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CAPE COD  
COMMISSION

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**208 Area Wide Water Quality Management Plan Update  
Subregional Meetings  
Draft Agenda – Meeting 2**

**Meeting Goals:**

- **Understand the Triple Bottom Line analysis to evaluate scenario planning**
- **Identify key criteria for successful collaboration for shared watersheds and evaluate existing models against those criteria**
- **Clarify the scope and charge of the Ad Hoc Monitoring Committee to meet permitting requirements and water quality goals**
- **Visualize monitoring within an adaptive management approach**

- 8:30 Welcome & Review of 208 Goals  
Introductions, Agenda Overview & Goals of Today's Meeting
- 8:45 Scenario Planning
- *Overview of scenarios in all shared watersheds.*
  - *Use TBL model to discuss various options for each watershed.*
- 9:15 Regulatory, Legal, and Institutional Interactions
- *Review challenges and opportunities for collaboration across shared watersheds*
  - *Examine and evaluate tools for watershed collaboration from across the state*
- 10:45 Break
- 11:00 Implementation
- *Identify existing monitoring and proposed monitoring approaches for each of the technologies and monitoring in the water bodies for TMDL compliance.*
- 12:15 Public Comment
- 12:30 Adjourn



# Upper Cape Sub Regional Group



MEETING 2

# Standing Sub Regional Meeting Topics

Scenario  
Planning

Regulatory,  
Legal,  
Institutional

Implementation

Mtg. 1

One representative  
watershed

Challenges & opportunities  
associated with permitting the  
watershed scenario

Adaptive  
management plans

Mtg. 2

**All shared  
watersheds & TBL  
model**

**Tools to support  
intermunicipal cooperation**

**Monitoring**

Mtg. 3

Subregional scenarios  
& TBL model

Structures for permitting

Financing &  
affordability

# Standing Sub Regional Meeting Topics

Scenario  
Planning

Regulatory,  
Legal,  
Institutional

Implementation

## Meeting 2 Goals:

- Introduce the **Triple Bottom Line** analysis tool and its application to scenario planning
- Identify key criteria for **successful collaboration** for shared watersheds and evaluate existing models against the criteria
- Clarify the scope and charge of the **Ad Hoc Monitoring Committee** to meet permitting requirements and water quality goals
- Visualize **monitoring** within an adaptive management approach

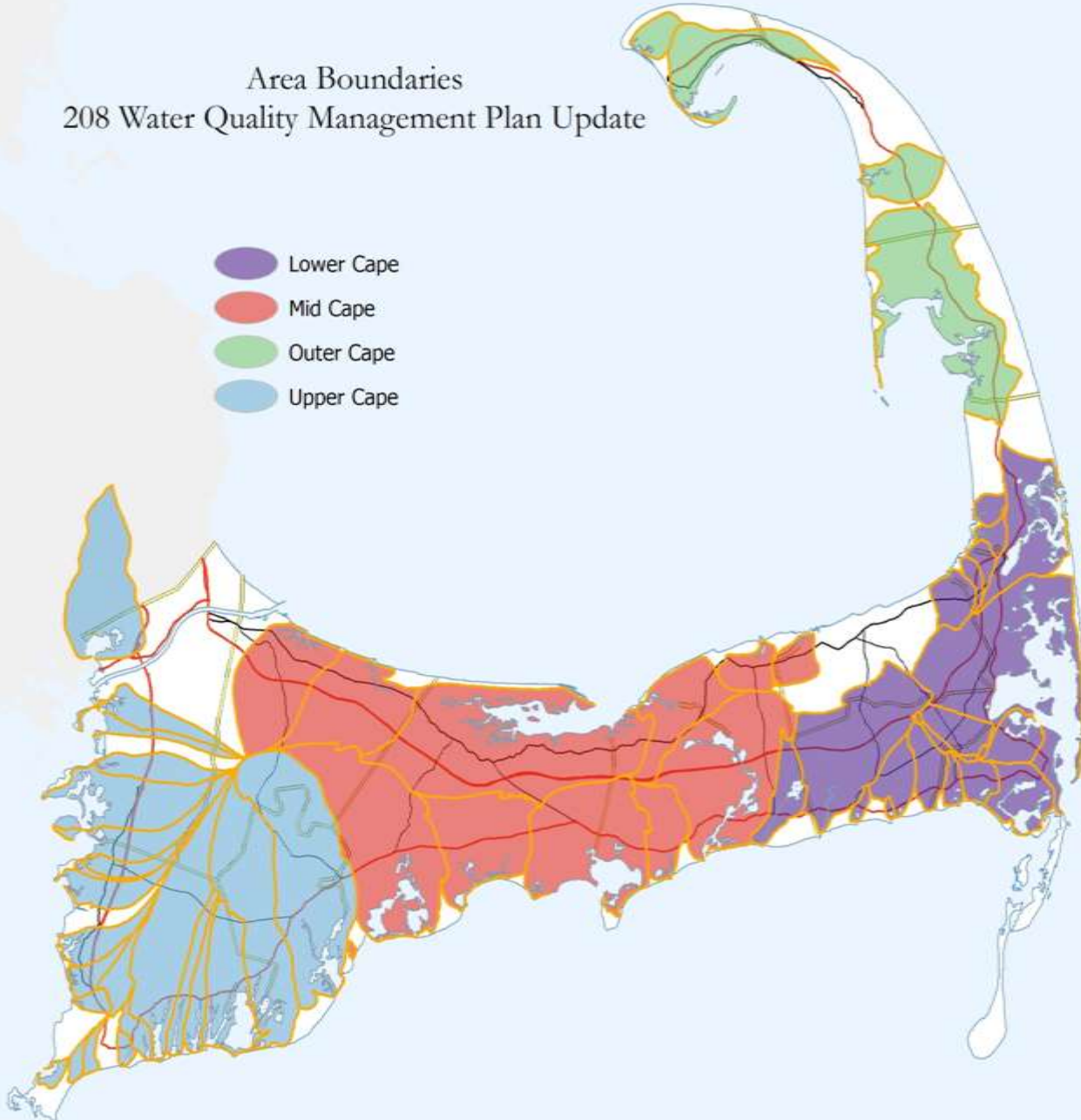
# Scenario Planning

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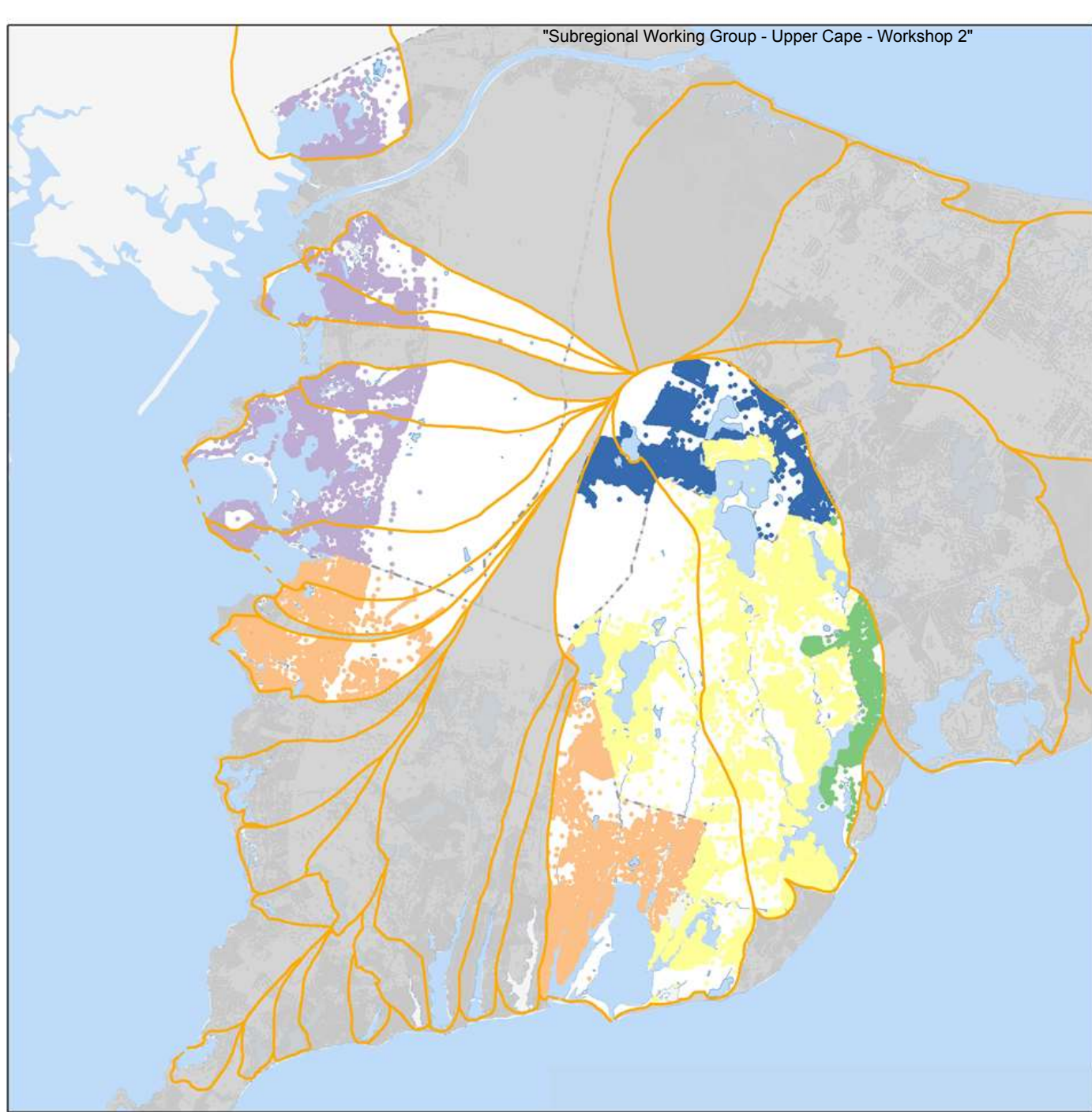
UPPER CAPE

