Lower 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

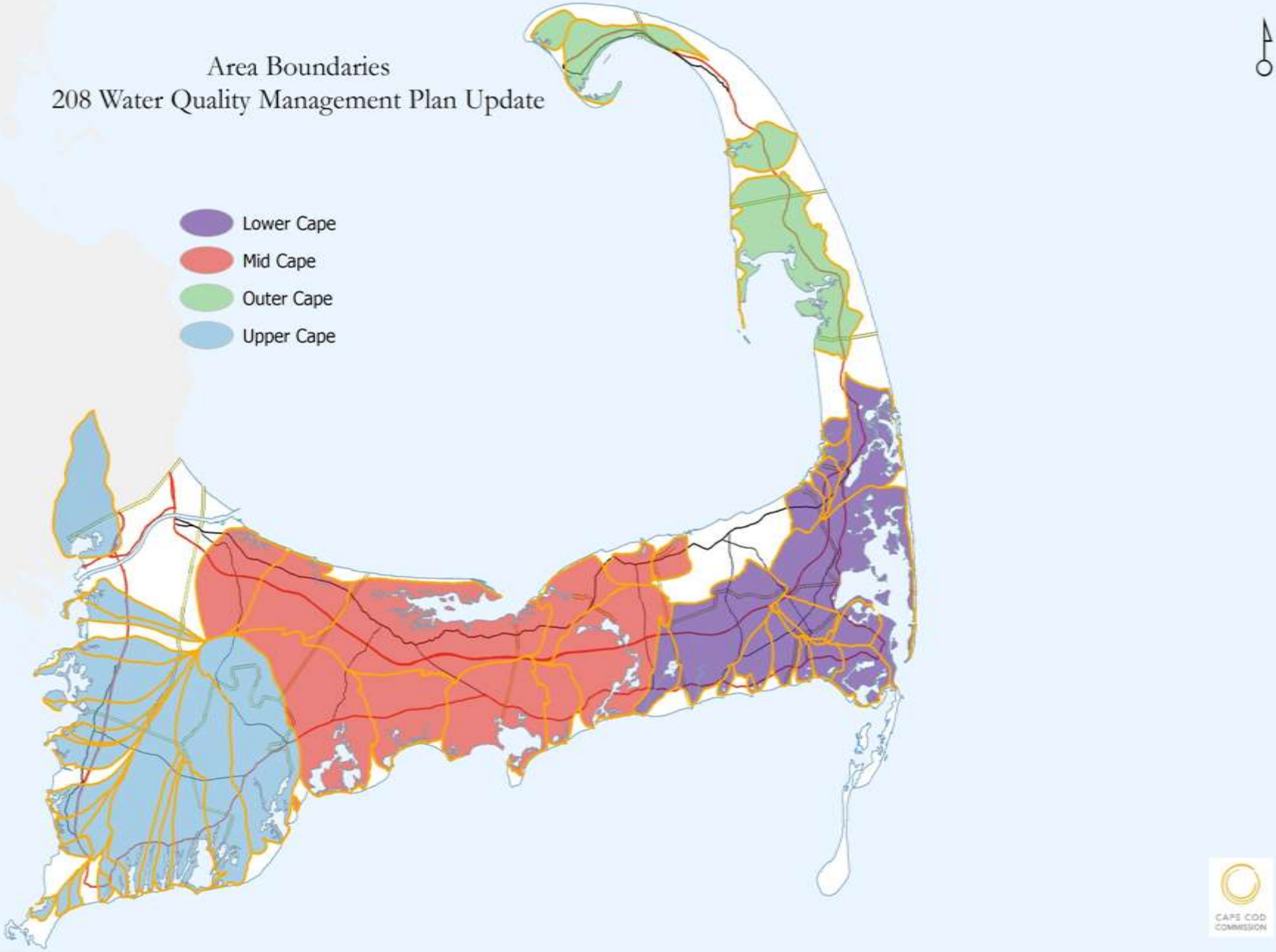
Meeting 2 Goals:

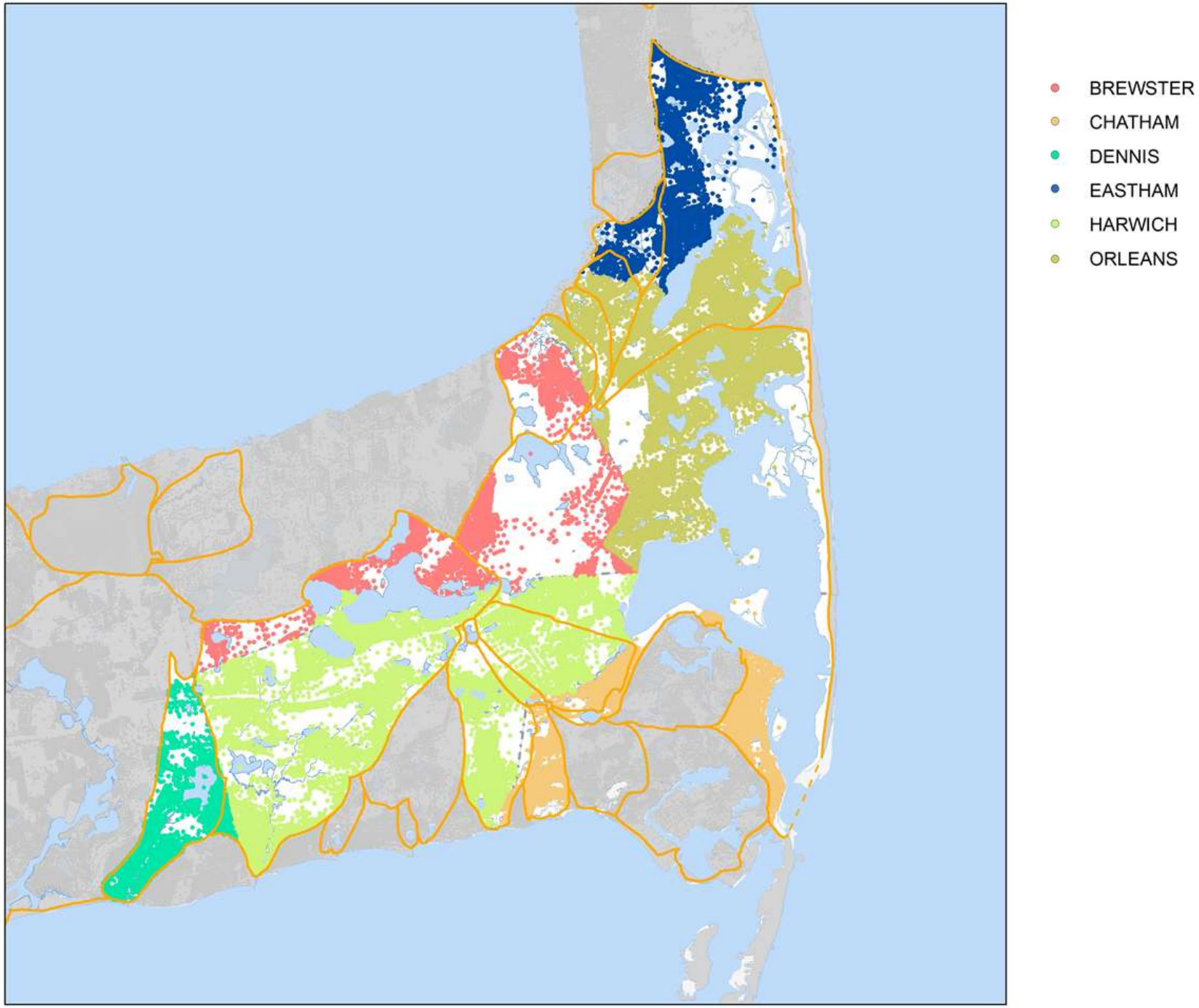
- Introduce the **Triple Bottom Line** analysis tool and its application to scenario planning
- Identify key criteria for **successful collaboration** for shared watersheds and evaluate existing models against the criteria
- Clarify the scope and charge of the **Ad Hoc Monitoring Committee** to meet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

