Cape Cod 208 Area Water Quality Planning
Cape Cod Bay Watershed Working Group

Meeting Three
Monday, December 9, 2013 | 8:30 am – 12:30 pm
Cape Cod Commission, 3225 Main Street, Barnstable

Meeting Agenda

8:30 Welcome, Review 208 goals and Process and the Goals of today's meeting – *Cape Cod Commission Area Manager*

8:45 Introductions, Agenda Overview, Updates and Action Items– *Facilitator and Working Group*

9:00 Presentation of Initial Scenarios for each watershed – *Cape Cod Commission Technical Lead*
- Whole Watershed Conventional Scenarios
- Targeted Conventional Scenarios to meet the TMDLs (or expected TMDLs):
- Whole Watershed 7-Step Scenarios
- Working Group Reactions, Questions and Discussion

10:30 Break

10:45 Adaptive Management – *Cape Cod Commission and Working Group*
- Adaptive Management Sample Scenarios
- Key Adaptive Management Questions
- Defining Adaptive Management

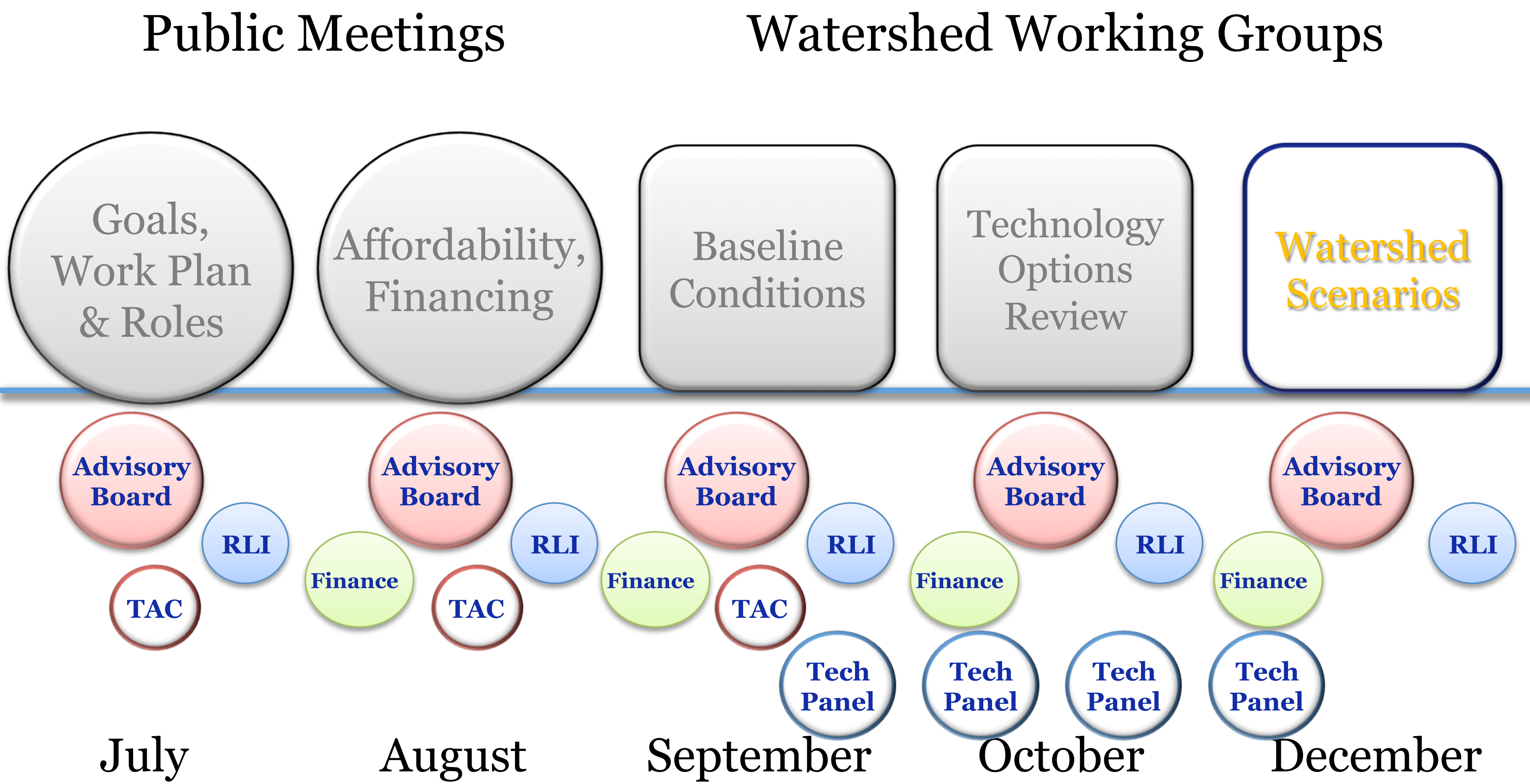
11:30 Preparing for 2014 Jan-June – *Cape Cod Commission and Working Group*
- Triple Bottom Line approach
- Identify Shared Principles and Lessons Learned
- Describe Next Steps

