

Mid 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:

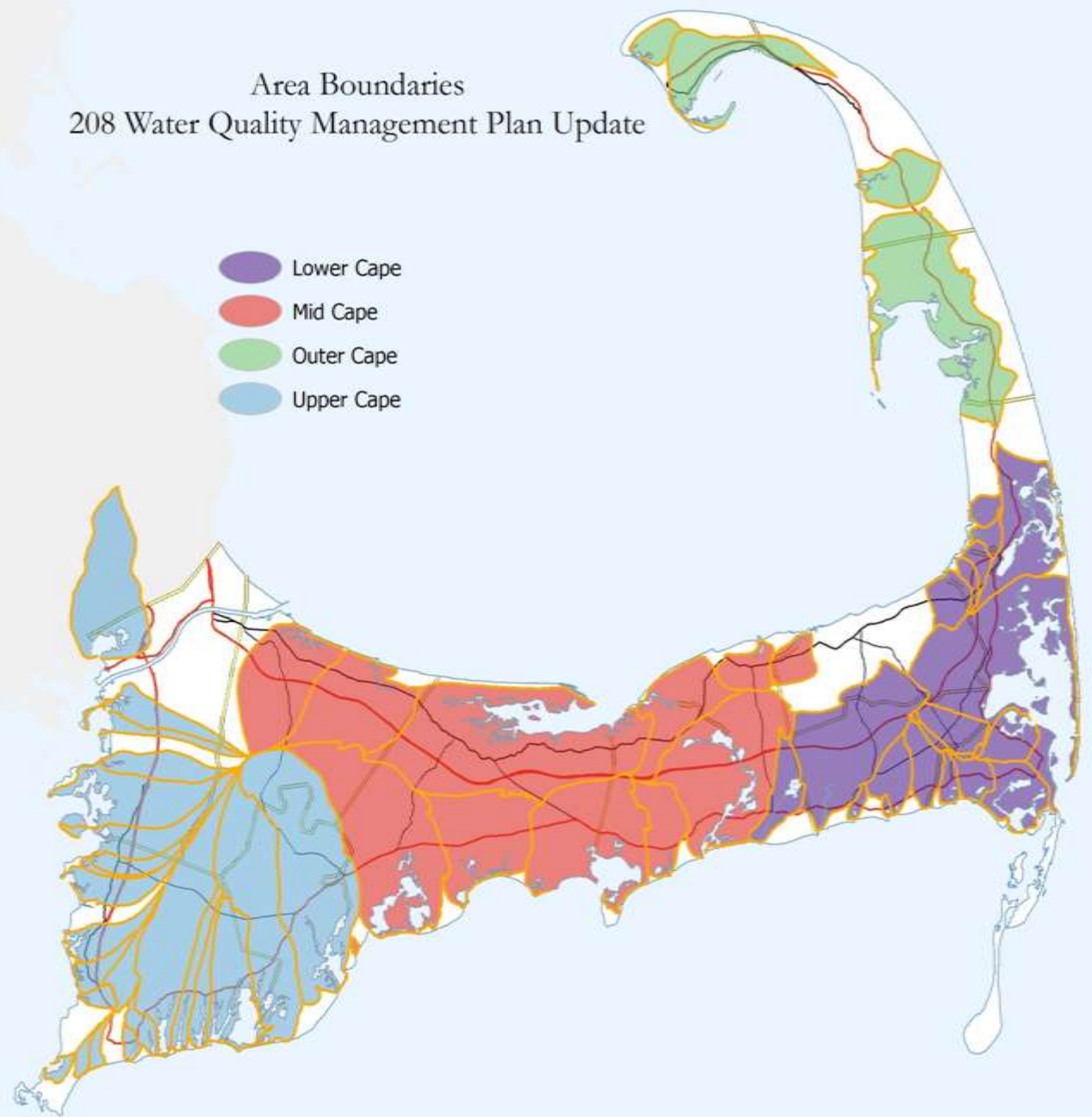
- Introduce the **Triple Bottom Line** analysis tool and its application to scenario planning
- Identify key criteria for **successful collaboration** for shared watersheds and evaluate existing models against the criteria
- Clarify the scope and charge of the **Ad Hoc Monitoring Committee** to meet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