Scenario Planning

LOWER CAPE

Area Boundaries
208 Water Quality Management Plan Update




BREWSTER
CHATHAM
DENNIS
EASTHAM
HARWICH
ORLEANS

LOWER CAPE SUB-REGIONAL
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

Collecting parcels:	9,656 parcels
Miles of collection:	292 miles
Flow:	1,380,821 gallons per day

LOWER CAPE SUB-REGIONAL TRADITIONAL

50% Fertilizer/Stormwater Reduction

Collecting parcels:	7,544 parcels
Miles of collection:	231 miles
Flow:	1,071,017 gallons per day

LOWER CAPE SUB-REGIONAL
TRADITIONAL
25% Removal for Non MEP Watersheds

Collecting parcels:	567 parcels
Miles of collection:	18 miles
Flow:	71,482 gallons per day

NAUSET MARSH
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

Collecting parcels:	1,627 parcels
Miles of collection:	58 miles
Flow:	267,396 gallons per day

NAUSET MARSH
TRADITIONAL
50% Fertilizer/Stormwater Reduction

Collecting parcels:	1,225 parcels
Miles of collection:	48 miles
Flow:	213,358 gallons per day

NAUSET MARSH
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

	Total	Orleans	Eastham
Collecting parcels:	1,627 parcels	560	1077
Miles of collection:	58 miles		
Flow:	267,396 gpd		

TOWN COVE
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

	Total	Orleans	Eastham
Collecting parcels:	1,215 parcels	560	655
Miles of collection:	44 miles		
Flow:	201,169 gpd		

SALT POND
TRADITIONAL
CENTRALIZED – INSIDE WATERSHED SOLUTIONS

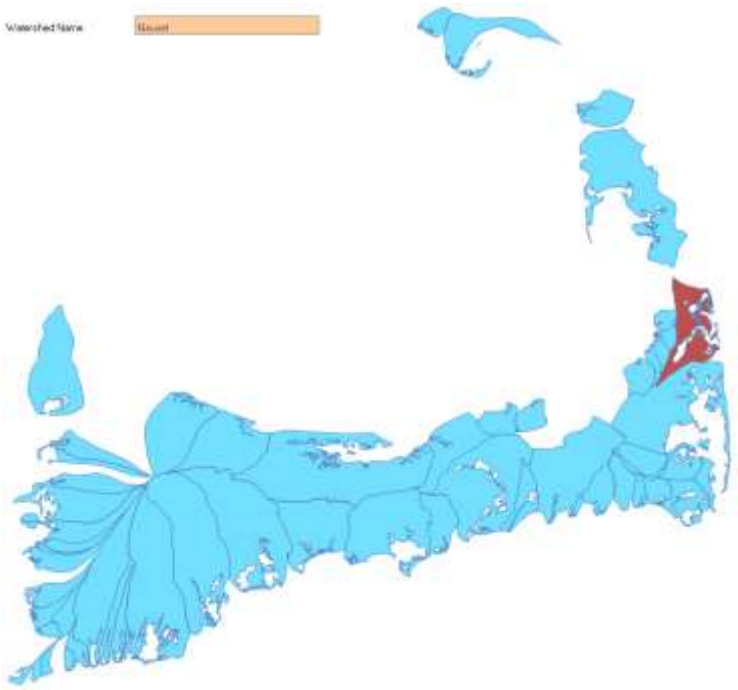
	Total
Collecting parcels:	422 parcels
Miles of collection:	15 miles
Flow:	68,859 gpd

NAUSET MARSH
NON-TRADITIONAL

- Saltwater & Fert. Reduction
- Constructed Wetlands
- Fertigation Wells-Turf
- Fertigation Wells-Bogs
- Dredging/ Inlet Widening
- Habitat Restoration
- Surface Water Remediation wetland

2	Aquaculture
3	PRBs
3	Floating Constructed Wetlands
27	Ecotoilets
402	Ecotoilets-Public (people)
60	I&A
3	Enhanced I&A

NAUSET TRIPLE BOTTOM LINE ASSESSMENT



Key Inputs	Update		
	%	Existing	Future
Present Controllable Load of Nitrogen (Kg/yr)			
Wastewater	90%	23,162	23,162
Fertilizer	6%	1,544	1,544
Stormwater	4%	1,029	1,029
Total	100%	25,735	25,735