12:15 Public Comments

12:30 Adjourn

Cape Cod Bay Group

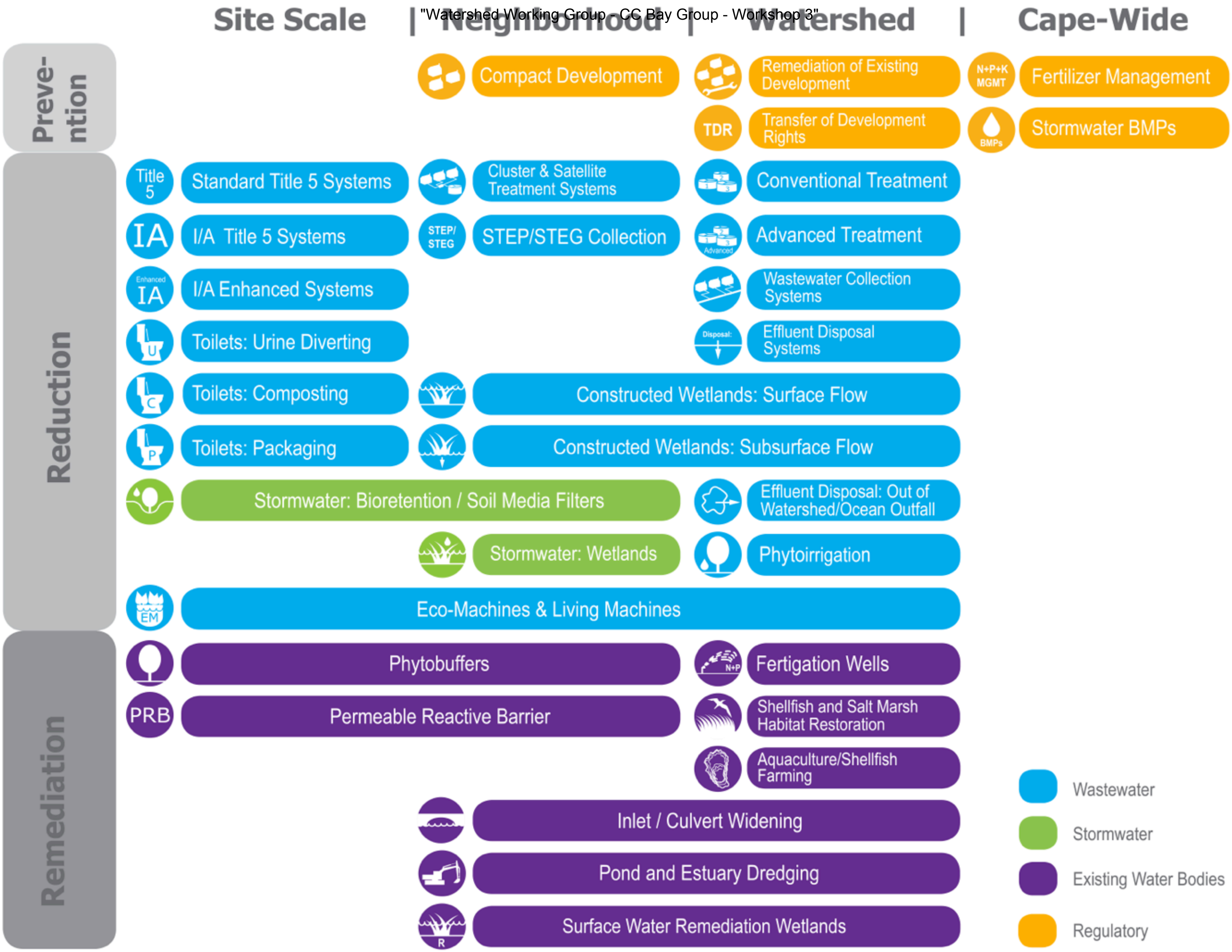
Watershed Scenarios



RLI Regulatory, Legal & Institutional Work Group

TAC Technical Advisory Committee of Cape Cod Water Protection Collaborative

208 Planning Process


Site Scale
Neighborhood
Watershed
Cape-Wide
Prevention
Reduction