Scenario Planning

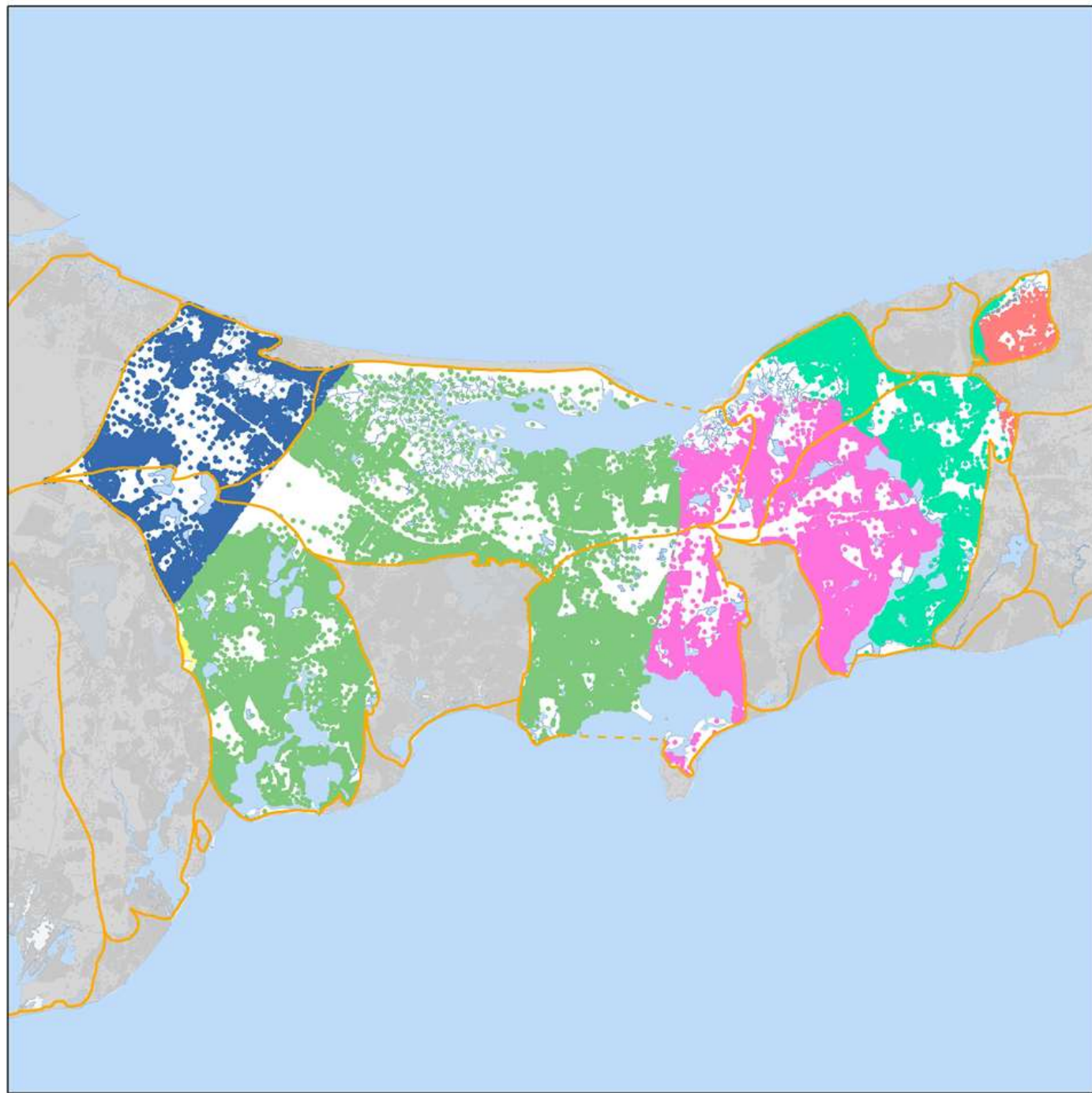
MID CAPE

Area Boundaries 208 Water Quality Management Plan Update

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



- BARNSTABLE
- BREWSTER
- DENNIS
- MASHPEE
- SANDWICH
- YARMOUTH



**MID CAPE SUB-REGIONAL
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS**

Collecting parcels:	14,798 parcels
Miles of collection:	443 miles
Flow:	2,654,129 gallons per day

MID CAPE SUB-REGIONAL TRADITIONAL

50% Fertilizer/Stormwater Reduction

Collecting parcels:	11,950 parcels
Miles of collection:	349 miles
Flow:	2,074,385 gallons per day

**MID CAPE SUB-REGIONAL
TRADITIONAL**

25% Removal for Non MEP Watersheds

Collecting parcels:	4,350 parcels
Miles of collection:	142 miles
Flow:	750,548 gallons per day

**THREE BAYS
TRADITIONAL**
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

Collecting parcels:	4,229 parcels
Miles of collection:	147 miles
Flow:	826,150 gallons per day

**THREE BAYS
TRADITIONAL**

50% Fertilizer/Stormwater Reduction

Collecting parcels:	2,741 parcels
Miles of collection:	95 miles
Flow:	526,473 gallons per day

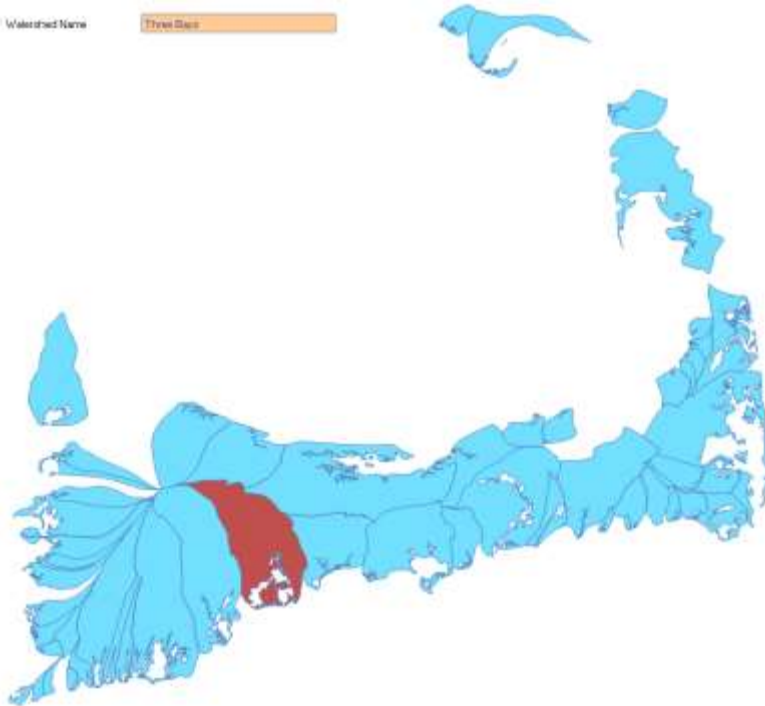
THREE BAYS NON-TRADITIONAL

- 4** PRBs
- 5** Constructed Wetlands
- 2** Fertigation Wells-Turf
- 5** Shellfish/Aquaculture
- 458** Ecotoilets
- 700** Ecotoilets-Public (people)