# Area Boundaries 208 Water Quality Management Plan Update

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



- BARNSTABLE
- BOURNE
- FALMOUTH
- MASHPEE
- SANDWICH



**SUB-REGIONAL  
TRADITIONAL**

Centralized – Inside Watershed Solutions

<b>Collecting parcels:</b>	7,130 parcels
<b>Miles of collection:</b>	193 miles
<b>Flow:</b>	831,393 gallons per day



**SUB-REGIONAL  
TRADITIONAL**

50% Fertilizer/Stormwater Reduction

<b>Collecting parcels:</b>	5,187 parcels
<b>Miles of collection:</b>	148 miles
<b>Flow:</b>	595,262 gallons per day

**SUB-REGIONAL  
TRADITIONAL**

25% Removal for Non MEP Watersheds

<b>Collecting parcels:</b>	1,268 parcels
<b>Miles of collection:</b>	28 miles
<b>Flow:</b>	134,405 gallons per day

## **WAQUOIT BAY TRADITIONAL**

Centralized – Inside Watershed Solutions

<b>Collecting parcels:</b>	5,212 parcels
<b>Miles of collection:</b>	143 miles
<b>Flow:</b>	599,433 gallons per day

## **WAQUIOT BAY TRADITIONAL**

50% Fertilizer/Stormwater Reduction

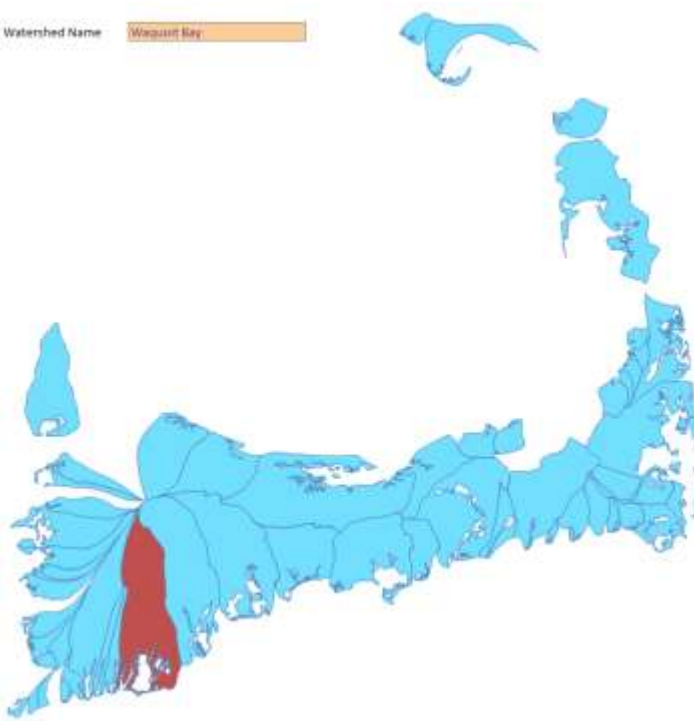
<b>Collecting parcels:</b>	4249 parcels
<b>Miles of collection:</b>	121 miles
<b>Flow:</b>	595,262 gallons per day

## WAQUOIT BAY NON-TRADITIONAL

- 4** Permeable Reactive Barriers
- 2** Fertigation Wells-Turf
- 1** Fertigation Wells-Bogs
- 5** Aquaculture
- 7** Floating Constructed Wetlands
- 177** Ecotoilets
- 725** Ecotoilets-Public (people)
- 389** I&A
- 90** Enhanced I&A

# WAQUOIT BAY TRIPLE BOTTOM LINE ASSESSMENT

Watershed Name **Waquoit Bay**



Key Inputs		Update	
	%	Existing	Future
Present Controllable Load of Nitrogen (Kg/yr)			
Wastewater	90%	30,962	42,797
Fertilizer	6%	2,064	2,853
Stormwater	4%	1,376	1,902
<b>Total</b>	<b>100%</b>	<b>34,402</b>	<b>47,552</b>

Target Setting	
Future Nitrogen Load (Kg/yr)	34,402
TMDL Target	53.4%
Target Nitrogen Load (Kg/yr)	16,031
<b>Nitrogen Reduction Required (Kg/yr)</b>	<b>18,371</b>




## Community Goals

Please set watershed-wide thresholds for the performance factors below. All scenarios for the watershed will be scored against these thresholds.


- 1 Development Buildout Timeframe**  **2033**  
The estimated time when Development in the watershed will reach capacity as planned by current zoning
- 2 Min. % of TMDL Goal achieved in 20 years**  **50%**  
The acceptable level of Nitrogen reduction for a viable scenario within a reasonable timeframe
- 3 Max. % of MHI as 208 Plan Wastewater Management Fee**  **7%**  
The acceptable burden on households measured as a % of Median Household Income (MHI)
- 4 Max. average Capital Cost of On-Site Improvement per HH**  **\$14,000**  
The acceptable burden on households investing in 208 plan related on-site improvements
- 5 Min. % of Properties in Watershed improving in Value**  **20%**  
The minimum % of properties expected to gain in value due to 208 plan improvements
- 6 Min. % of High Quality Habitat Created in Watershed**  **3%**  
The minimum % of high quality habitat being added to the existing habitat areas with the watershed
- 7 Min. % of GHG Emission Reduction from Wastewater sector**  **4%**  
The minimum % reduction of GHG compared to 2002 levels from wastewater sector
- 8 Min. % New Jobs Created in Watershed**  **2%**  
The minimum % of new jobs created in the construction, maintenance and rate-payer sectors
- 9 Min. Concentration Reduction of Phosphorous**  **18 Kg/SF**  
The minimum amount of phosphorous concentration reduction in fresh water ponds (Kg/Acre/Yr)
- 10 Min. % of TMDL Target Achievement 20.4 Years**  **50%**  
The minimum extent to which a scenario achieves TMDL target in a specific time frame
- 11 Min. % Number of Property Gains Property Value**  **7%**  
The minimum % of number of properties estimated to be increase in property value with the watershed
- 12 Min. % Value of Property Gain Property Value**  **6%**  
The minimum % of total property values of properties estimated to be increase in property value with the
- 13 Min Extent of Development Areas Best Suited For Growth**  **90%**  
The minimum extent to which a Scenario guides development to areas best suited for growth

# SCENARIO 1 : Maximizing Sewer Option



## Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



HOME
MODEL INPUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology: S1. Sewering - Sewershed #1 + - ↺ ↻

Select a Location (Watershed): Waquoit Bay      SCENARIO NAME: Sewer Only ↺ ↻ ↻ ↻ ↻ ↻

**Current Application Stack: 1 Strategies/Technologies**

+ Sewering Options

→ S1 Sewering (Sewershed #1)

from Selection	
Total Number of Properties	4717
Land Area (acres)	5686.7
Existing Nitrogen Load (Kg/yr)	20554.6
Future Nitrogen Load (Kg/yr)	20554.6
Properties Already Sewered	2
Application Suitability	4,715
<b>% Selected</b>	<b>100%</b>
<b>Properties Impacted</b>	<b>4717</b>
<b>Land Area Impacted</b>	<b>5,686.7</b> acre
<b>Future Nutrient Load Impacted</b>	<b>20,554.6</b> Kg/yr
<b>Collection Systems</b>	<b>Quantity</b>
Man Sewer	469,402 linear feet
Sewer Laterals	235,850 linear feet
Force Man	1 miles
Pump Station	2 Each
On-Site Pump Station	Each
STED - Collector	Linear Foot
STEP - Collector	
Force Man	Linear Foot
On-Site Pump Station	Each
Interior Plumbing Reconfiguration	Each
<b>Treatment Systems</b>	
Treatment System Included	Yes
Location (within/outside watershed)	within
% capacity for sewershed	100%
Treatment Facility Type	Advanced
<b>Effluent Disposal</b>	<b>Quantity</b>
Infiltration Basins	Square Foot
Soil Absorption System (SAS)	Square Foot
Injection Well	Each
Wick Well	Each
Ocean Outfall	Linear Foot
Effluent Transport out of Watershed	Linear Foot

[Clear Selection](#)