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Remediation of Existing Development
Fertilizer Management
N+P+K MGMT
TDR
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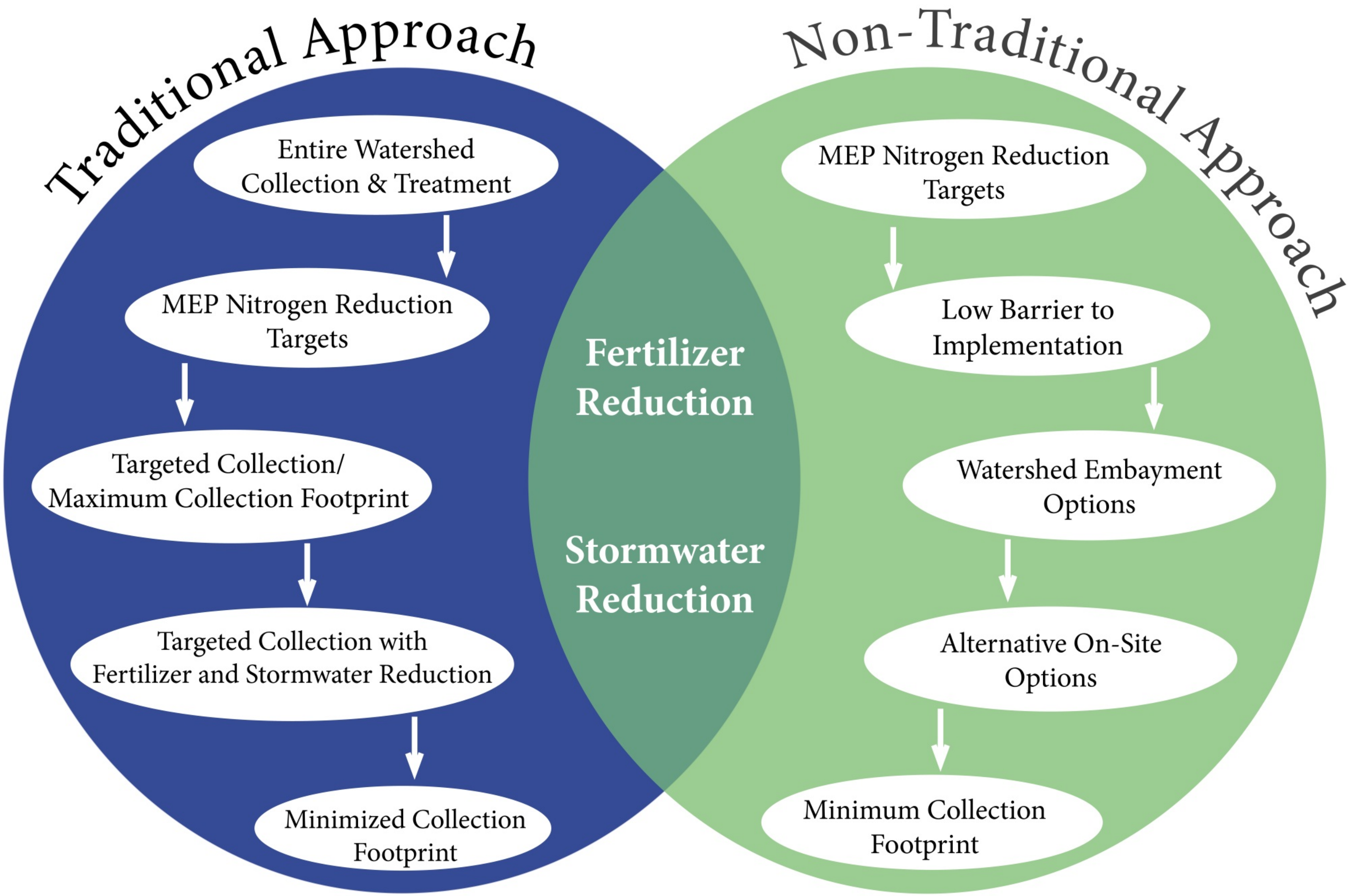
Inlet / Culvert Widening
Pond and Estuary Dredging
R
Surface Water Remediation Wetlands
Wastewater
Stormwater
Existing Water Bodies
Regulatory