THREE BAYS TRIPLE BOTTOM LINE ASSESSMENT

Watershed Name

Three Bays



Key Inputs	Update		
	%	Existing	Future
Present Controllable Load of Nitrogen (Kg/yr)			
Wastewater	90%	34,440	34,440
Fertilizer	6%	2,296	2,296
Stormwater	4%	1,531	1,531
Total	100%	38,267	38,267

Target Setting	
Future Nitrogen Load (Kg/yr)	38,267
TMDL Target	46.3%
Target Nitrogen Load (Kg/yr)	20,560
Nitrogen Reduction Required (Kg/yr)	17,707



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** **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 watershed
- 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:

+
-
↺
↻

Select a Location (Watershed)

SCENARIO NAME:

Current Application Stack: 1 Strategies/Technologies

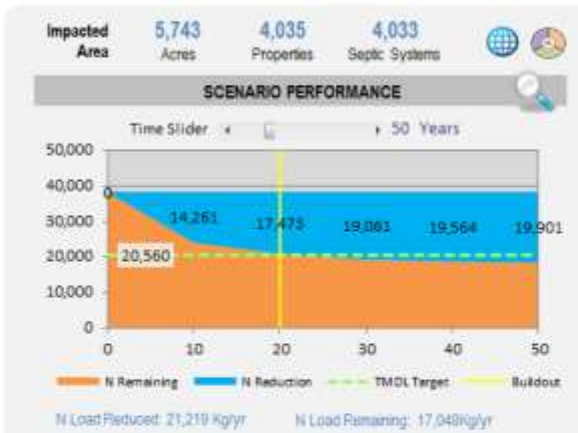
View Scenario Overview
View Technology Performance
Compare Technologies

+ Sewering Options

51 Sewering (Sewershed #1)

from Selection	
Total Number of Properties	4035
Land Area (acres)	5743.2
Existing Nitrogen Load (Kg/yr)	24794.7
Future Nitrogen Load (Kg/yr)	24794.7
Properties Already Sewered	2
Application Suitability	4,033
% Selected	100%
Properties Impacted	4035
Land Area Impacted	5,743.2 acre
Future Nutrient Load Impacted	24,794.7 Kg/yr
Collection Systems	Quantity
Main Sewer	421,894 linear feet
Sewer Laterals	201,750 linear feet
Force Main	2 miles
Pump Station	3 Each
On-Site Pump Station	Each
STEG - 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 sewershed	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

[Clear Selection](#)




TECHNOLOGY APPLICATION MAP

COMMUNITY IMPACTS SUMMARY


Quality Habitat Created	177.8 acres
GHG Reduced	418.4 MT CO ₂ e/yr
N Reduction Risk Ratio on Sea Level Rise	0.4%
% Properties Increase in Property Value	54%
New Employment added	179 jobs
Additional Cost per Household	\$199/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: S1. Sewering - Sewershed #1 + - ↺ ↻

Select a Location (Watershed): Three Bays SCENARIO NAME: Maximizing Sewer

Current Application Stack: 1 Strategies/Technologies

+ Sewering Options

S1 Sewering (Sewershed #1)


from Selection	
Total Number of Properties	4035
Land Area (acres)	5743.2
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STEG - Collection	Linear Foot
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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 sewershed	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

[Clear Selection](#)

View Scenario Overview

Impacted Area: **5,743** Acres, **4,035** Properties, **4,033** Septic Systems

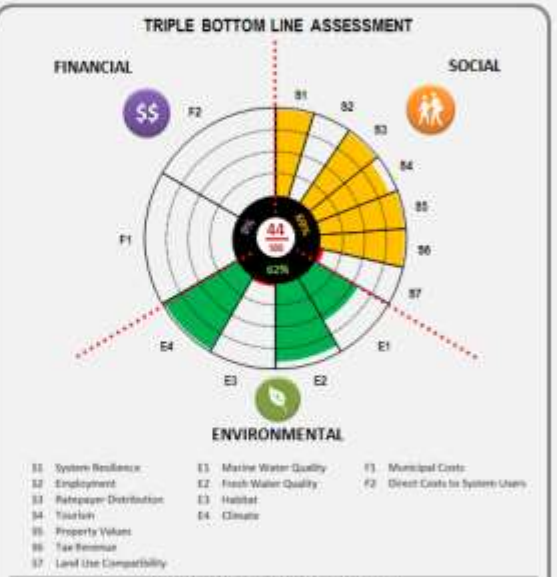
SCENARIO PERFORMANCE



Time Slider: 50 Years

N Load Reduced: 21,219 Kg/yr N Load Remaining: 17,048 Kg/yr

TRIPLE BOTTOM LINE ASSESSMENT



COMMUNITY IMPACTS SUMMARY

Quality Habitat Created	0 acres
GHG Reduced	418.4 MT CO2e/yr
N Reduction Risk Ratio on Sea Level Rise	0.4%
% Properties Increase in Property Value	54%
New Employment added	179 jobs
Additional Cost per Household	\$119/yr

