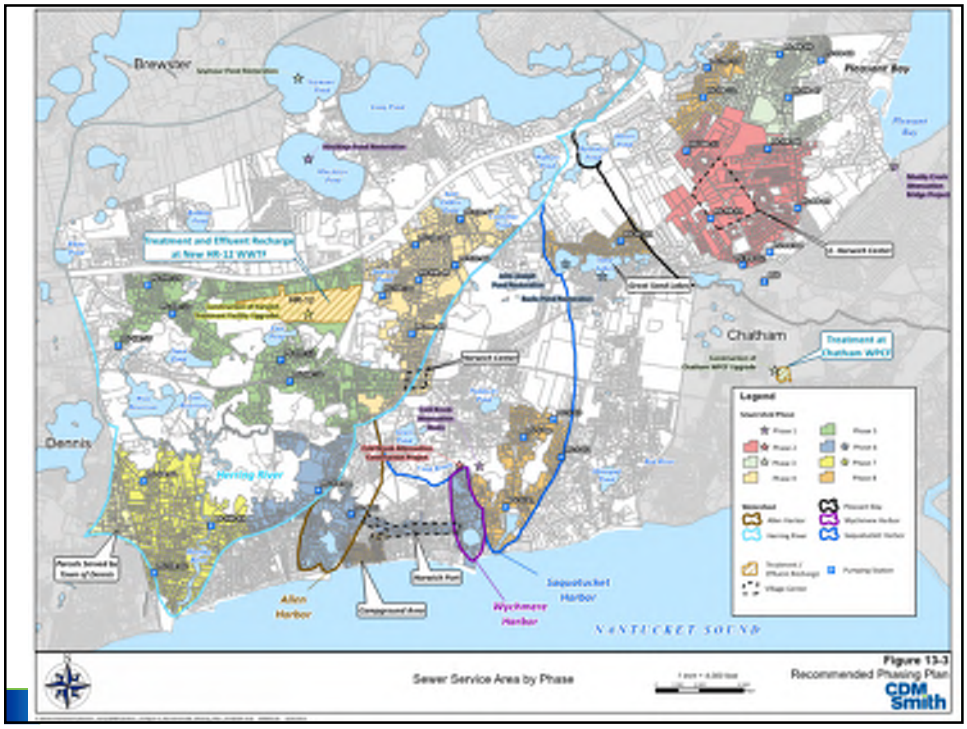
Dennis Recommended Wastewater Plan: Scenario 6A



- Scenario 6A was rated one of the top scenarios
- Meets MEP goals
- Meets other town goals: economic and community development
- $207 M – Capital Costs
- $ 7 M – O&M Costs
- Community partnership scenarios are built around Scenario 6A, allows for flexibility
- Consider Scenario 7A for future