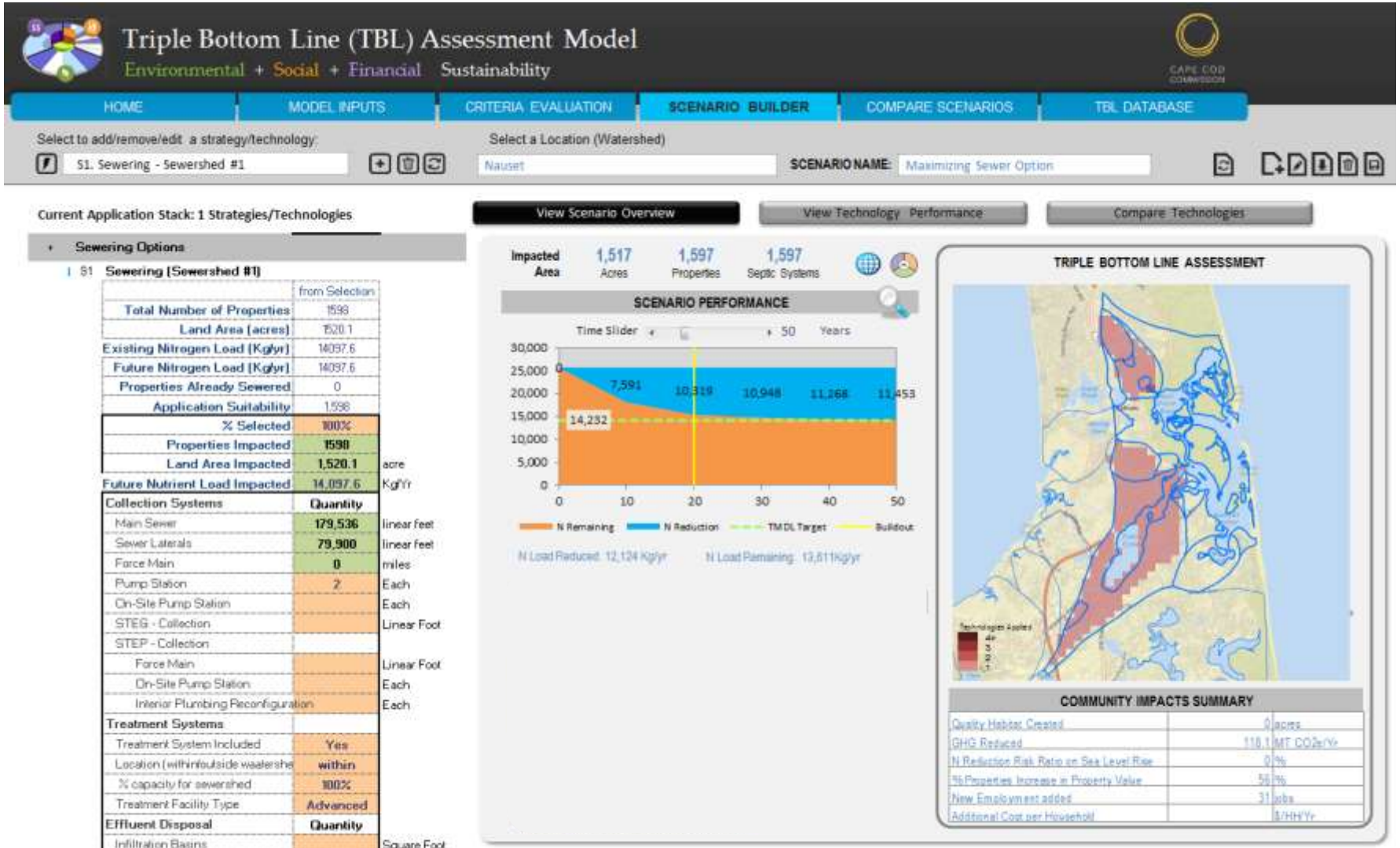
Target Setting	
Future Nitrogen Load (Kg/yr)	25,735
TMDL Target	44.7%
Target Nitrogen Load (Kg/yr)	14,232
Nitrogen Reduction Required (Kg/yr)	**11,504**

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	49.7%
	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	1%
	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 comapared 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 Phrosphorous	18 Kg/SF
	The minimum amount of phrosphorous concentration reduction in fresh water ponds (Kg/Acre/Yr)	
10	Min. % of TMDL Target Achievement in 20 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 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