**View Scenario Overview**


View Technology Performance

Compare Technologies

Impacted Area
5,687 Acres
4,717 Properties
4,715 Septic Systems

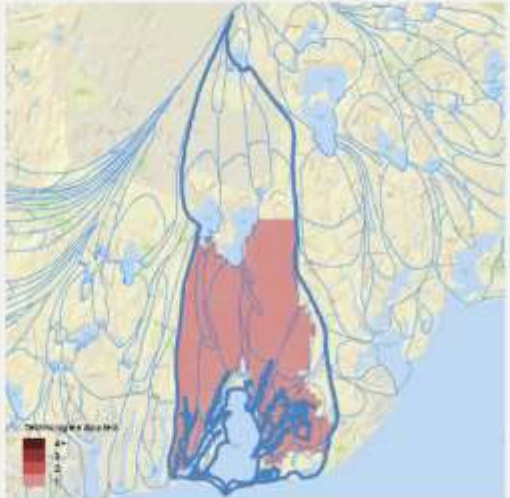
**SCENARIO PERFORMANCE**

Time Slider: [0] [10] [20] [30] [40] [50] Years



N Load Reduced: 16,763 Kg/yr      N Load Remaining: 17,630Kg/yr


TRIPLE BOTTOM LINE ASSESSMENT




**COMMUNITY IMPACTS SUMMARY**

Quality Habitat Created	0	acres
GHG Reduced	430.2	MT CO2e/yr
N Reduction Rate Ratio on Sea Level Rise	1	%
% Properties Increase in Property Value	55	%
New Employment added	53	jobs
Additional Cost per Household	\$188/yr	

# SCENARIO 1 : Maximizing Sewer Option



**Triple Bottom Line (TBL) Assessment Model**  
Environmental + Social + Financial Sustainability



HOME
MODEL INPUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology:

f
S1. Sewering - Sewershed #1
+
-
↺

Select a Location (Watershed)

Waquoit Bay

SCENARIO NAME: Sewer Only

**Current Application Stack: 1 Strategies/Technologies**

+ Sewering Options

→ S1 Sewering (Sewershed #1)

	from Selection	
Total Number of Properties	4717	
Land Area (acres)	5686.7	
Existing Nitrogen Load (Kg/yr)	20554.6	
Future Nitrogen Load (Kg/yr)	20554.6	
Properties Already Sewered	2	
Application Suitability	4,715	
% Selected	100%	
Properties Impacted	4717	
Land Area Impacted	5,686.7	acre
Future Nutrient Load Impacted	20,554.6	Kg/Yr
<b>Collection Systems</b>		
Man Sewer	469,402	linear feet
Sewer Laterals	235,850	linear feet
Force Man	1	miles
Pump Station	2	Each
On-Site Pump Station		Each
STEG - Collection		Linear Foot
STEP - Collection		
Force Man		Linear Foot
On-Site Pump Station		Each
Interior Plumbing Reconfiguration		Each
<b>Treatment Systems</b>		
Treatment System Included	Yes	
Location (within/outside watershed)	within	
% capacity for sewershed	100%	
Treatment Facility Type	Advanced	
<b>Effluent Disposal</b>		<b>Quantity</b>
Infiltration Basins		Square Foot
Soil Absorption System (SAS)		Square Foot
Injection Well		Each
Wick Well		Each
Ocean Outfall		Linear Foot
Effluent Transport out of Watershed		Linear Foot

[Clear Selection](#)

View Scenario Overview
View Technology Performance
Compare Technologies

**Impacted Area**    5,687 Acres    4,717 Properties    4,715 Septic Systems

SCENARIO PERFORMANCE



N Load Reduced: 16,763 Kg/yr    N Load Remaining: 17,839Kg/yr

TRIPLE BOTTOM LINE ASSESSMENT

**FINANCIAL**

SS F2

F1



**ENVIRONMENTAL**

E3 E2

**SOCIAL**

S1 S2 S3 S4 S5 S6 S7

E4 E1

**ENVIRONMENTAL**

E1 Marine Water Quality    E2 Fresh Water Quality    E3 Habitat    E4 Climate

**SOCIAL**

S1 Municipal Costs    S2 Direct Costs to System Users


COMMUNITY IMPACTS SUMMARY

Quality Habitat Created	0	acres
GHG Reduced	430.2	MT CO2e/Yr
N Reduction Risk Ratio on Sea Level Rise	1	%
% Properties Increase in Property Value	69	%
New Employment added	59	jobs
Additional Cost per Household	\$/HH/Yr	

Note: TBL Financial Indicators Not Shown



# SCENARIO 2 : Reduced Sewershed



## Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



HOME
MODEL INPUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology:

f
S1. Sewering - Sewershed #1
+
-
↺

Select a Location (Watershed)

f
Wauquoit Bay

SCENARIO NAME: Reduced Sewer

Current Application Stack: 1 Strategies/Technologies

+ Sewering Options

→ S1 Sewering (Sewershed #1)

	from Selection	
Total Number of Properties	3633	
Land Area (acres)	4672.4	
Existing Nitrogen Load (Kg/yr)	16701.3	
Future Nitrogen Load (Kg/yr)	16701.3	
Properties Already Sewered	2	
Application Suitability	3,631	
% Selected	100%	
Properties Impacted	3633	
Land Area Impacted	4,672.4	acre
Future Nutrient Load Impacted	16,701.3	Kg/Yr
<b>Collection Systems</b>	<b>Quantity</b>	
Man Sewer	374,686	linear feet
Sewer Laterals	181,650	linear feet
Force Main	1	miles
Pump Station	1	Each
On-Site Pump Station		Each
STEIG - Collection		Linear Foot
STEP - Collection		
Force Main		Linear Foot
On-Site Pump Station		Each
Interior Plumbing Reconfiguration		Each
<b>Treatment Systems</b>		
Treatment System Included	Yes	
Location (within/outside watershed)	within	
% capacity for sewershed	100%	
Treatment Facility Type	Advanced	
<b>Effluent Disposal</b>	<b>Quantity</b>	
Infiltration Basins		Square Foot
Soil Absorption System (SAS)		Square Foot
Injection Well		Each
Wick Well		Each
Ocean Outfall		Linear Foot
Effluent Transport out of Watershed		Linear Foot



[View Selection](#)

View Scenario Overview
View Technology Performance
Compare Technologies

Impacted Area: **4,672** Acres


Properties: **3,633**

Septic Systems: **3,631**

### SCENARIO PERFORMANCE


Time Slider: ← → Years



— N Remaining   
 — N Reduction   
 - - - TMDL Target   
 | Buildout

N Load Reduced: 13,449 Kg/yr   
 N Load Remaining: 20,953kg/yr


### TRIPLE BOTTOM LINE ASSESSMENT



#### COMMUNITY IMPACTS SUMMARY


Quality Habitat Created	0	acres
GHG Reduced	353.1	MT CO <sub>2</sub> e/yr
N Reduction Risk Ratio on Sea Level Rise	1	%
% Properties Increase in Property Value	61	%
New Employment added	95	jobs
Additional Cost per Household	\$144/yr	

# SCENARIO 2 : Reduced Sewershed



## Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



HOME
MODEL #PUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology:

f
S1. Sewering - Sewershed #1
+
-
↺

Select a Location (Watershed)

SCENARIO NAME:

**Current Application Stack: 1 Strategies/Technologies**

+ Sewering Options

→ S1 Sewering (Sewershed #1)

		from Selection
Total Number of Properties		3633
Land Area (acres)		4672.4
Existing Nitrogen Load (Kg/yr)		16701.3
Future Nitrogen Load (Kg/yr)		16701.3
Properties Already Sewered		2
Application Suitability		3,631
% Selected		100%
Properties Impacted		3633
Land Area Impacted		4,672.4
Future Nutrient Load Impacted		16,701.3
Collection Systems	Quantity	
Main Sewer	374,686	linear feet
Sewer Laterals	181,650	linear feet
Force Main	1	miles
Pump Station	1	Each
On-Site Pump Station		Each
STEP - Collection		Linear Foot
STEP - Collection		Linear Foot
Force Main		Linear Foot
On-Site Pump Station		Each
Interior Plumbing Reconfiguration		Each
Treatment Systems		
Treatment System Included	Yes	
Location (within/outside watershed)	within	
% capacity for sewerwired	100%	
Treatment Facility Type	Advanced	
Effluent Disposal	Quantity	
Infiltration Basins		Square Foot
Soil Absorption System (SAS)		Square Foot
Injection Well		Each
Wick Well		Each
Ocean Outfall		Linear Foot
Effluent Transport out of Watershed		Linear Foot

View Scenario Overview
View Technology Performance
Compare Technologies

**Impacted Area**

4,672 Acres

3,633 Properties

3,631 Septic Systems

TRIPLE BOTTOM LINE ASSESSMENT

FINANCIAL
SOCIAL

**ENVIRONMENTAL**

- S1: System Resilience
- S2: Employment
- S3: Resilient Distribution
- S4: Tourism
- S5: Property Values
- S6: Tax Revenue
- S7: Land Use Compatibility