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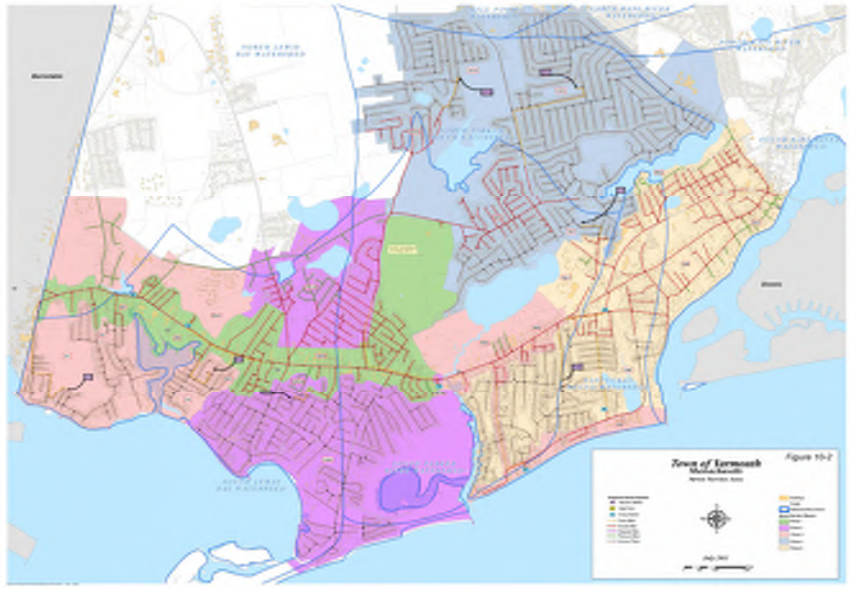
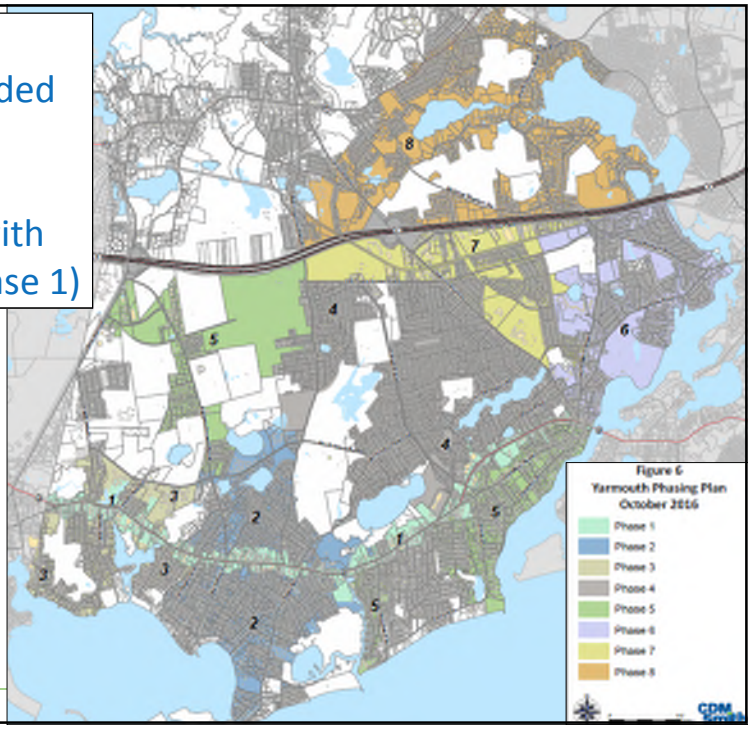
CWMP Recommended Program
Yarmouth Phasing

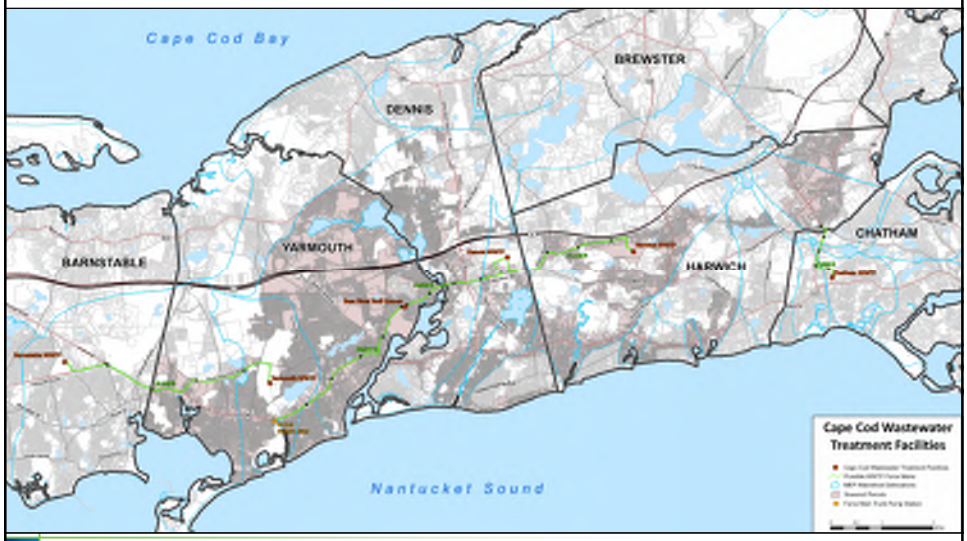


Yarmouth Recommended Program

(8 Phases with Revised Phase 1)