Note: TBL Financial Indicators Not Shown

SCENARIO 2 : Reduced Sewershed



Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



HOME
MODEL INPUTS
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COMPARE SCENARIOS
TBL DATABASE

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

+
-
↺
↻

Select a Location (Watershed)

SCENARIO NAME:

Current Application Stack: 1 Strategies/Technologies

View Scenario Overview
View Technology Performance
Compare Technologies

Sewering Options

51 Sewering (Sewershed #1)

from Selection	
Total Number of Properties	2774
Land Area (acres)	3907.7
Existing Nitrogen Load (Kg/yr)	174314
Future Nitrogen Load (Kg/yr)	174314
Properties Already Sewered	2
Application Suitability	2,772
% Selected	100%
Properties Impacted	2774
Land Area Impacted	3,907.7 acre
Future Nutrient Load Impacted	17,431.4 Kg/yr
Collection Systems	Quantity
Main Sewer	316,708 linear feet
Sewer Laterals	138,700 linear feet
Force Main	2 miles
Pump Station	1 Each
On-Site Pump Station	Each
STEG - 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 sewershed	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

[Clear Selection](#)



TECHNOLOGY APPLICATION MAP

COMMUNITY IMPACTS SUMMARY

Quality Habitat Created	0 acres
GHG Reduced	282.9 MT CO ₂ e/yr
N Reduction Risk Ratio on Sea Level Rise	0.3%
% Properties Increase in Property Value	43%
New Employment added	134 jobs
Additional Cost per Household	\$119/yr

SCENARIO 2 : Reduced Sewershed



Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



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

Select a Location (Watershed)

SCENARIO NAME:

Current Application Stack: 1 Strategies/Technologies

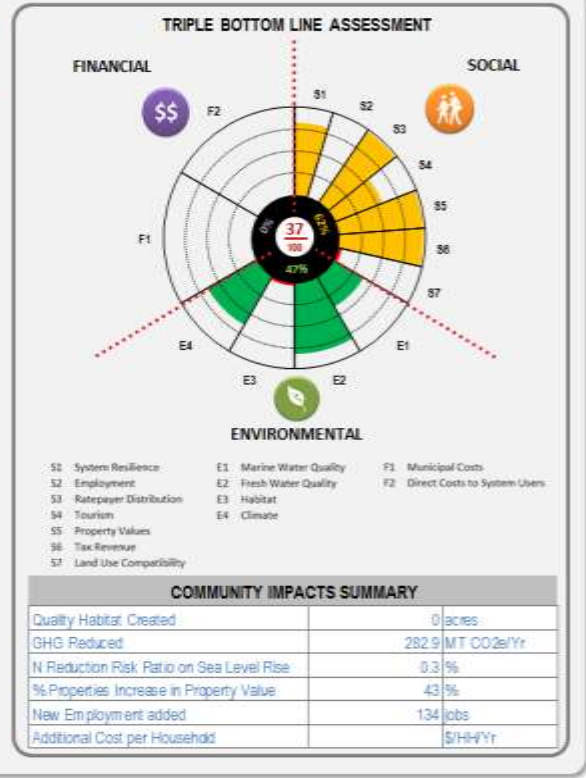
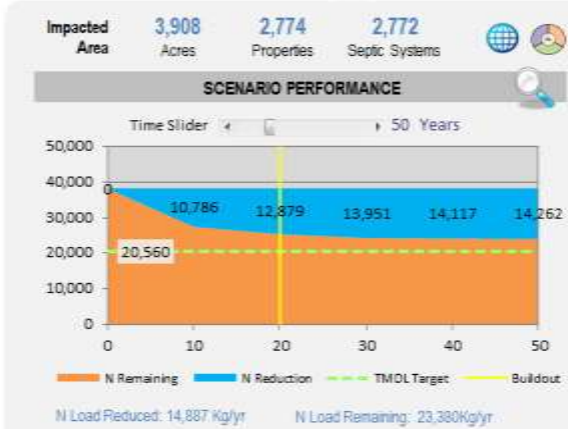
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+ Sewering Options

S1 Sewering (Sewershed #1)


from Selection	
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Land Area (acres)	3907.7
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On-Site Pump Station	Each
Interior Plumbing Reconfiguration	Each
Treatment Systems	
Treatment System Included	Yes
Location (within/outside watershed)	within
% capacity for sewershed	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

Clear Selection




Note: TBL Financial Indicators Not Shown

SCENARIO 3 : Alternate Technology



Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability



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TBL DATABASE

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

A1. Toilets: Composting
+
-
↺

Select a Location (Watershed):

Three Bays

SCENARIO NAME: Alternative Technologies



Current Application Stack: 6 Strategies/Technologies

Watershed Options

- W1 Permeable Reactive Barriers (PRBs)
- W2 Constructed Wetlands - Surface Flow
- W7 Aquaculture/Shellfish
- W9 Fertigation Wells
- W13 Pond and Estuary Dredging