**ENVIRONMENTAL**

- E1: Marine Water Quality
- E2: Fresh Water Quality
- E3: Habitat
- E4: Climate

**FINANCIAL**

- F1: Municipal Costs
- F2: Direct Costs to System Users

COMMUNITY IMPACTS SUMMARY

Quality Habitat Created	0	acres
GHG Reduced	353.1	MT CO2e/yr
N Reduction Risk Ratio on Sea Level Rise	1	%
% Properties Increase in Property Value	51	%
New Employment added	56	jobs
Additional Cost per Household	\$4M/yr	

Note: TBL Financial Indicators Not Shown

# SCENARIO 3 : Alternate Technology

## Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability

HOME
MODEL INPUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology

Select a Location (Watershed)

SCENARIO NAME: Alternate Technology Applications

A4. I/A Systems

Waquoit Bay

**Current Application Stack: 7 Strategies/Technologies**

- Watershed Options**
  - W1 Permeable Reactive Barriers (PRBs)
  - W7 Aquaculture/Shellfish
  - W9 Fertigation Wells
  - W15 Floating Constructed Wetlands
- Alternative On-Site Options**
  - A1 Toilets: Composting
  - A4 IA Systems

**IA**

	from Selection
Total Number of Properties	909
Land Area (acres)	785.9
Existing Nitrogen Load (Kg/yr)	3749.2
Future Nitrogen Load (Kg/yr)	3749.2
Properties Already Sewered	0
Application Suitability	909
% Selected	89%
Properties Impacted	642
Land Area Impacted	410.9
Future Nutrient Load Impacted	3,541.8 Kg/yr

Clear Selection

View Scenario Overview
View Technology Performance
Compare Technologies

**Impacted**    3,291 Acres    2,757 Properties    2,756 Septic Systems

**SCENARIO PERFORMANCE**

Time Slider: 50 Years

N Load Reduced: 17,142 Kg/yr    N Load Remaining: 17,261 Kg/yr


**TRIPLE BOTTOM LINE ASSESSMENT**

**COMMUNITY IMPACTS SUMMARY**

Quality Habitat Created	0.3 acres
GHG Reduced	87.9 MT CO2e/yr
N Reduction Risk Ratio on Sea Level Rise	0%
% Properties Increase in Property Value	30%
New Employment added	45 jobs
Additional Cost per Household	18/HH/yr




# SCENARIO 3 : Alternate Technology



## Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability




HOME
MODEL INPUTS
CRITERIA EVALUATION
SCENARIO BUILDER
COMPARE SCENARIOS
TBL DATABASE

Select to add/remove/edit a strategy/technology: A4. I/A Systems + - ↺ ↻

Select a Location (Watershed): Waquoit Bay      SCENARIO NAME: Alternate Technology Applications

**Current Application Stack: 7 Strategies/Technologies**

- Watershed Options**
  - W1 Permeable Reactive Barriers (FRBs)
  - W7 Aquaculture/Shellfish
  - W9 Fertigation Wells
  - W15 Floating Constructed Wetlands
- Alternative On-Site Options**
  - A1 Toilets: Composting
  - A4 IA Systems



	from Selection
Total Number of Properties	909
Land Area (acres)	785.9
Existing Nitrogen Load (Kg/yr)	3749.2
Future Nitrogen Load (Kg/yr)	3749.2
Properties Already Sewered	0
Application Suitability	909
% Selected	89%
Properties Impacted	642
Land Area Impacted	410.9
Future Nutrient Load Impacted	3,541.8 Kg/yr


[Clear Selection](#)

A5 IA Enhanced Systems

View Scenario Overview
View Technology Performance
Compare Technologies

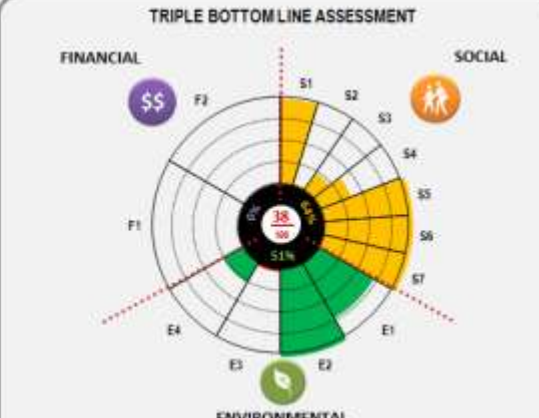
**Impacted**    3,291 Acres    2,757 Properties    2,756 Septic Systems

SCENARIO PERFORMANCE



N Load Reduced: 17,142 Kg/yr      N Load Remaining: 17,261 Kg/yr

**TRIPLE BOTTOM LINE ASSESSMENT**



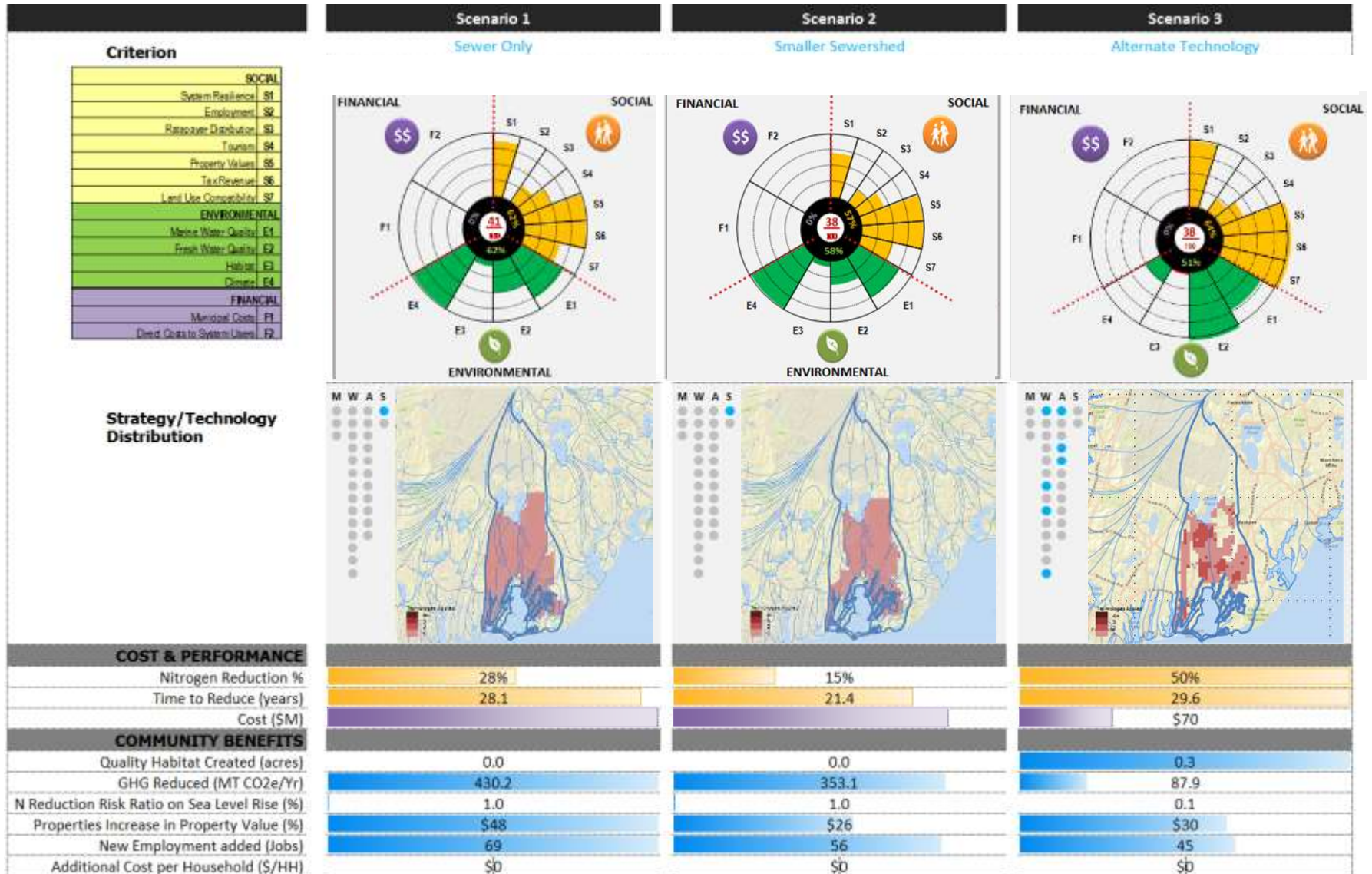
**FINANCIAL**  
 S1 System Resilience    F1 Municipal Costs  
 S2 Employment        F2 Direct Costs to System Users  
 S3 Roleplayer Distribution    F3  
 S4 Tourism                F4  
 S5 Property Values        F5  
 S6 Tax Revenue            F6  
 S7 Land Use Compatibility    F7

COMMUNITY IMPACTS SUMMARY

Quality Habitat Created	0.3 acres
GHG Reduced	87.9 MT CO2e/yr
N Reduction Risk Ratio on Sea Level Rise	0%
% Properties Increase in Property Value	30%
New Employment added	45 jobs
Additional Cost per Household	\$/HH/yr