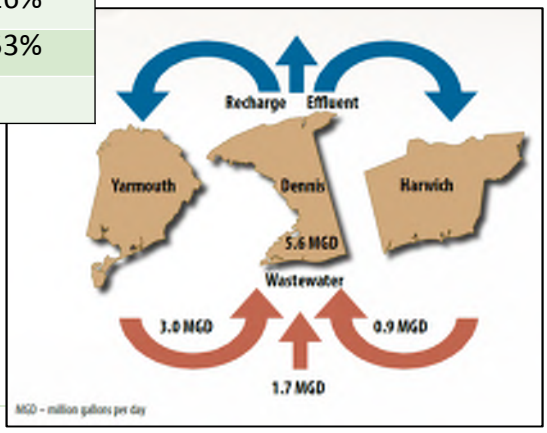


Potential Mid/Lower-Cape WWTFs: Hyannis, Yarmouth, Dennis, Harwich, Chatham

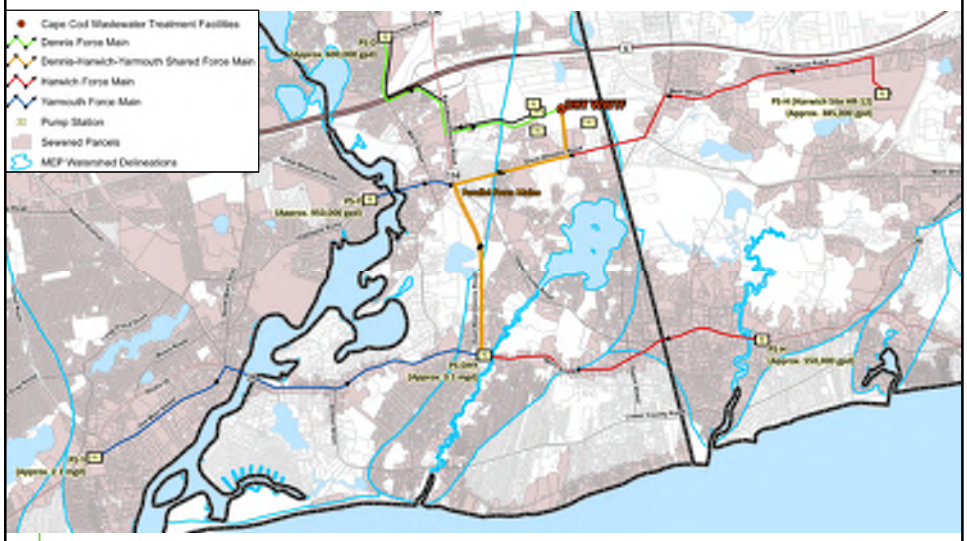


Wastewater Flow by Town

	Wastewater Flow at Buildout	% of DHY WWTF
Dennis	1.7 MGD	31%
Harwich	0.9 MGD	16%
Yarmouth	3.0 MGD	53%
Total	5.6 MGD	