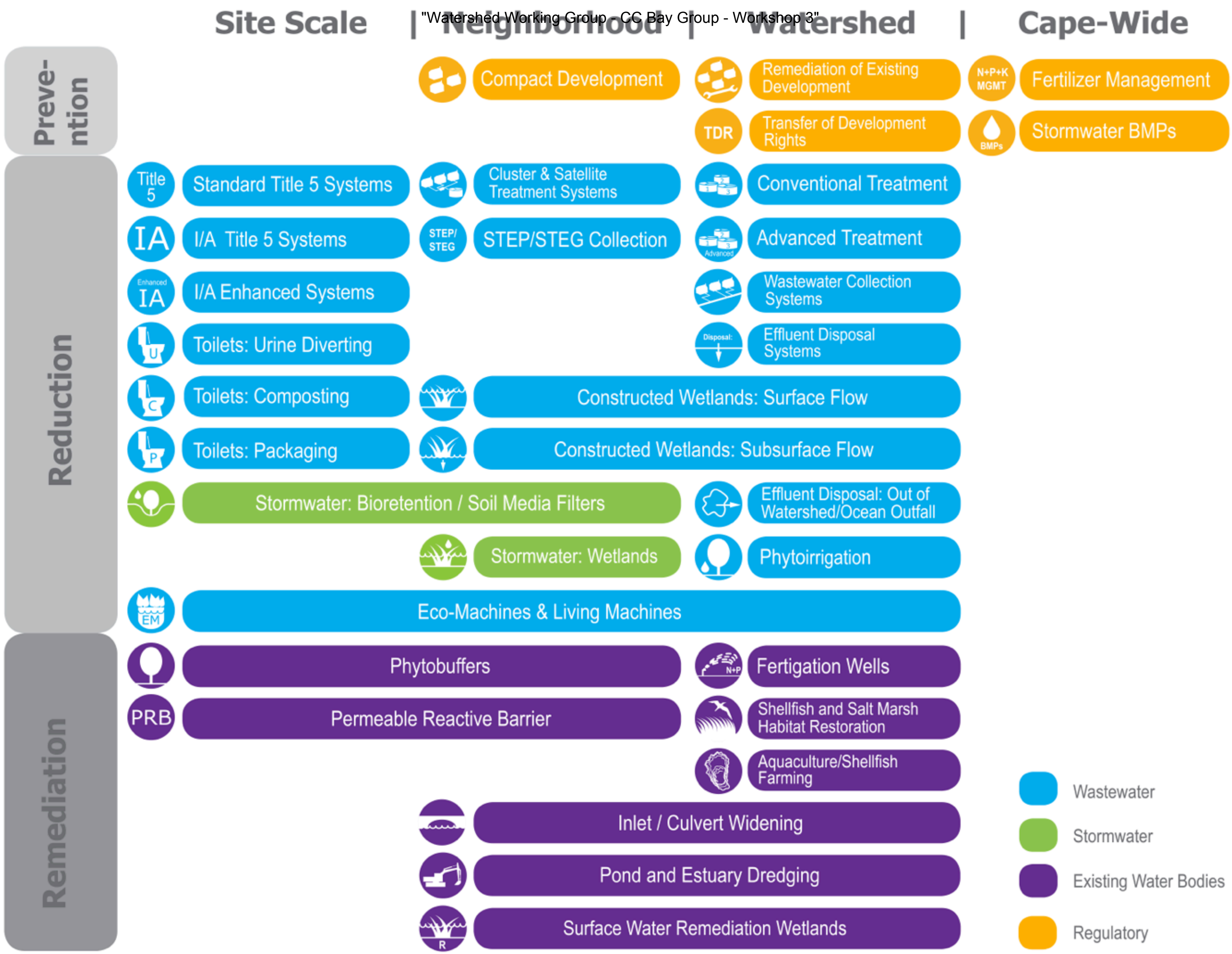
Watershed Scenarios

11 Working Group Meetings: Dec 2-11

Goal of Today's Meeting:

- To discuss the approach for developing watershed scenarios that will remediate water quality impairments in your watersheds.
- To identify preferences, advantages and disadvantages of a set of scenarios of different technologies and approaches, and
- To develop a set of adaptive management principles to guide sub-regional groups in refining scenarios for the 208 Plan.


Traditional Approach
Entire Watershed Collection & Treatment
MEP Nitrogen Reduction Targets
Targeted Collection/ Maximum Collection Footprint
Targeted Collection with Fertilizer and Stormwater Reduction
Minimized Collection Footprint
Fertilizer Reduction
Stormwater Reduction
Non-Traditional Approach
MEP Nitrogen Reduction Targets
Low Barrier to Implementation
Watershed Embayment Options
Alternative On-Site Options
Minimum Collection Footprint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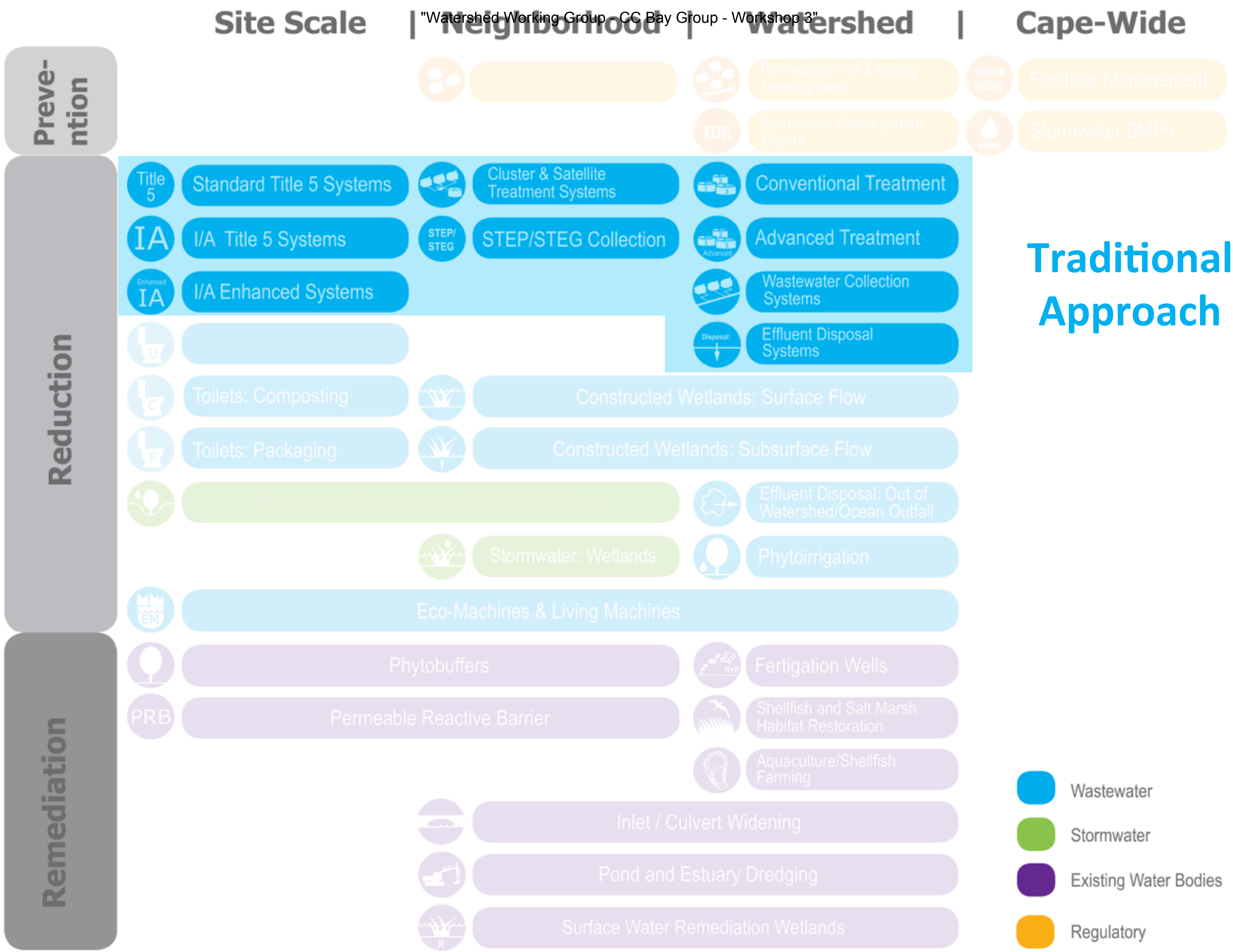