Note: TBL Financial Indicators Not Shown

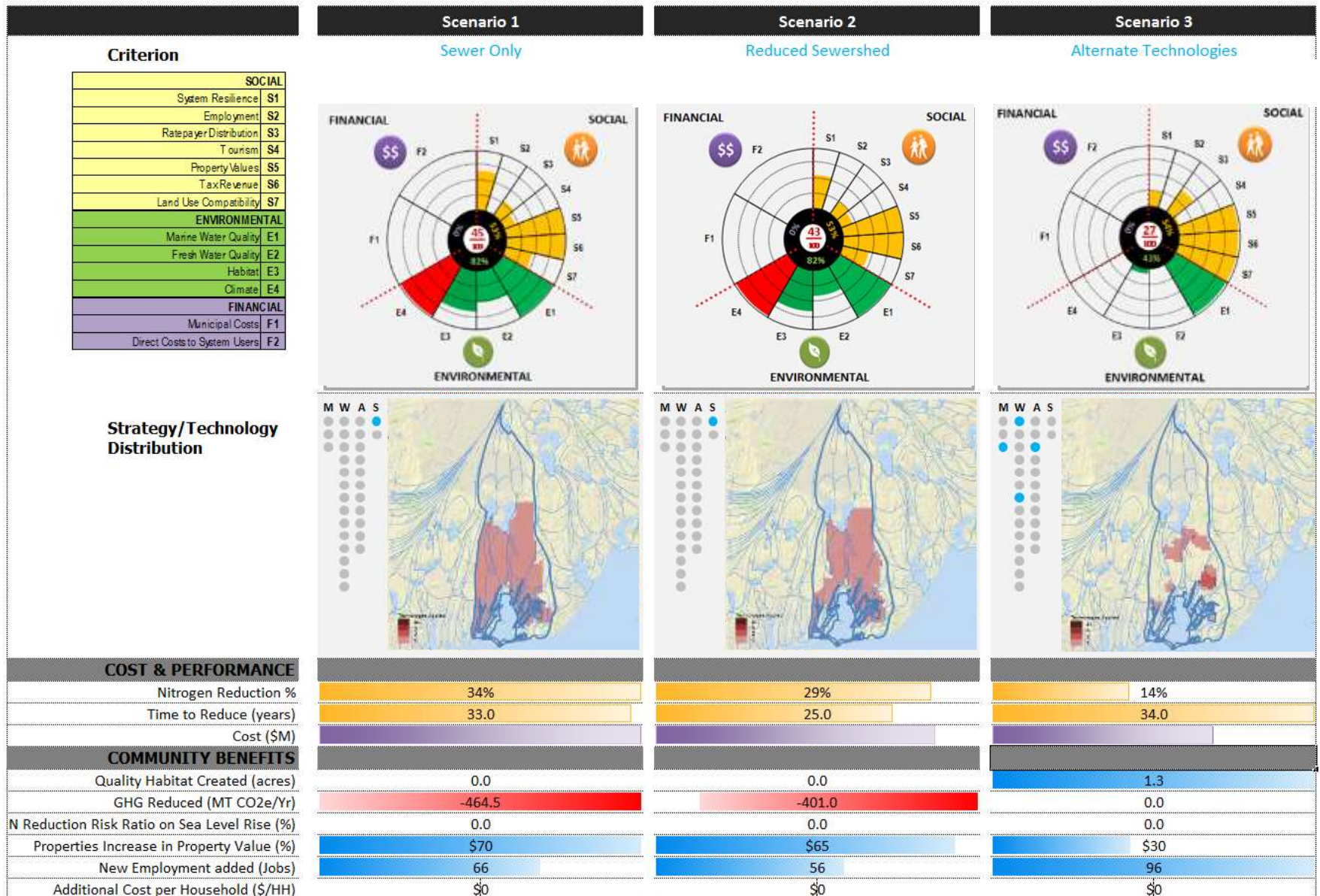
# SCENARIO COMPARISONS



Note: TBL Financial Indicators Not Shown



# SCENARIO COMPARISONS



# Regulatory, Legal, Institutional

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COLLABORATION  
MODELS

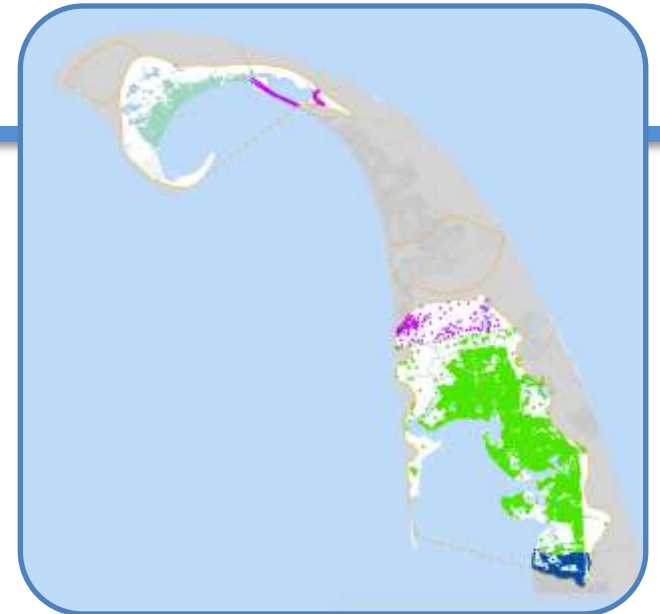
# JURISDICTION OF THE PROBLEM

## **Nitrogen:**

- Does not follow town boundaries

## **Watershed based approach:**

- look across entire watershed
- identify cost-effective, environmentally effective plan to restore estuary





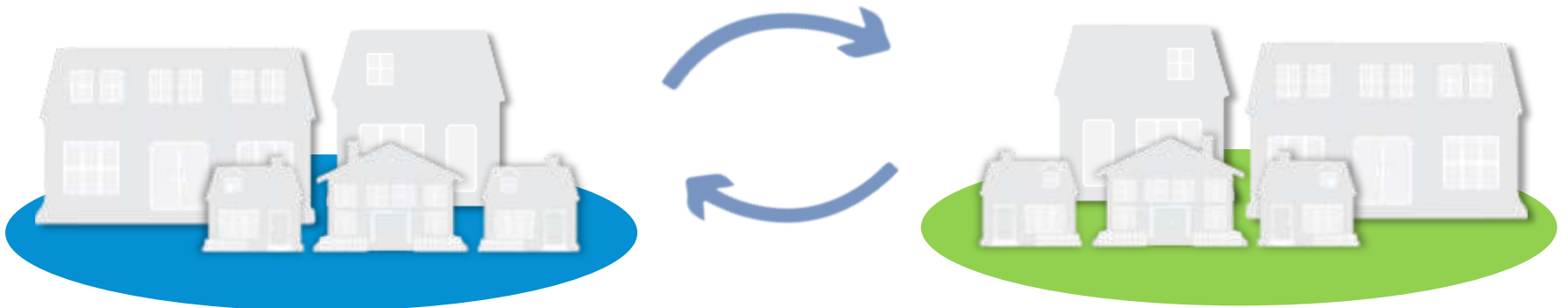
# JURISDICTION OF THE SOLUTION

**Multi-town  
collaboration**

**Shared actions  
by towns**

**Collaborative relationships**

- Build successful intermunicipal relationships
- Begin with existing watersheds



# REQUIREMENTS OF CLEAN WATER ACT / EPA

## **208 plan requirement:**

- State must designate one or more waste management agency (WMA)

## **WMA must be able to:**

- Carry out plan
- Manage waste treatment
- Design & construct new, existing works
- Accept/utilize grants
- Raise revenues
- Incur indebtedness
- Assure each town pays its costs



# COLLABORATION CHALLENGES

## FROM SUB-REGIONAL MEETING 1

**Who decides?**

**Who pays?**

**Who manages?**

# COLLABORATION CHALLENGES

**Who decides?**

**Who pays?**

**Who manages?**

- Which solutions to implement and when and how to re-assess?
- Different levels of planning across towns (including approved CWMPs)
- Different town decision-making processes and publics
- Timeline required for building agreement
- Managing disagreement

# COLLABORATION CHALLENGES

**Who decides?**

**Who pays?**

**Who manages?**

- Coordinating multiple town funding approval processes
- Applying for and allocating off-Cape funding opportunities
- Differences in willingness/abilities to pay
- Assigning financial responsibility for: capital funding, operation and maintenance, monitoring, data management, reporting
- Managing disagreement

# COLLABORATION CHALLENGES

**Who decides?**

**Who pays?**

**Who manages?**

- Preparing the watershed plan for permitting
- Building, operating, maintaining, monitoring, and reporting
- Ultimate responsibility for water quality outcomes
- Managing disagreement

**WHAT ARE WE MISSING?**

**WHAT ARE THE CHARACTERISTICS/CRITERIA OF A  
SUCCESSFUL COLLABORATION?**

# COLLABORATION MODELS



# INTERMUNICIPAL AGREEMENTS

## What is it?

Written agreement between municipalities to perform services or activities

## Authority:

M.G.L. c. 40 § 4A

## What it does:

Allows towns to contract with each other/other government units (RPA, water/sewer com)