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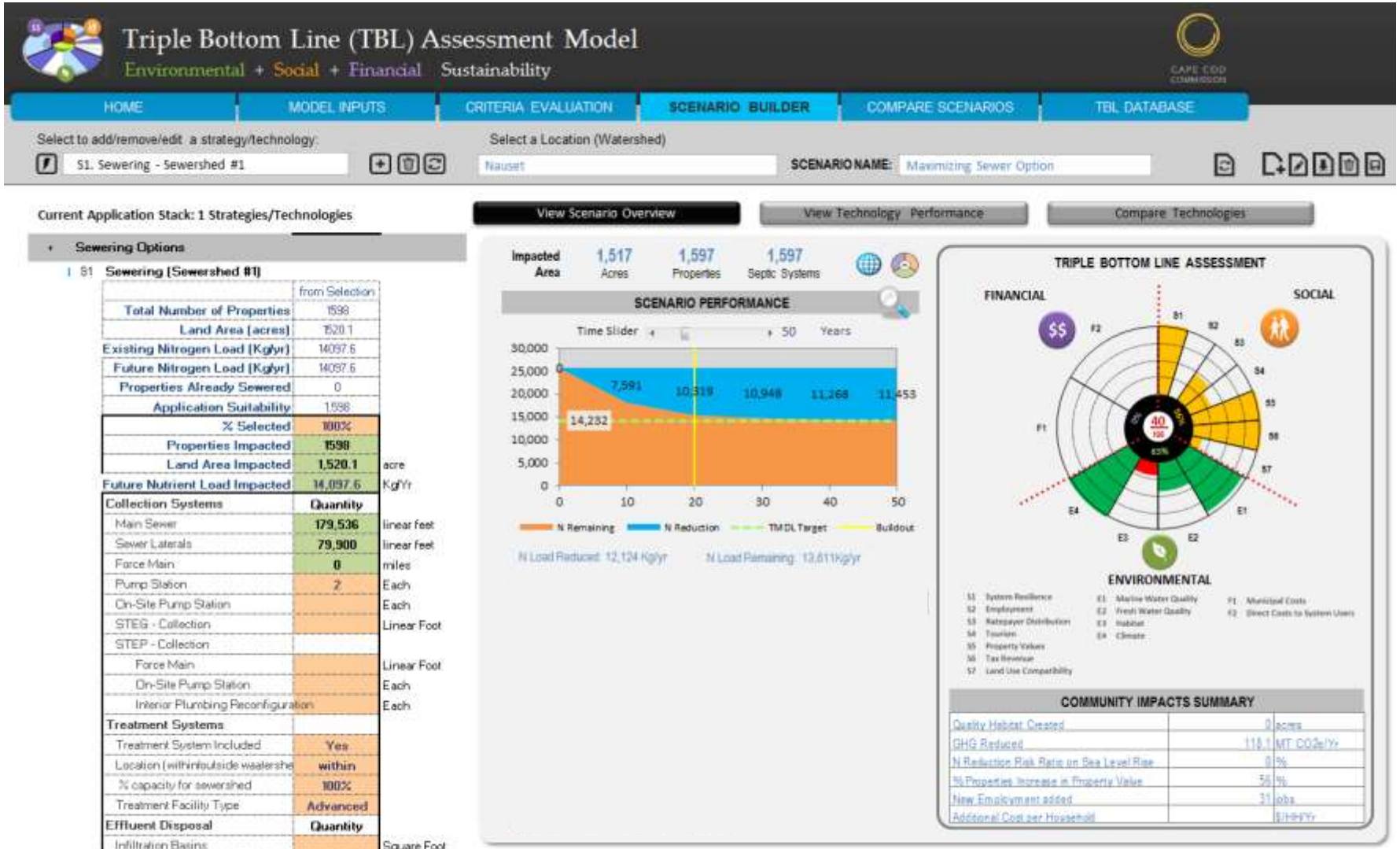
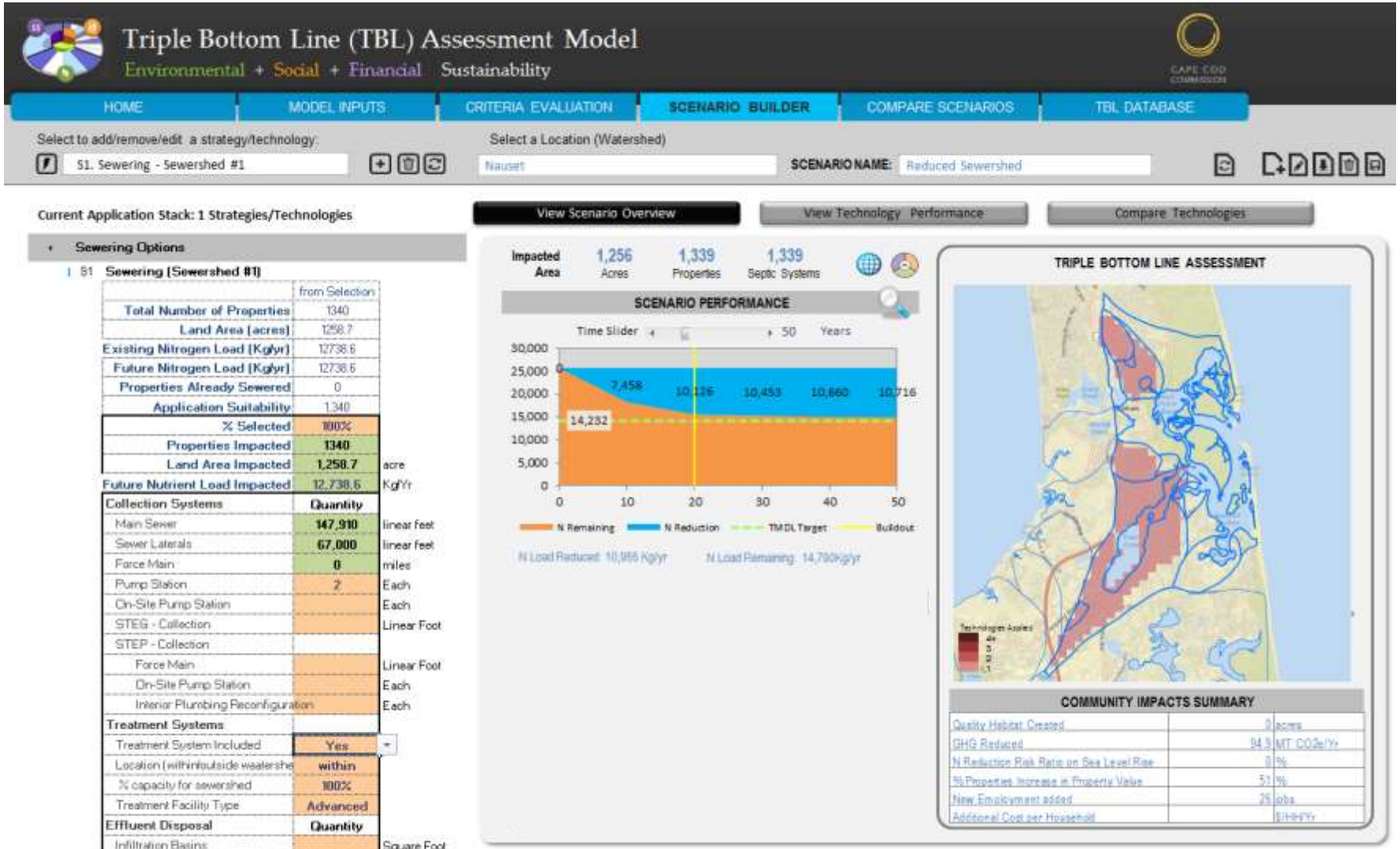