Alternative On-Site Options

- A1 **Toilets: Composting**

	from Selection
Total Number of Properties	121
Land Area (acres)	110.5
Existing Nitrogen Load (Kg/yr)	869.2
Future Nitrogen Load (Kg/yr)	869.2
Properties Already Sewered	0
Application Suitability	121
% Selected	80%
Properties Impacted	93
Land Area Impacted	86.7
Future Nutrient Load Impacted	792.8 Kg/yr

[Clear Selection](#)


View Scenario Overview
View Technology Performance
Compare Technologies

Impacted

1,797
Acres
1,203
Properties
1,203
Septic Systems

SCENARIO PERFORMANCE


Time Slider: 50 Years



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

N Load Reduced: 10,556 Kg/yr N Load Remaining: 19,711 Kg/yr


TECHNOLOGY APPLICATION MAP



COMMUNITY IMPACTS SUMMARY


Quality Habitat Created	177.6 acres
GHG Reduced	10.3 MT CO2e/yr
N Reduction Risk Ratio on Sea Level Rise	0.2 %
% Properties Increase in Property Value	14 %
New Employment added	184 jobs
Additional Cost per Household	\$/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: Select a Location (Watershed):

A1. Toilets: Composting + - ↺ ↻ Three Bays SCENARIO NAME: Alternative Technologies 📄 📁 🗑️ 📄 📁 🗑️



Current Application Stack: 6 Strategies/Technologies

+ Watershed Options

- W1 Permeable Reactive Barriers (PRBs)
- W2 Constructed Wetlands - Surface Flow
- W7 Aquaculture/Shellfish
- W9 Fertigation Wells
- W13 Pond and Estuary Dredging

+ Alternative On-Site Options

A1 **Toilets: Composting**

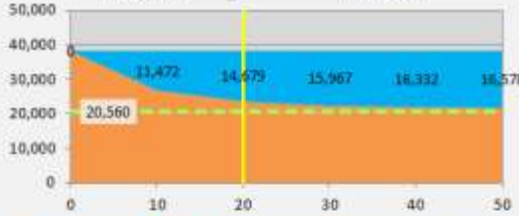
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Impacted 1,797 1,203 1,203

Acres Properties Septic Systems

SCENARIO PERFORMANCE

Time Slider 50 Years



■ N Remaining ■ N Reduction — TMDL Target — Buildout


N Load Reduced: 18,556 Kg/yr N Load Remaining: 19,711 Kg/yr

	from Selection
Total Number of Properties	121
Land Area (acres)	110.5
Existing Nitrogen Load (Kg/yr)	869.2
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[Clear Selection](#)