## Types:

1. Formal contract
2. Joint service agreement
3. Service exchange arrangements

## Key Considerations:

- Modified authority enables Board of Selectmen rather than Town Mtg.
- Max. 25 years
- Establishes maximum financial liability of parties
- Components:
  - Purpose, term of agreement
  - Method of financing
  - Responsibilities
  - Costs of services
  - Indemnification
  - Insurance
  - Alternative dispute resolution
  - Personnel property

# ATTLEBORO - NORTH ATTLEBOROUGH

## **The Situation:**

- Town and City have common borders
- Sewer services could be more efficiently provided by connecting neighborhoods in the Town to the City's existing treatment facility and City neighborhoods to the Town's facility

## **Why the solution was chosen:**

- Mutually beneficial
- Allows the towns to contract with each other for specific geographic areas

# ATTLEBORO - NORTH ATTLEBOROUGH

## Who decides?

- Town of North Attleborough through its Board of Public Works
- City of Attleboro through its Mayor and Municipal Council

## Who pays?

- Apportioned to the ratepayers in the City and Town on basis of their contributions

## Who manages?

- Each town manages their treatment facility independently
- Both entities can review and reject proposed changes to the other's infrastructure

# FEDERAL/MUNICIPAL PUBLIC-PUBLIC PARTNERSHIPS

## What is it?

Shared service agreement

## Authority:

Section 331 National Defense Authorization Act - United States Code 10, c. 137 §1226

## What it does:

Authorizes DoD Secretary to enter into intergovernmental support agreements with state/local governments

## Examples:

Towns may seek to utilize capacity from wastewater facility on Joint Base Cape Cod

## Key considerations:

- Must serve best interest of the state/local government and military
- Provides mutual benefits not achieved on own
- Benefit may be monetary or in-kind
- May be entered into on sole source basis
- May be for a term not to exceed 5 years
- Towns enter into partnership agreement with JBCC

# NELLIS AIR FORCE BASE

## **Situation:**

- Air Force was seeking to exchange underutilized assets in excess land
- City of North Las Vegas needed land to build a Water Reclamation Facility
- In exchange for leasing property, the Air Force received in-kind consideration in the form of a fitness center and water supply infrastructure

## **Why the solution was chosen:**

- Mutual benefit to both Air Force and city
- Achieved a common purpose
- Enabled the city to build a 25 million gallon/day facility with ability to expand (double size) for future growth

# NELLIS AIR FORCE BASE

## Who decides?

- Strategic Asset Utilization Division, or CIU for Air Force negotiates agreement for Air Force
- Mayor of City of North Las Vegas for the city

## Who pays?

- No money was exchanged
- In-kind benefit
- Exchange of Air Force's excess land for receipt of use of fitness center and onsite infrastructure

## Who manages?

- City of North Las Vegas built facilities in accordance with the lease agreement

# INDEPENDENT WATER AND SEWER DISTRICTS

## What is it?

Independent public instrumentality for establishing shared water/sewer systems

## Authority:

M.G.L. c. 40N §§ 1-25

## What it does:

One or more municipalities may join to form a regional water and sewer district

## Requirement:

Town meeting vote required to establish/operate

## Key considerations:

- Special unpaid district planning board for two or more towns forms to study advisability, construction and operating costs, methods of financing, issues report
- May submit proposed agreement for town meeting vote which shows:
  - Number, composition method of selection of members of board
  - Municipalities to be within district
  - Method of apportioning expenses
  - Terms by which town is admitted or separated from district
  - Detailed procedure for preparation/adoption of budget

# GREATER LAWRENCE SANITARY DISTRICT

## **The Situation:**

- A 1963 report on Merrimack River pollution called for several facilities in key areas, including one for these four communities

## **Why the solution was chosen:**

- A sewer district was among the recommendations in the 1963 report



# GREATER LAWRENCE SANITARY AND CHARLEMONT SEWER

## Who decides?

- Approved by Town Meeting and City Councils in each community

## Who pays?

- Annual assessment to member communities, not users
- Full bonding powers

## Who manages?

- 7-member commission appointed on a population basis by member communities

# WATER POLLUTION ABATEMENT DISTRICTS

## What is it?

District designated by Mass DEP for one or more towns (or designated parts) established for the "prompt and efficient abatement of water pollution"

## Authority:

Massachusetts Clean Waters Act (M.G.L. c. 21, §§28-30, 32, 35, 36).

## What it does:

Creates district responsible for abatement plan

## Types:

1. Town voted district
2. DEP voted district

## Key considerations:

- Adopt bylaws/regulations
- Acquire, dispose of and encumber real/personal property
- Construct, operate and maintain water pollution abatement facilities
- Apportion assessments on the member municipalities
- Issue bonds and notes, raise revenues to carry out the purposes of the district
- Member municipalities may then impose assessments on residents, corporations and other users in the district
- If town fails to pay its share, state may pay it for them out of other funds appropriated to that town

# UPPER BLACKSTONE WATER POLLUTION ABATEMENT DISTRICT

## **The Situation:**

- Blackstone River was the recipient of industry toxins
- In 1968, the Legislature passed an emergency law for the immediate preservation of the public safety and welfare to create the Upper Blackstone Water Pollution Abatement District

## **Why the solution was chosen:**

To enable the City of Worcester and the Towns of Auburn, Boylston, Holden, Leister, Millbury, Oxford, Paxton, Rutland, Shrewsbury and West Boylston to create a sewer district

# UPPER BLACKSTONE WATER POLLUTION ABATEMENT DISTRICT

## Who decides?

- City of Worcester by its City Council
- Towns of Auburn, Boylston, Holden, Leister, Millbury, Oxford, Paxton, Rutland, Shrewsbury and West Boylston by Town Meeting

## Who pays?

- Apportioned among the city/towns on basis of their contributions to the flow entering the district's facilities

## Who manages?

- The District, which is governed by a Board comprised of one member from each district

# INDEPENDENT PUBLIC AUTHORITY

## What is it?

Could create separate legislative entity

## Authority:

Mass. Legislature

## What it could do:

Create construct that provides for funding mechanisms outside town meeting

## What it could potentially do:

- Plan, build, finance, own and operate certain wastewater collection treatment, disposal and septage management assets and programs
- Research, develop, own and operate non-traditional wastewater treatment assets and programs
- Provide services for residential WW systems
- Plan and protect drinking water resources on Cape Cod through protection plans and policies
- Develop and enforce policies and procedures governing customer metering, billing and collection systems

# MASSACHUSETTS WATER RESOURCES AUTHORITY (MWRA)

## **The Situation:**

- Federal District Court in Massachusetts ruled that wastewater discharged into the Boston Harbor was in violation of the 1972 Federal Clean Water Act requirements
- Court ordered MWRA to develop and implement a program to provide treatment of its wastewater as required by that law

## **Why the solution was chosen:**

In accordance with the court-ordered schedule, MWRA undertook a program of improvements to the wastewater collection and treatment facilities serving the metropolitan Boston area.

# MASSACHUSETTS WATER RESOURCES AUTHORITY (MWRA)

## Who decides?

- The Massachusetts Water Resources Authority (MWRA) was established by Chapter 372 of the Acts of 1984 to assume the duties and responsibilities of the Metropolitan District Commission's Water and Sewer Division

## Who pays?

- The Authority has its own powers to issue bonds and assessments to pay expenses

## Who manages?

- Board of Directors, consisting of 11 members, who are deemed to act on behalf of the independent authority to perform "an essential public function"



# REGIONAL HEALTH DISTRICT

## What is it?

Regional Board of Health

## Authority:

M.G.L. c. 111 §27B

## What it does:

Has all the powers and duties of boards of health/health department of a town  
Includes wastewater regulatory powers of Board of Health

## Who may belong:

One or more towns

## Key considerations:

- Can form by votes of two or more boards of health and their respective town meeting to delegate some/all of its legal authority to regional board
- Estimate budget each December, assessor then includes this amount in the tax levies each Board may order treasurer to pay town's share of cost/expense of the district
- Reimbursement from Commonwealth for "initial capital outlays"
- Subj. to appropriation – Requires matching funds from town
- HB 3822 – proposes removal of town meeting requirement

# Quabbin Regional Health District

## **The Situation**

- Quabbin Health District formed in response to issues occurring in Belchertown, Ware, and Pelham.
- Issues included a hazardous landfill, lack of oversight and consistency in providing required public health services, citizen complaints, septic issues, and concerns from MDPH and DEP around the communities' inability to address state mandates.

## **Why the solution was chosen:**

Joint effort by the towns to provide their town with quality public health professionals and services in response to problems.