SCENARIO 2 : Reduced Sewershed



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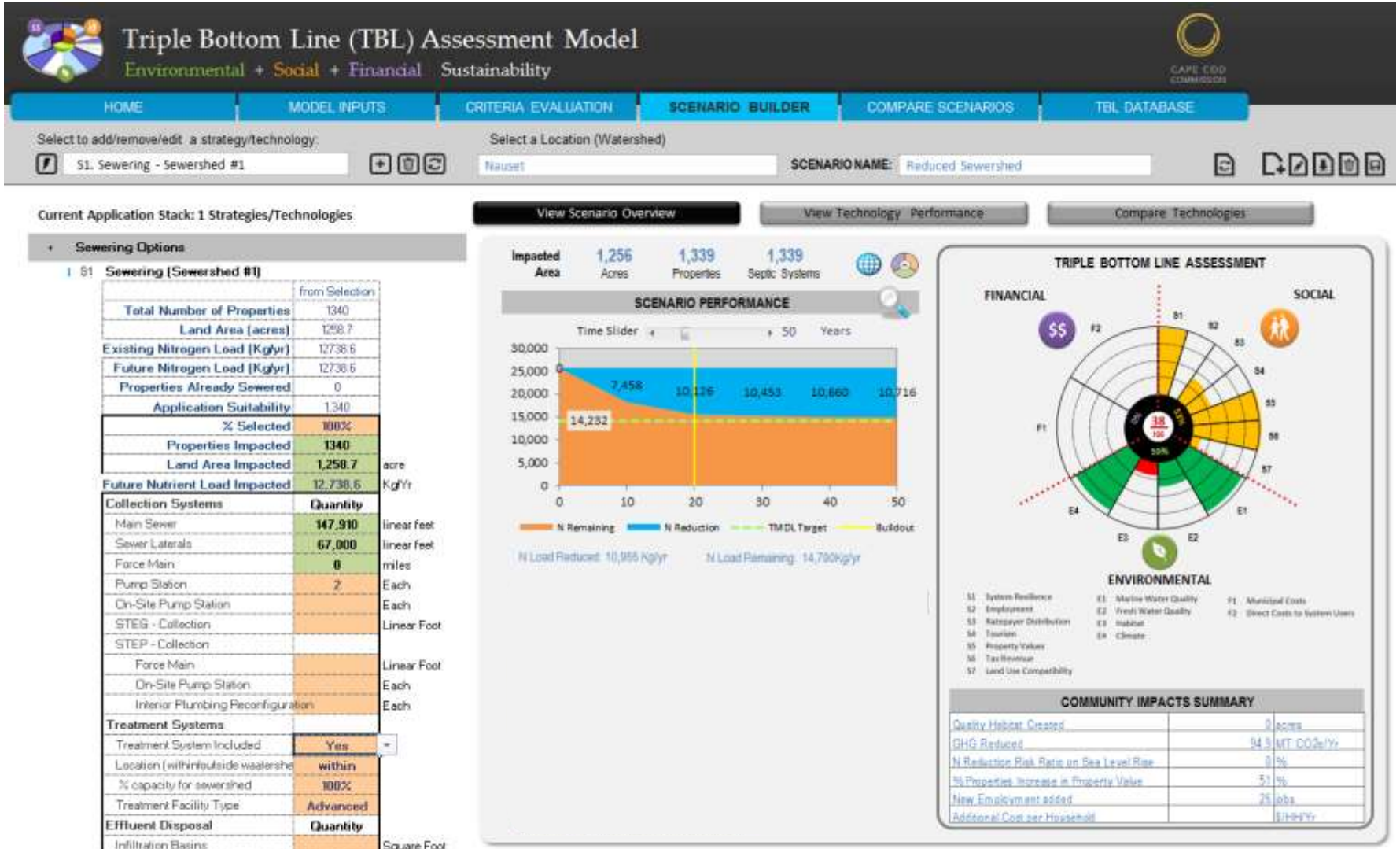
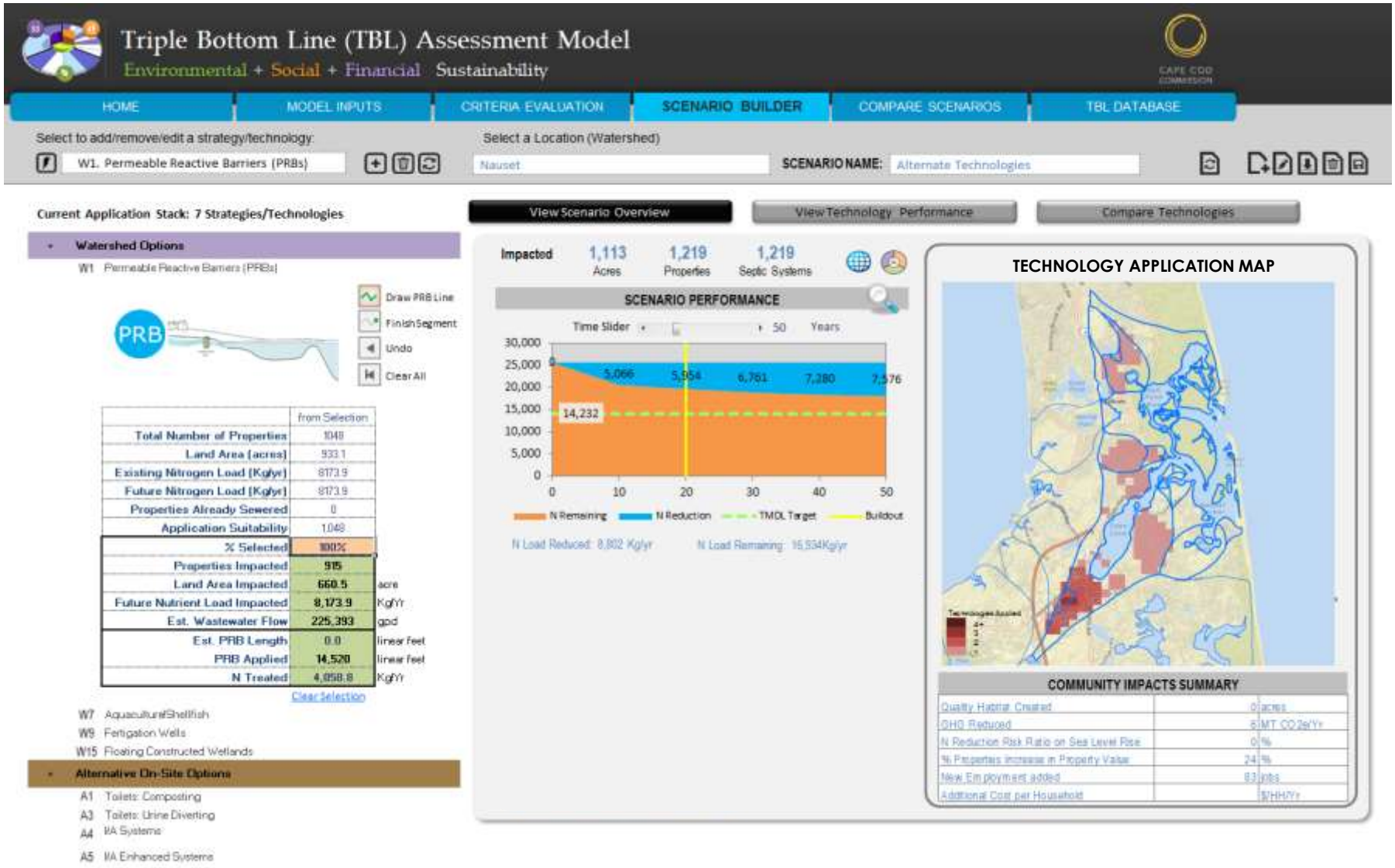