TRIPLE BOTTOM LINE ASSESSMENT


FINANCIAL




ENVIRONMENTAL



SOCIAL



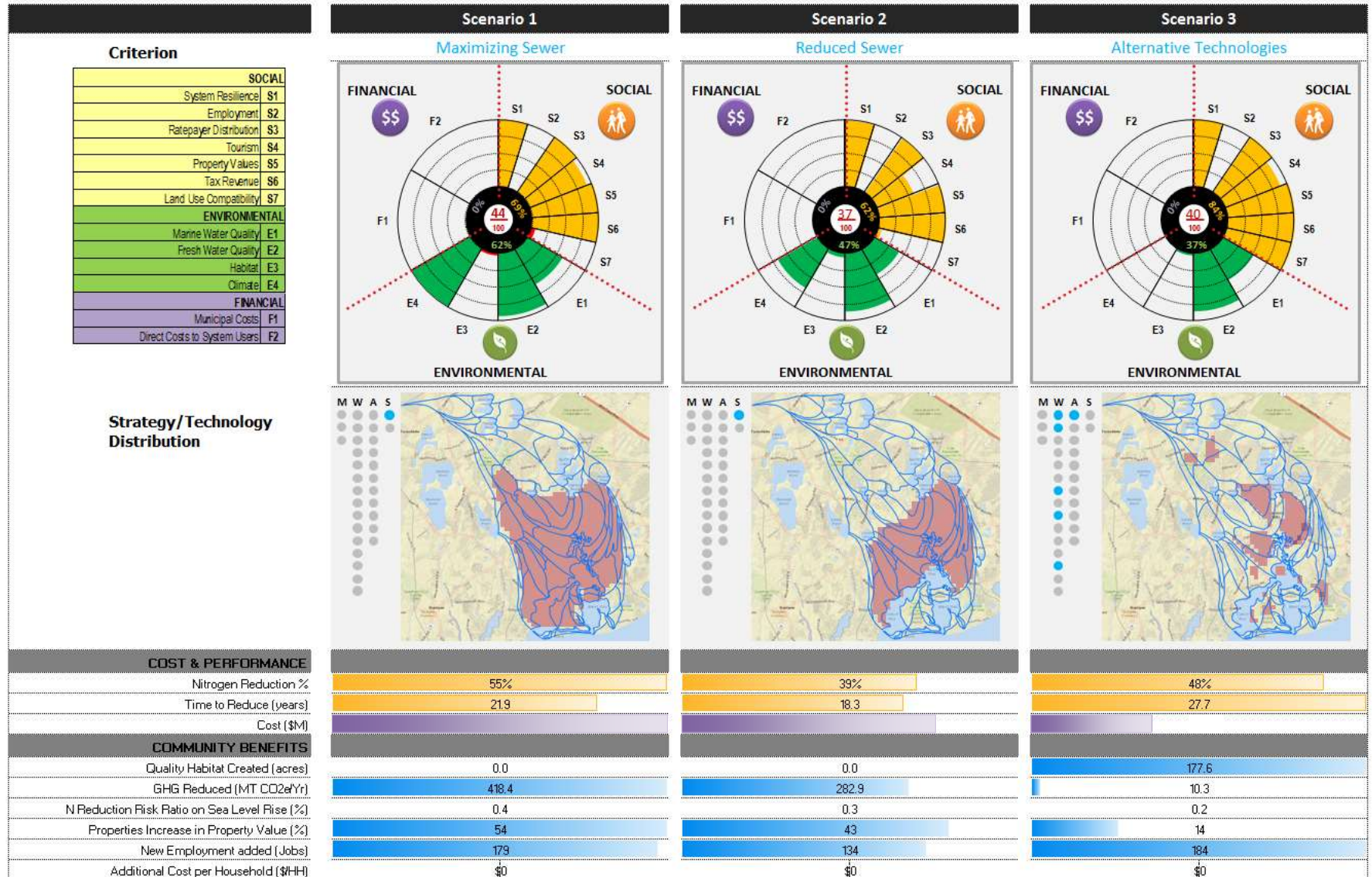


E1: System Resilience E11: Marine Water Quality F1: Municipal Costs
 E2: Employment E2: Fresh Water Quality F2: Direct Costs to System Users
 E3: Ratepayer Distribution E3: Habitat
 E4: Tourism E4: Climate
 E5: Property Values
 E6: Tax Revenue
 E7: Land Use Compatibility

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N Reduction Risk Ratio on Sea Level Rise	0.2%
% Properties Increase in Property Value	14%
New Employment added	184 jobs
Additional Cost per Household	\$/HH/yr