# Quabbin Regional Health District

## Who decides?

- Established by town meeting vote by the towns of Belchertown, Ware and Pelham

## Who pays?

- Towns of Belchertown, Ware and Pelham jointly

## Who manages?

- Towns of Belchertown, Ware and Pelham jointly

**HOW WELL DO EACH OF THESE MODELS MEET THE  
CRITERIA FOR EFFECTIVE COLLABORATION?**

---

**HOW WELL WOULD EACH OF THESE MODELS  
ADDRESS THE SITUATION ON THE OUTER CAPE  
AND CAPE COD?**

# COLLABORATION CHALLENGE SUMMARY

## Who decides?

- Which solutions to implement and when and how to re-assess?
- Different levels of planning across towns (including approved CWMPs)
- Different town decision-making processes and publics
- Timeline required for building agreement
- Managing disagreement

## Who pays?

- Coordinating multiple town funding approval processes
- Applying for and allocating off-Cape funding opportunities
- Differences in ability & willingness to pay
- Assigning responsibility for: capital funding, operation and maint., monitoring, data mgt., reporting
- Managing disagreement

## Who manages?

- Preparing the watershed plan for permitting
- Building, operating, maintaining, monitoring, and reporting
- Ultimate responsibility for water quality outcomes
- Managing disagreement

# Implementation

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MONITORING

# SECTION 208 AREA WIDE WATER QUALITY MANAGEMENT PLAN

## **MONITORING SUBCOMMITTEE**

### **Mission:**

To provide advice and guidance on appropriate monitoring protocols for technology efficiency and total maximum daily loads, while identifying a process for consolidating all available monitoring data in a central location and format.



# SECTION 208 AREA WIDE WATER QUALITY MANAGEMENT PLAN

## **MONITORING SUBCOMMITTEE**

### **Roles and Responsibilities:**

- Establish performance monitoring protocols for technologies that may be a part of watershed permits in the future
- Establish compliance monitoring protocols for meeting total maximum daily loads (TMDLs) in the water body
- Establish process and structure for consolidating and cooperation of existing monitoring programs and data in to a centralized location
- Identify region-wide monitoring needs and develop proposals





# SECTION 208 AREA WIDE WATER QUALITY MANAGEMENT PLAN

## **MONITORING SUBCOMMITTEE**

### **Invited Members:**

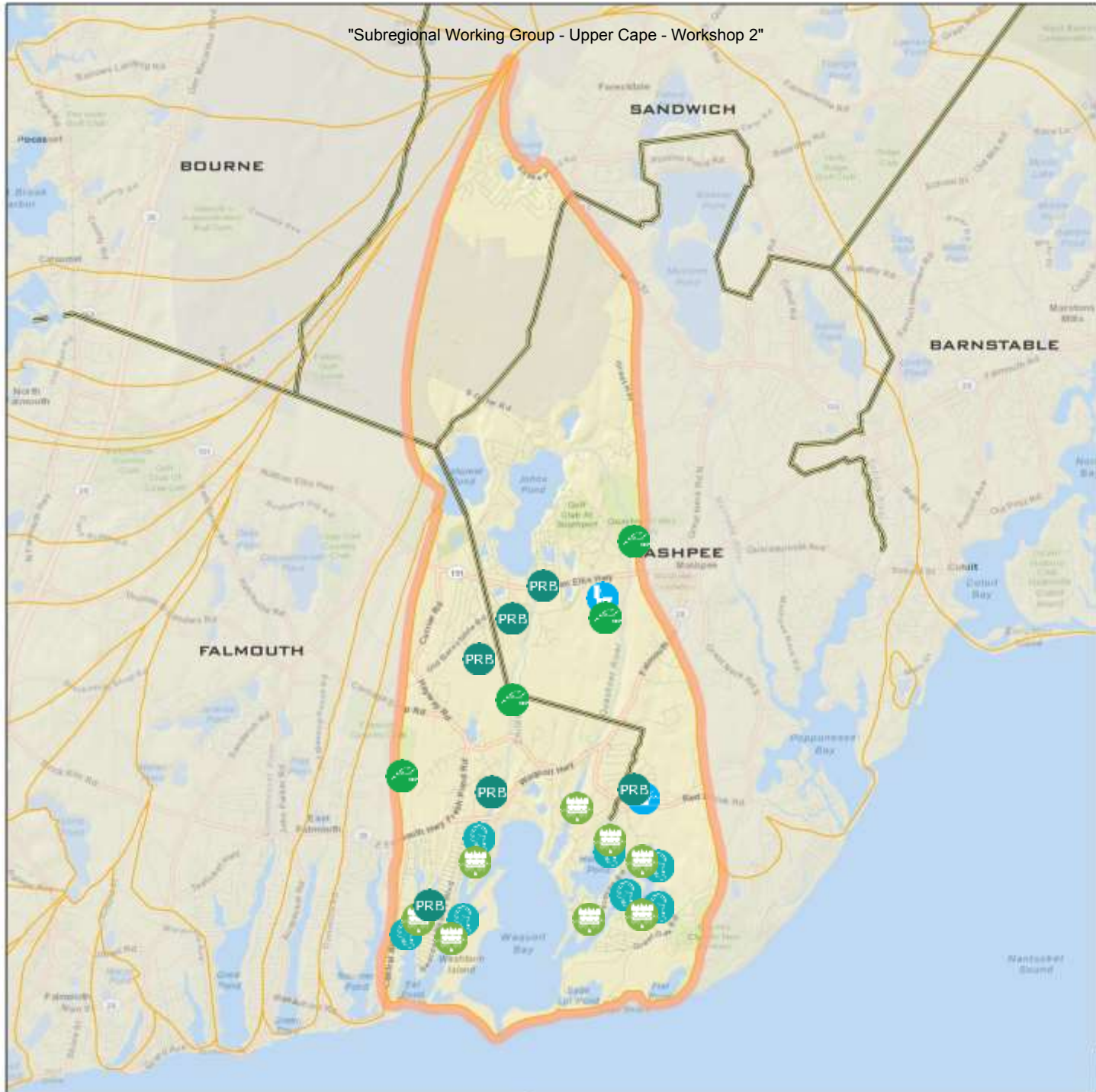
DEP, EPA, Provincetown  
Center, WBNERR, Town Rep,  
Academics,  
Institution/Agency

# TRADITIONAL TECHNOLOGY MONITORING FRAMEWORK

Technology	Monitoring	Frequency	
	Conventional Treatment	GWDP Influent/ Effluent WQ + quantity	Quarterly - three down & one up gradient
	Satellite Treatment Systems	GWDP Influent/ Effluent WQ + quantity	Quarterly - three down & one up gradient
	Cluster Treatment Systems	Board of Health performance monitoring similar but less rigorous than GWDP - varies based on conditions, groundwater monitoring may not be required	Varries
	I/A Title 5 Systems	Influent/ Effluent WQ + quantity	Quarterly













"Subregional Working Group - Upper Cape - Workshop 2"





## NON-TRADITIONAL TECHNOLOGY MONITORING FRAMEWORK FOR PILOT PROJECTS (PRELIMINARY)

Technology	Monitoring	Frequency
 Constructed Wetlands	WQ samples inlet/outlet (N)	Monthly during growing season
 Pond Dredging	WQ samples inlet/outlet of pond (N/P)	Quarterly
 Salt Marsh Restoration	Area of restoration, wetland types (GIS and field confirmation)	Annually
 Shellfish Bed Restoration	Area of restoration/density of shellfish/landings N content of shellfish Denitrification in benthic (N,DO) WQ samples (N)	Annually Annually - composite 20 animals Annually - three locations Monthly during summer -three locations
 Phytobuffer	WQ samples inlet/outlet (N)	Monthly during growing season
 Fertigation Wells	Pumping volume/rate WQ samples (N)	Monthly Monthly during summer
 Shellfish Aquaculture	Annual landings from each grant N content in shellfish	Annually Annually - composite 20 animals
 PRB Perm. React. Barrier	2 upgradient/2 downgradient wells – WQ samples (N, DO) Well in media - WQ samples (N, DO, N gas)	Quarterly Quarterly
 Inlet Widening	Salinity measurements to confirm model WQ samples at sentinel station	Two tidal cycles Two tidal cycles
 Eco Toilet Systems	Numbers/locations/types of installations WQ samples (N/P) - grey water	Running database Quarterly - three locations per watershed