SCENARIO 3 : Alternate Technology



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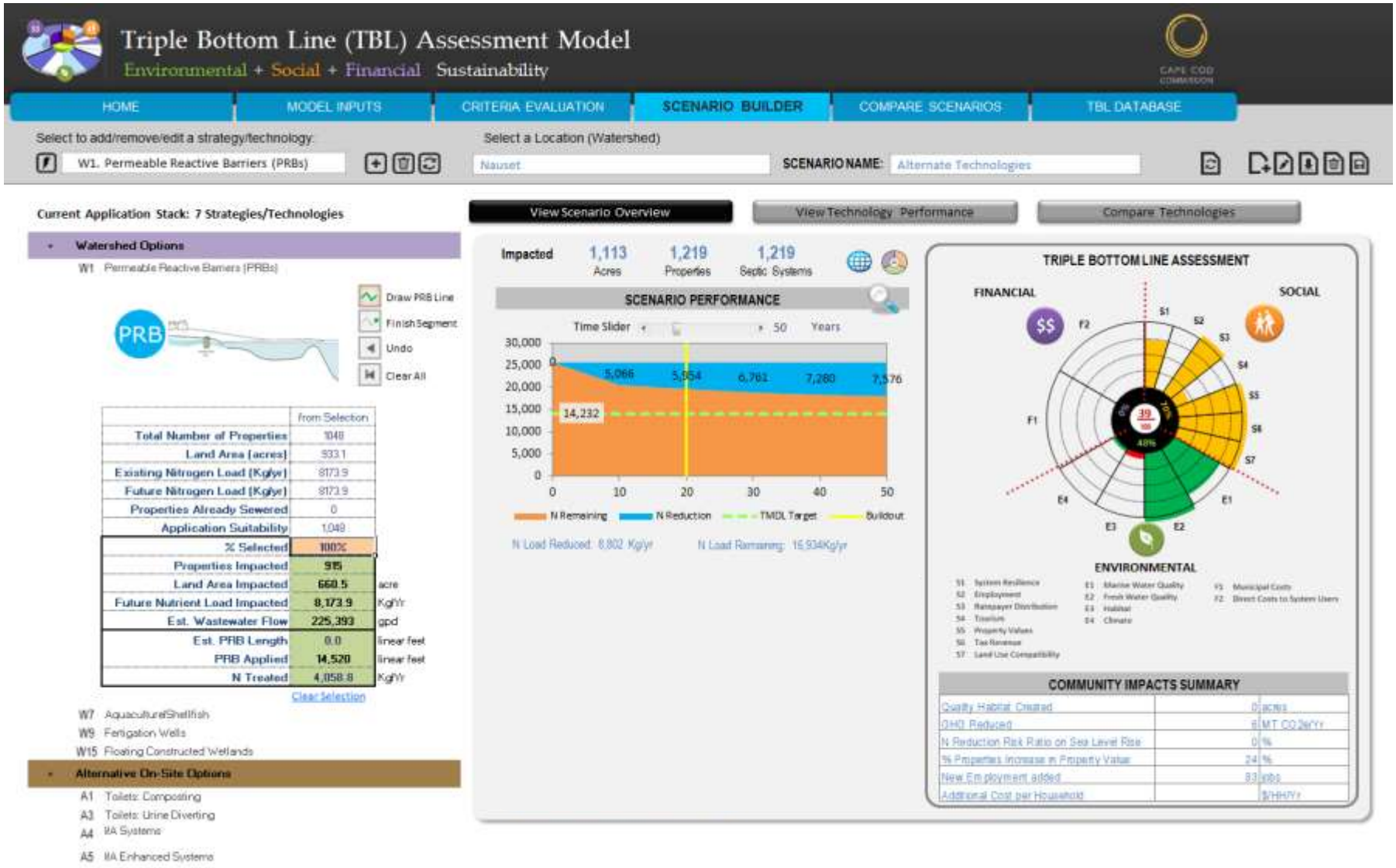