Note: TBL Financial Indicators Not Shown

SCENARIO COMPARISONS



Note: TBL Financial Indicators Not Shown

Regulatory, Legal, Institutional

COLLABORATION
MODELS

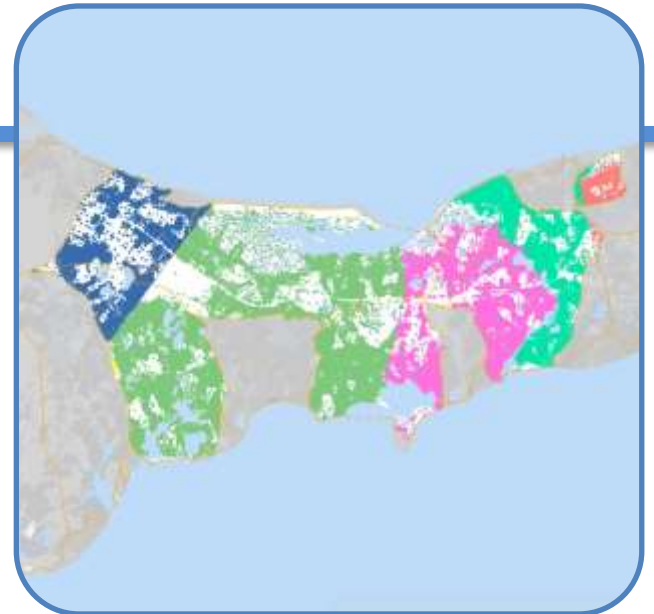
JURISDICTION OF THE PROBLEM

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 DISTRICT

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 MID CAPE AND
CAPE COD?**

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

Implementation

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

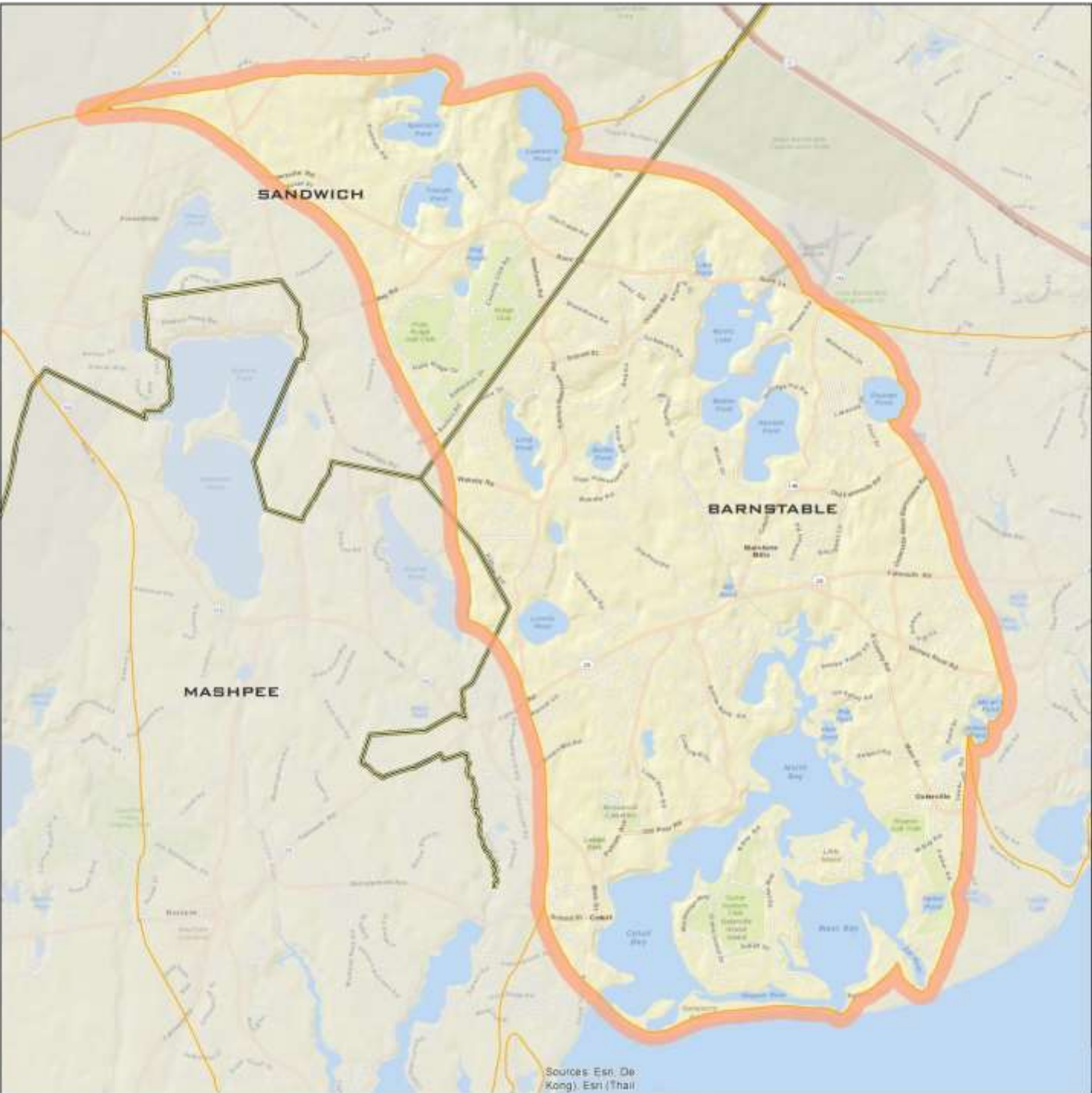
MONITORING SUBCOMMITTEE

Invited Members:

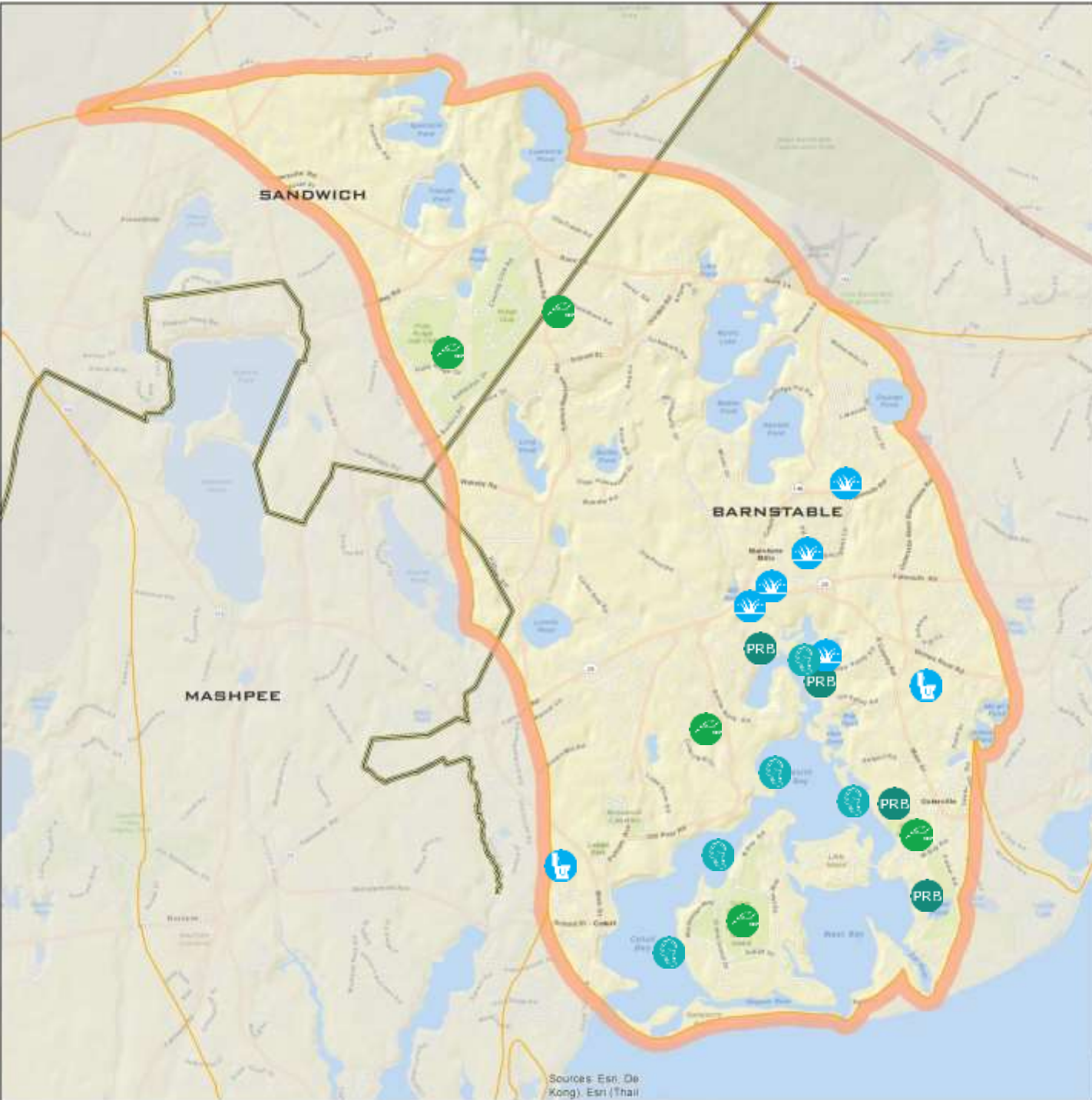
DEP, EPA, Provincetown
Center, WBNERR, Town Rep,
Academics, SMAST, CCC,
Institution/Agency