# Adaptive Management

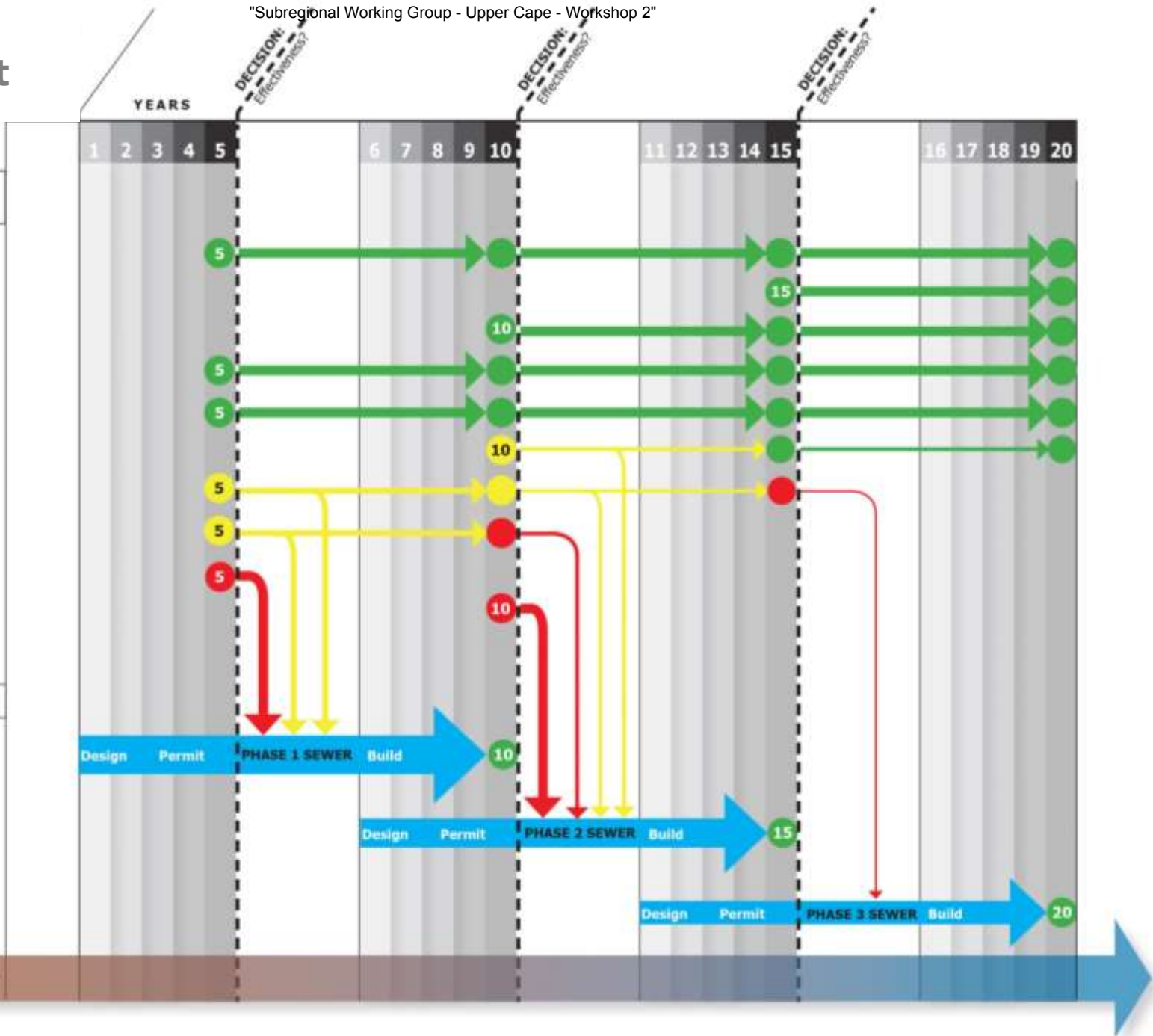
**SELECTED SCENARIO:**  
Alternative Technologies

-  Fertilizer Management
-  Const. Wetlands - GW
-  Shellfish Aquaculture
-  Inlet Widening
-  IA Title 5 Systems
-  Const. Wetlands - SW
-  Stormwater BMPs
-  Perm. React. Barrier
-  Fertigation Wells
-  Phytobuffer

Traditional Technologies

-  1 Priority Collection/ Sewer Areas
-  2 Supplemental Collection/ Sewer
-  3 Supplemental Collection/ Sewer

**EMBAYMENT WATER QUALITY**



All materials and resources for the Upper Cape Sub Regional Group will be available on the Cape Cod Commission website:



<http://watersheds.capecodcommission.org/index.php/watersheds/upper-cape>



# Upper Cape Sub Regional Group



MEETING 2

# COLLABORATION CHALLENGES

## FROM SUB-REGIONAL MEETING 1

### Who decides?

- Which solutions to implement and when and how to re-assess?
- Different levels of planning across towns (including approved CWMPs)
- Different town decision-making processes and publics
- Timeline required for building agreement
- Managing disagreement

### Who pays?

- Coordinating multiple town funding approval processes
- Applying for and allocating off-Cape funding opportunities
- Differences in ability & willingness to pay
- Assigning responsibility for: capital funding, operation and maint., monitoring, data mgt., reporting
- Managing disagreement

### Who manages?

- Preparing the watershed plan for permitting
- Building, operating, maintaining, monitoring, and reporting
- Ultimate responsibility for water quality outcomes
- Managing disagreement

Intermunicipal Agreements

Federal/Municipal public-public partnerships

Independent Water and Sewer Districts

Water Pollution Abatement Districts

Independent Authority

Regional Health District

AGREEMENT  
MODEL

LENGTH OF  
AGREEMENT

ENABLING  
BODIES

REQUIRES TOWN  
MEETING

**Intermunicipal  
Agreements**

25 years

Boards of Selectmen

No  
But agreement can be  
made subject to vote  
approval

**Federal/Municipal  
Public-Public**

5 years

Boards of Selectmen

No

**Independent Water  
and Sewer Districts**

No limit

Town Meeting

Yes

**Water Pollution  
Abatement Districts**

Dissolved by act of  
Legislature

Boards of Selectmen

No

**Independent  
Authority**

Based on enabling  
legislation

Requires new  
legislation

No

**Regional Health  
District**

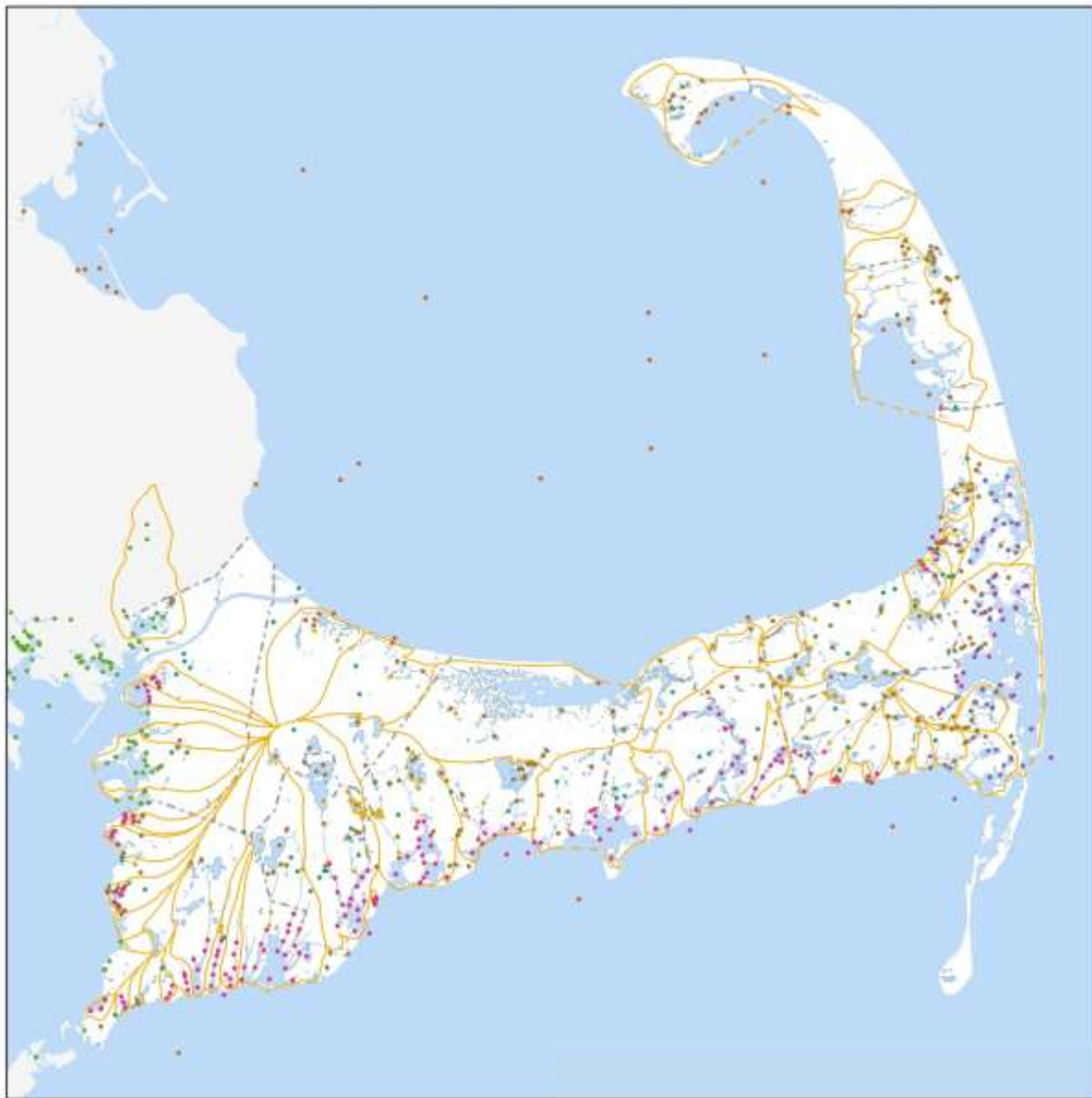
No limit  
Unless specified in the  
agreement

Town Boards of Health  
and Town Meeting

Yes



# CURRENT NITROGEN MONITORING



- Groundwater Discharge Permits
- Center for Coastal Studies Stations
- Pleasant Bay Alliance Stations
- Massachusetts Estuaries Project Stations
- Coalition for Buzzards Bay Stations
- DEP Water Management Group Stations
- Ponds & Lakes Stewardship Ponds