Regional Conveyance: North and South Connections

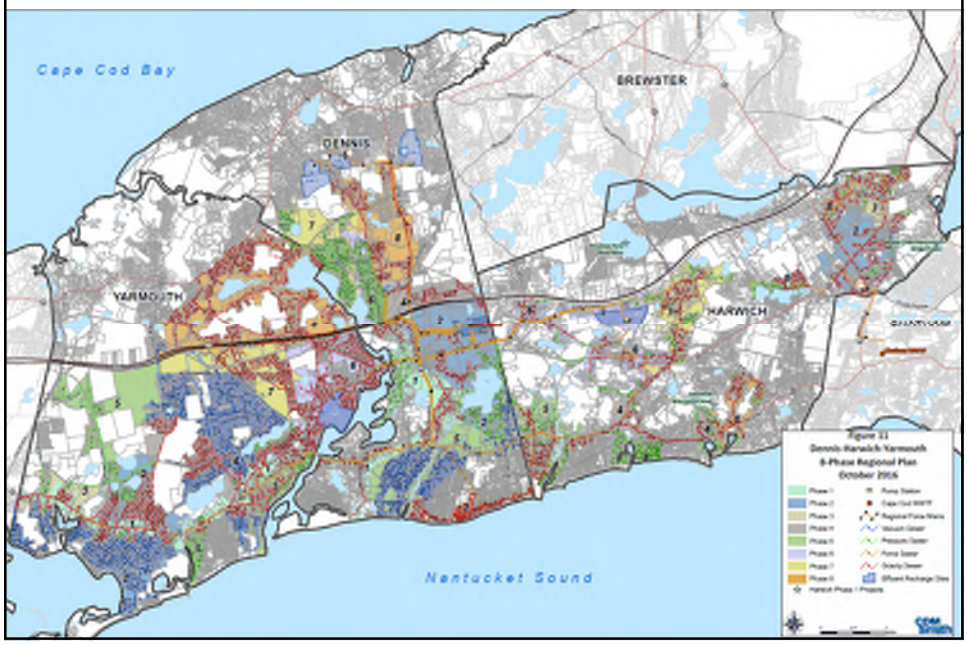


Summary of Shared Utilities

- A regional pumping station near the intersection of Route 28 and Route 134 in Dennis
- Dual 20-inch force mains from the intersection of Route 28 and Route 134 into the DHY WWTF
- DHY WWTF
- Piping to convey to multiple recharge sites
- Regional effluent recharge sites:
  - Dennis Site Nos. 1 and 2
  - Yarmouth Bass River Golf Course
  - Harwich Site HR-12
  - Dennis Pines Golf Course (Site No. 3)
  - Dennis Highland Golf Course (Site No. 5)
  - Dennis Parcels north and south of Hokum Rock Road (Site No. 4)

DHY WWTF at 120 Theophilis Smith Road, Dennis

DHY Community Partnership - Wastewater



DHY Regional Phasing Timeline

- Phase 1
  - Regional DHY WWTF Construction
  - Regional Pumping Station near Intersection of Route 28/Route 134
  - Regional Dual Force Mains to DHY WWTF
  - Dennis sewer system backbone on Route 28 West
  - Harwich Pleasant Bay sewer service area (to Chatham WPCF)
  - Yarmouth South Connection: Force Main along Route 28 in Dennis to connect Yarmouth's Rt28 sewer service area
- Phase 2
  - Dennis sewer system expansion
  - Harwich Pleasant Bay sewer service area (to Chatham WPCF)
  - Yarmouth sewer system expansion

DHY Regional Phasing Timeline (continued)

- Phase 3
  - Dennis and Yarmouth sewer system expansion
  - Harwich South Connection: PS & Force Main along Route 28 in Dennis to connect southern Harwich's sewer service area
- Phase 4
  - Regional DHY WWTF Expansion
  - Dennis sewer system expansion (north of Route 6)
  - Harwich sewer system backbone on Route 28 in Harwich
  - Yarmouth sewer system expansion

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DHY Regional Phasing Timeline (continued)

- Phase 5
  - Dennis, Harwich, and Yarmouth sewer system expansion
- Phase 6
  - Dennis sewer system expansion
  - Harwich North Connection: PS & Force Main on Great Western Road
  - Harwich sewer service expansion
  - Yarmouth North Connection: Force Main on Highbank Road
  - Yarmouth sewer service expansion
- Phases 7 and 8
  - Harwich sewer service expansion
  - Potential for Dennis/Yarmouth sewer service expansion

Town and Regional Preliminary Cost Comparison at Buildout

	Capital Costs		O&M Costs		Equivalent Annual Costs		Annual Savings	
	Town	Regional	Town	Regional	Town	Regional	$ Mil/year	%
Dennis	$207 M	$170 M	$7.0 M	$4.1 M	$16.3 M	$11.7 M	$4.6 M	28%
Harwich	$251 M	$211 M	$3.4 M	$2.4 M	$14.6 M	$11.8 M	$2.7 M	19%
Yarmouth	$342 M	$325 M	$9 M	$6.3 M	$24.2 M	$20.8 M	$3.4 M	14%

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Preliminary Costs for First Three Phases at Buildout

Fiscal Year	Dennis		Harwich		Yarmouth	
2017			Phase 1:	$2,600,000		
2018	Phase 0:	$375,000	Phase 2:	$34,150,000	Phase 0:	$200,000
2019	Phase 1:	$29,200,000			Phase 1:	$24,200,000
2019	Phase 1A:	$20,800,000	Phase 2A:	$9,000,000	Phase 1A:	$38,100,000
2023			Phase 3:	$13,700,000		
2024	Phase 2:	$21,900,000			Phase 2:	$38,300,000
2028	Phase 3:	$13,200,000	Phase 4:	$25,200,000	Phase 3:	$13,900,000