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	Varies
	I/A Title 5 Systems	Influent/ Effluent WQ + quantity	Quarterly













Sources: Esri, DeLorme, Esri (Thailand)



Sources: Esri, DeLorme, Swire, Esri, Esri (China), Esri (India), Esri (Japan), Esri (Korea), Esri (Taiwan), Esri (Vietnam), Esri (Thailand), Esri (Southeast Asia), Esri (Africa), Esri (Latin America), Esri (Middle East), Esri (Europe), Esri (USA), Esri (Australia), Esri (New Zealand), Esri (Oceania), Esri (Antarctica), Esri (Arctic), Esri (Alaska), Esri (Hawaii), Esri (Caribbean), Esri (South America), Esri (North America), Esri (Europe), Esri (Africa), Esri (Asia), Esri (Oceania), Esri (Antarctica)

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

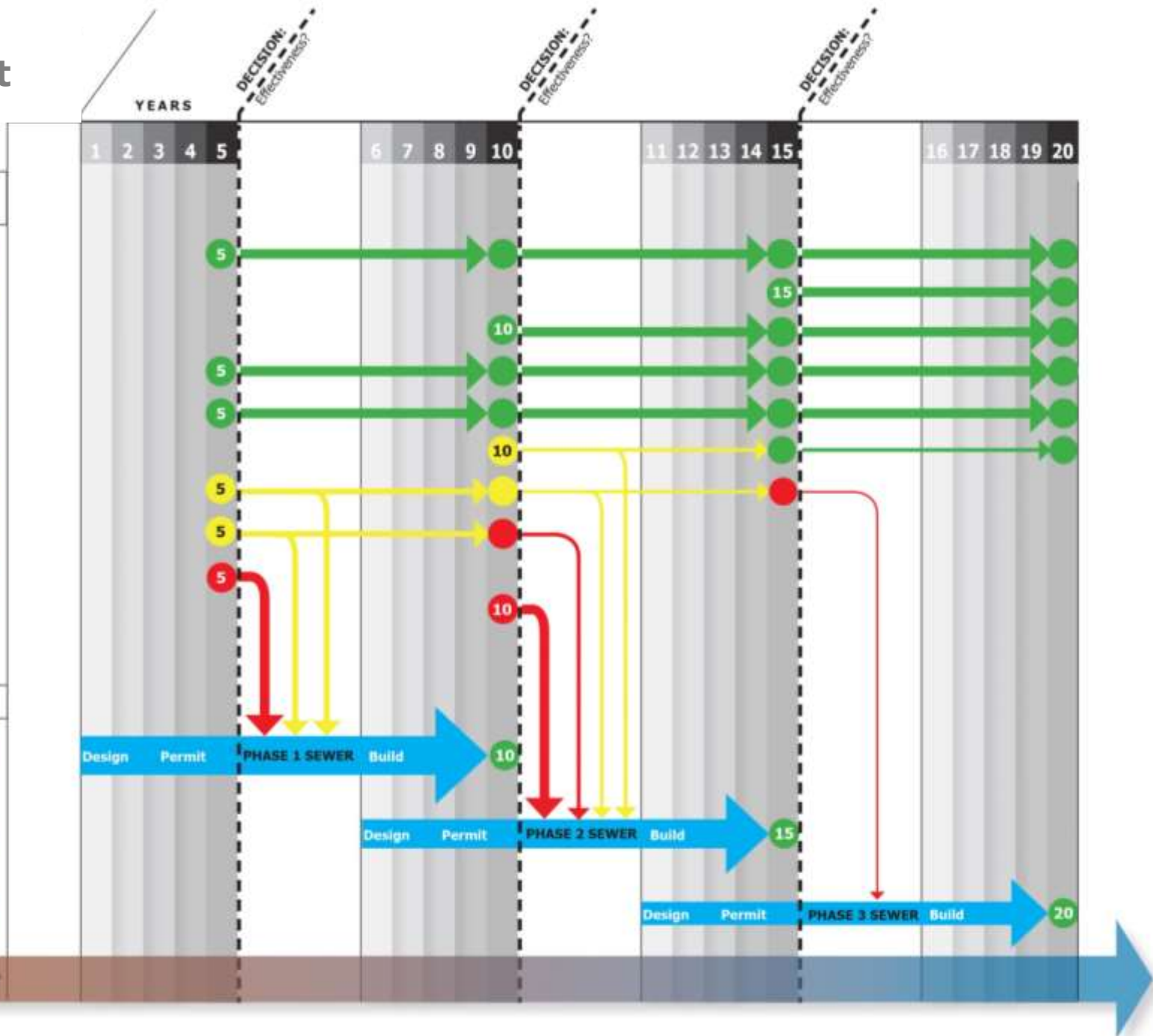
SELECTED SCENARIO: Alternative Technologies

-  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 Mid Cape Sub Regional Group will be available on the Cape Cod Commission website:



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