SCENARIO COMPARISONS

Criterion		Scenario 1 Maximizing Sewer Option	Scenario 2 Reduced Sewershed	Scenario 3 Alternate Technologies
SOCIAL				
System Resilience	S1			
Employment	S2			
Ratepayer Distribution	S3			
Tourism	S4			
Property Values	S5			
Tax Revenues	S6			
Land Use Compatibility	S7			
ENVIRONMENTAL				
Marine Water Quality	E1			
Fresh Water Quality	E2			
Habitat	E3			
Climate	E4			
FINANCIAL				
Municipal Costs	F1			
Direct Costs to System Users	F2			
Strategy/Technology Distribution				
COST & PERFORMANCE				
Nitrogen Reduction %		47%	43%	34%
Time to Reduce (years)		33.0	25.0	34.0
Cost ($M)				
COMMUNITY BENEFITS				
Quality Habitat Created (acres)		0.0	0.0	0.0
GHG Reduced (MT CO2e/Yr)		118.1	94.9	6.0
N Reduction Risk Ratio on Sea Level Rise (%)		0.0	0.0	0.0
Properties Increase in Property Value (%)		$56	$51	$24
New Employment added (Jobs)		31	26	83
Additional Cost per Household ($/HH)		$0	$0	$0

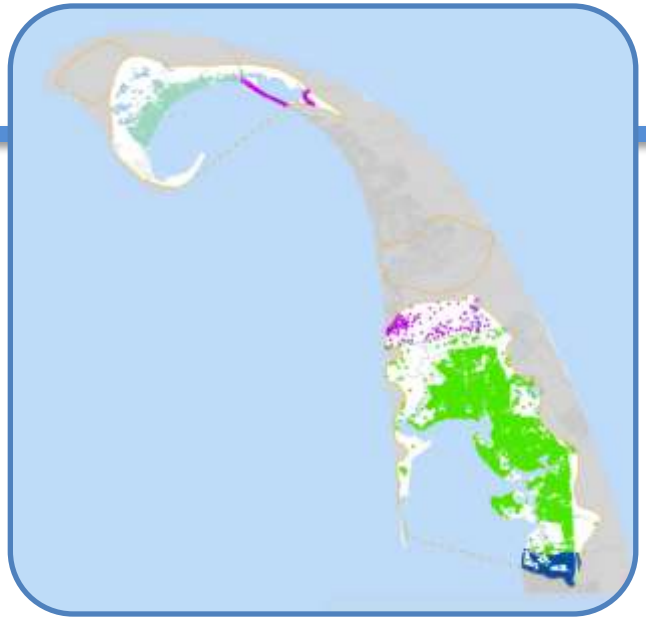
Regulatory, Legal, Institutional

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



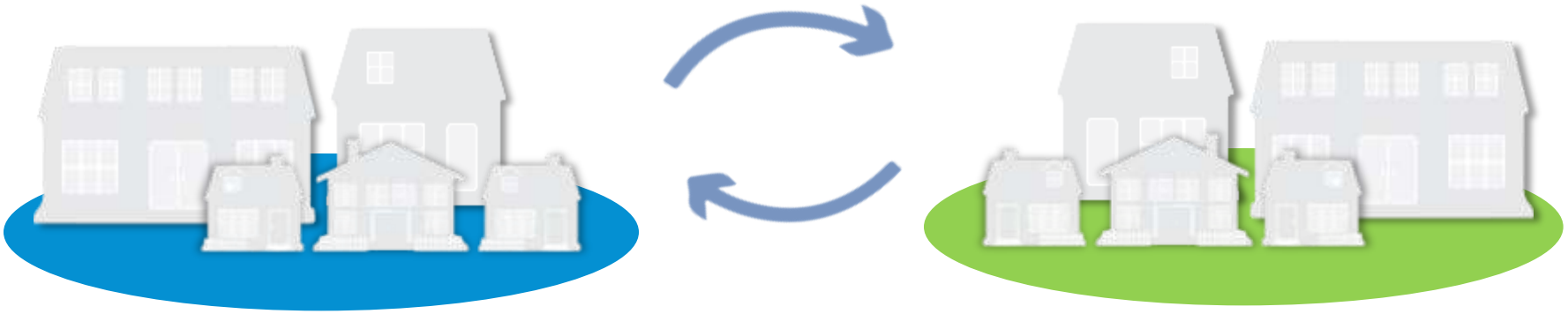
JURISDICTION OF THE SOLUTION

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 infastructure

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 intergovermental 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 LOWER 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)
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Who pays?

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- 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