Cost Categories
Harwich completed natural nitrogen attenuation programs (Muddy Creek Bridge Widening and Cold Brook Study)
Dennis and Yarmouth Final CWMP Planning and Pilot Programs
Multiple services – Pleasant Bay sewer design and construction; Cold Brook
Design and Construction

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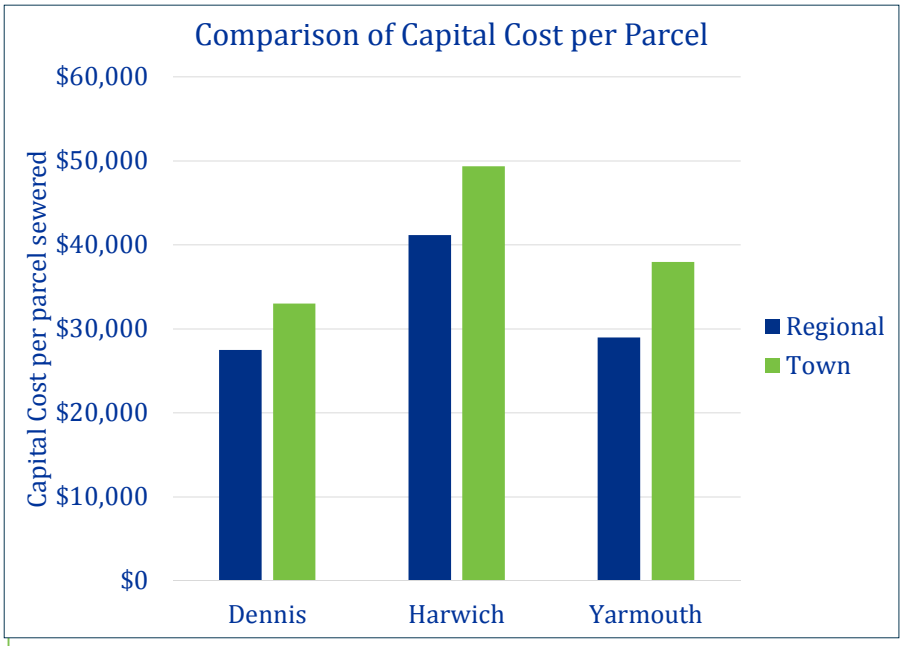

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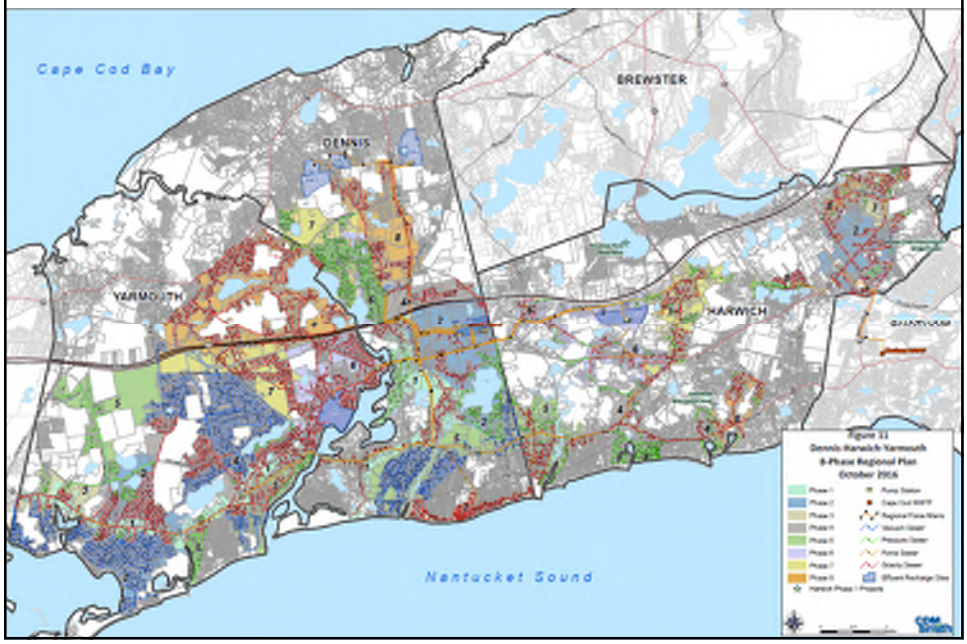
DHY Community Partnership - Wastewater



Summary: Advantages of Community Partnership Option

- Cost savings;
- Improve water bodies and overall aesthetics on the Cape;
- Work with regulators to meet watershed Total Maximum Daily Loads (TMDLs);
- Recharge effluent in beneficial locations (i.e., golf courses, washing stations);
- Operate and maintain the treatment facility and shared infrastructure with one staff;
- Address potential future treatment of contaminants of emerging concern (CECs);
- Simplifies governance for wastewater operations;
- Construction of sewers in commercial areas to promote desired economic development and smart growth; and
- Gain more points for State Revolving Fund (SRF) loan program to access low interest rates.

It's been done before…

- Drinking Water Systems in Dennis, Harwich, and Yarmouth all cost about what it will cost to implement the wastewater solution.
- Recent formation (2014) of the MFN Regional Wastewater District for the towns of Mansfield, Foxborough and Norton.

MassDEP Response Strategy

- Designation of Nitrogen Sensitive Areas ("NSAs")
  - Revise Title 5 Regulations.
  - Would require homeowners to install enhanced I/A septic systems (twice the cost of sewers per pound of nitrogen removed) if located in an NSA.
- Changes to Ground Discharge Permits and Regulations
  - Tighten current permit limits.
  - Remove Title 5 Exemption, requiring enhanced I/A septic systems.
- Formation of Water Pollution Abatement Districts ("WPADs")
  - DEP could form WPADs and require implementation of wastewater plans.

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The Consequences

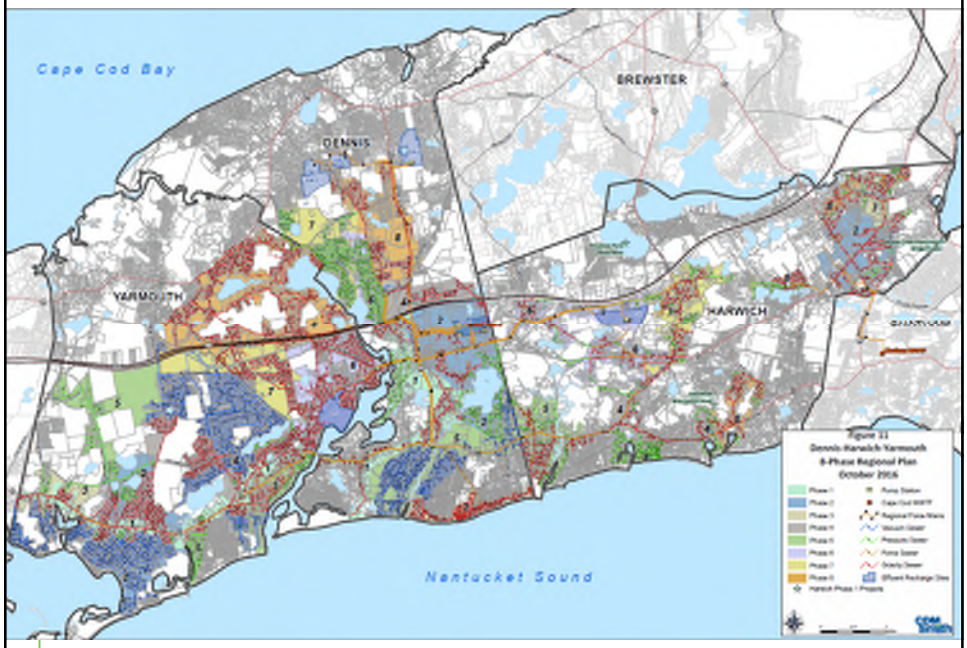
- "The cost of doing nothing is economically devastating to every Cape homeowner."

  -Cape Cod Commission, 208 Plan, 2014

- "A 1% decline in water quality led to an average loss in home value of 0.61%"

  -Cape Cod Commission, Three Bays Study, 2015

Questions/Comments?


Cape Cod Bay
BREWSTER
DENNIS
YARMOUTH
HARWICH
Nantucket Sound
Figure 11
Dennis-Yarmouth
8-Phase Regional Plan
October 2016