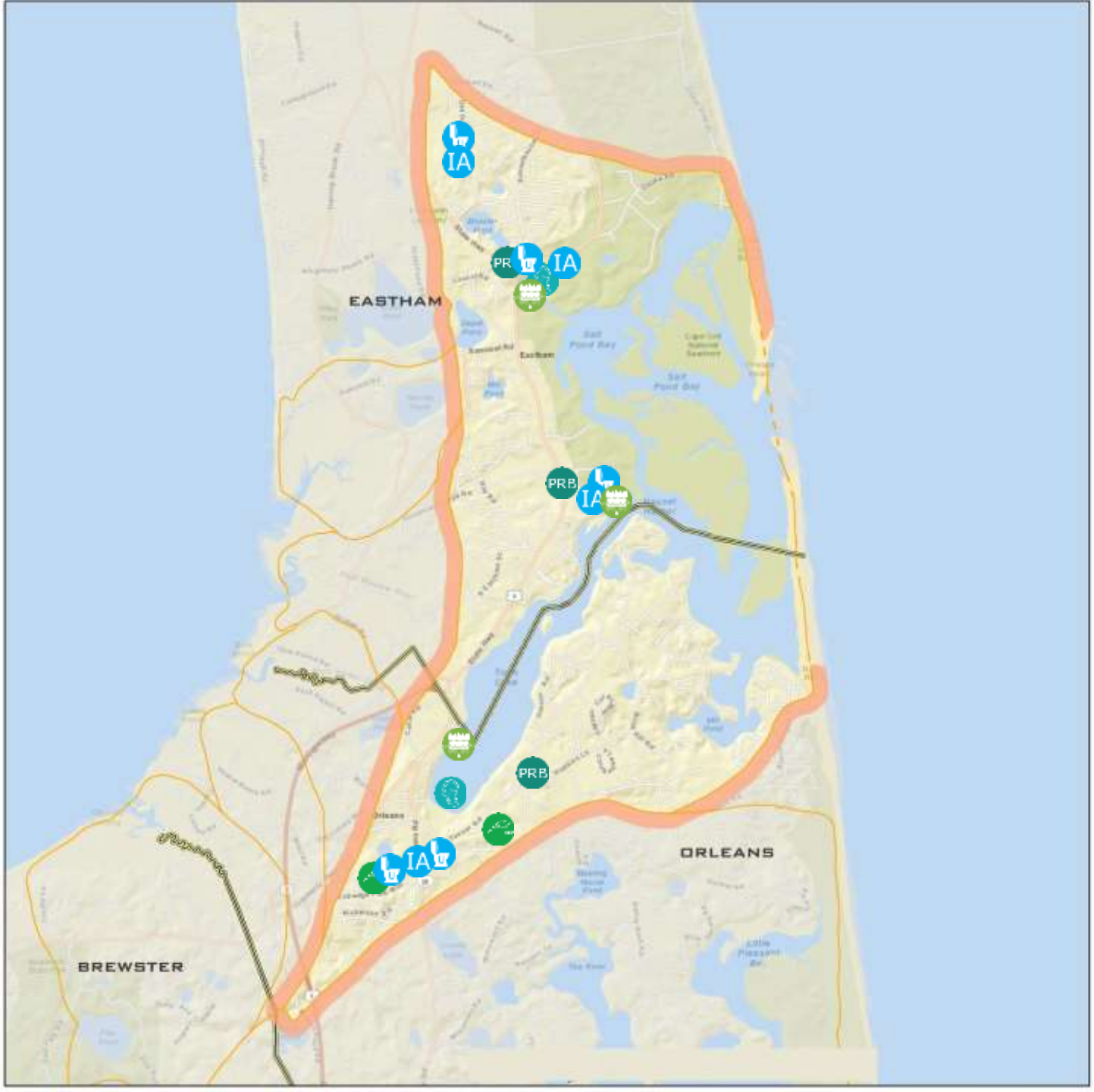
MONITORING SUBCOMMITTEE

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
SatelliteTreatment 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 - varries based on conditions, groundwater monitoring may not be required	Varries
I/A Title 5 Systems	Influent/ Effluent WQ + quantity	Quarterly


EASTHAM
ORLEANS
BREWSTER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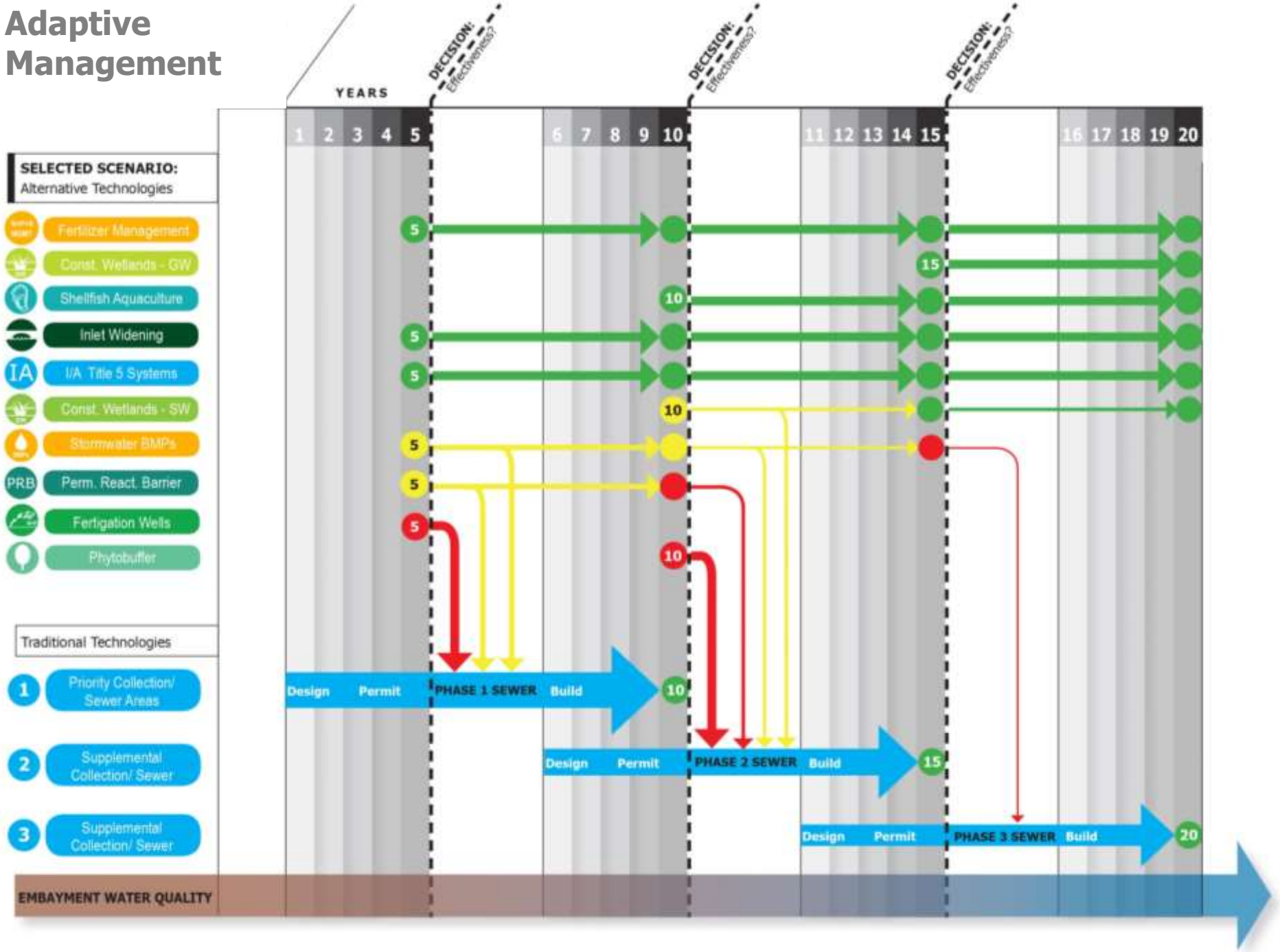
NON-TRADITIONAL TECHNOLOGY MONITORING FRAMEWORK FOR PILOT PROJECTS (PRELIMINARY)

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
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



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

http://watersheds.capecodcommission.org/index.php/watersheds/lower-cape