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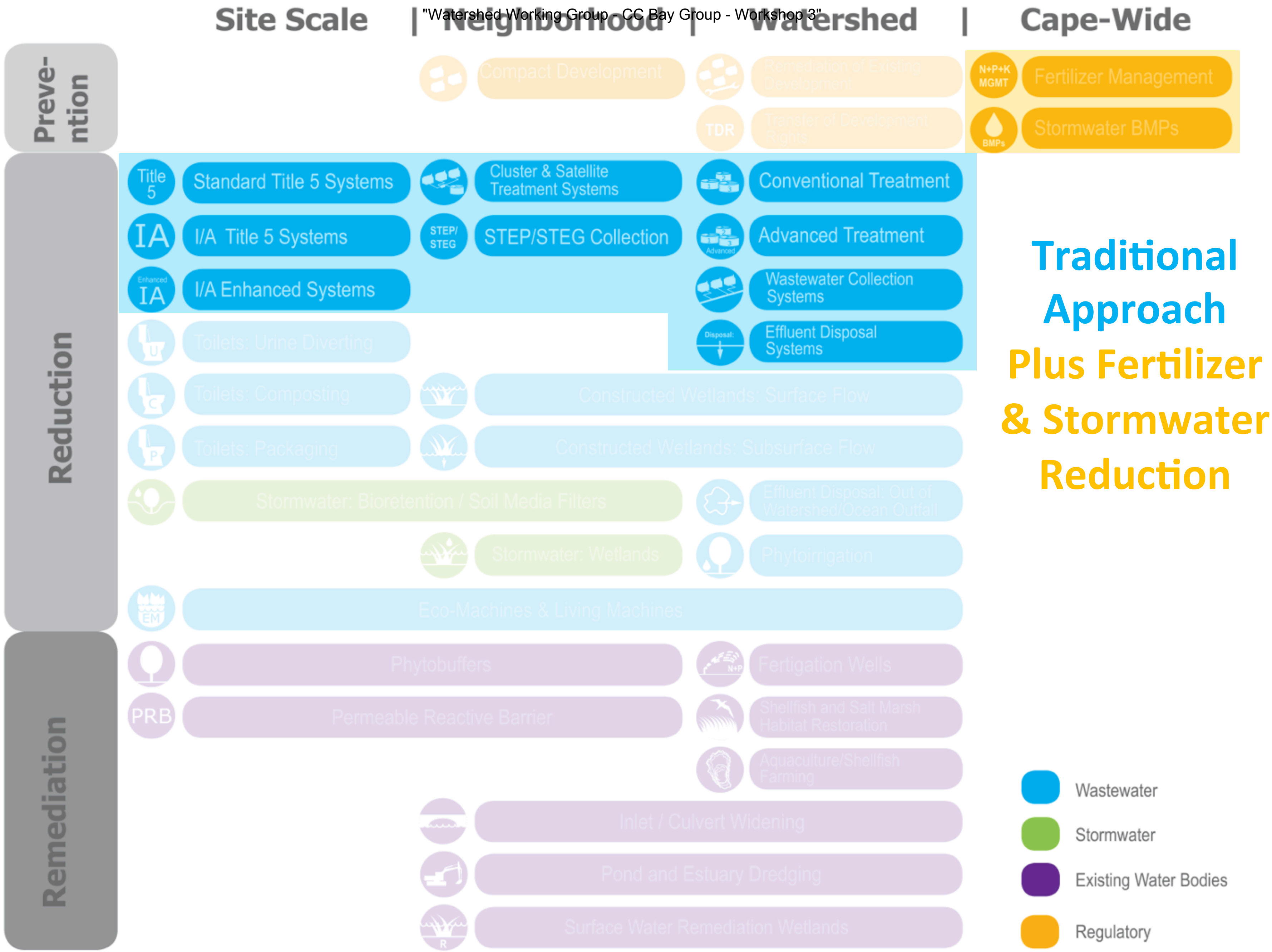
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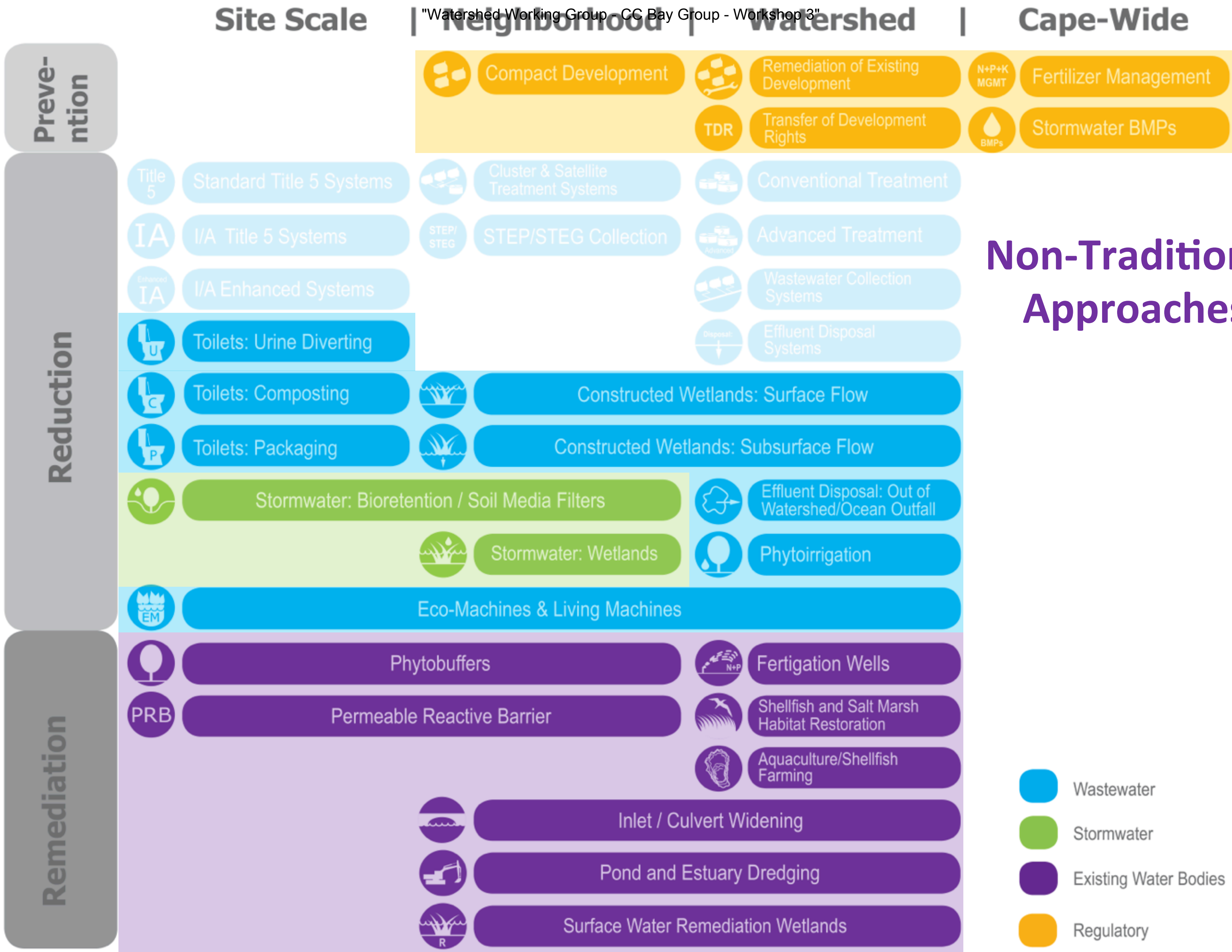
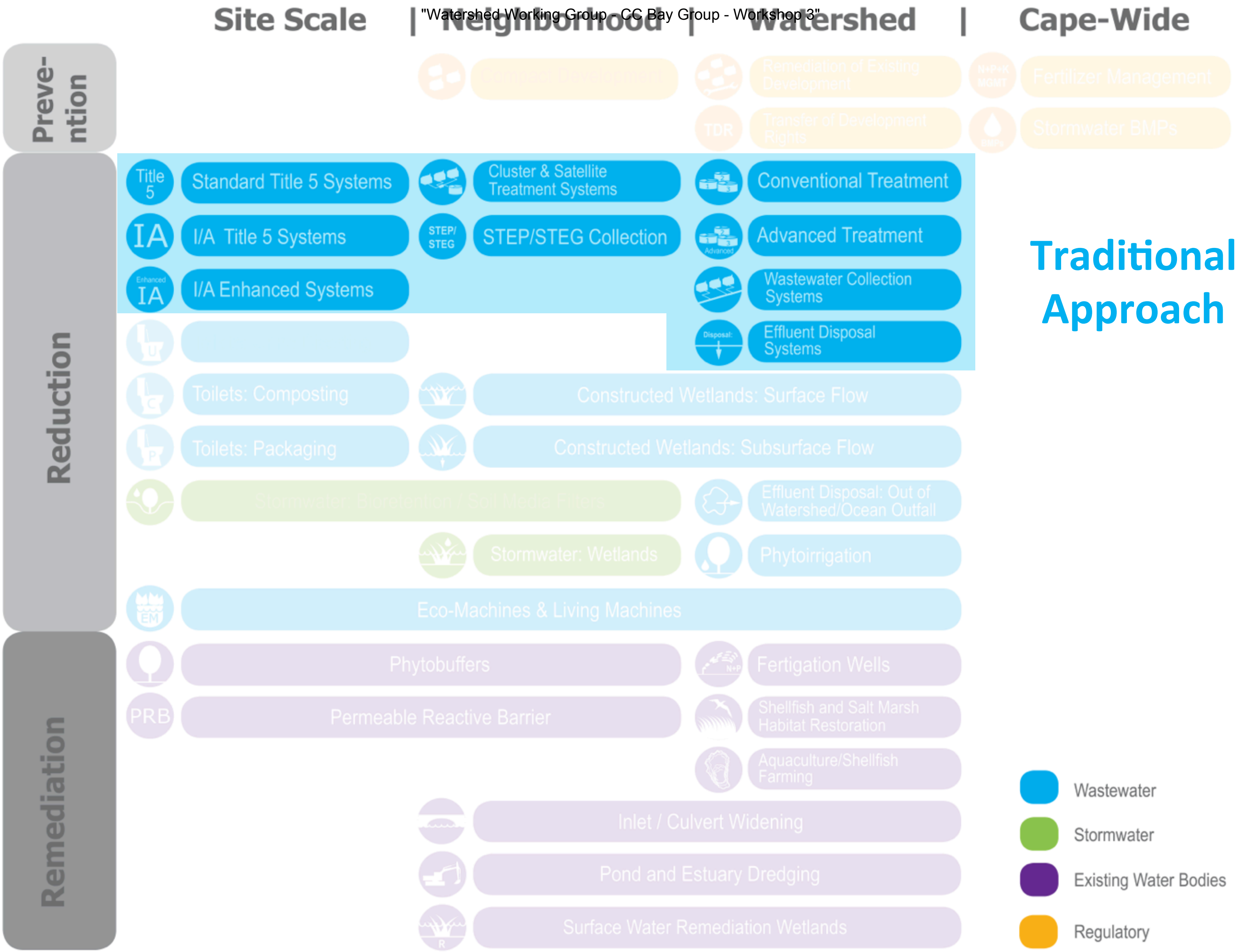
Non-Traditional Approaches

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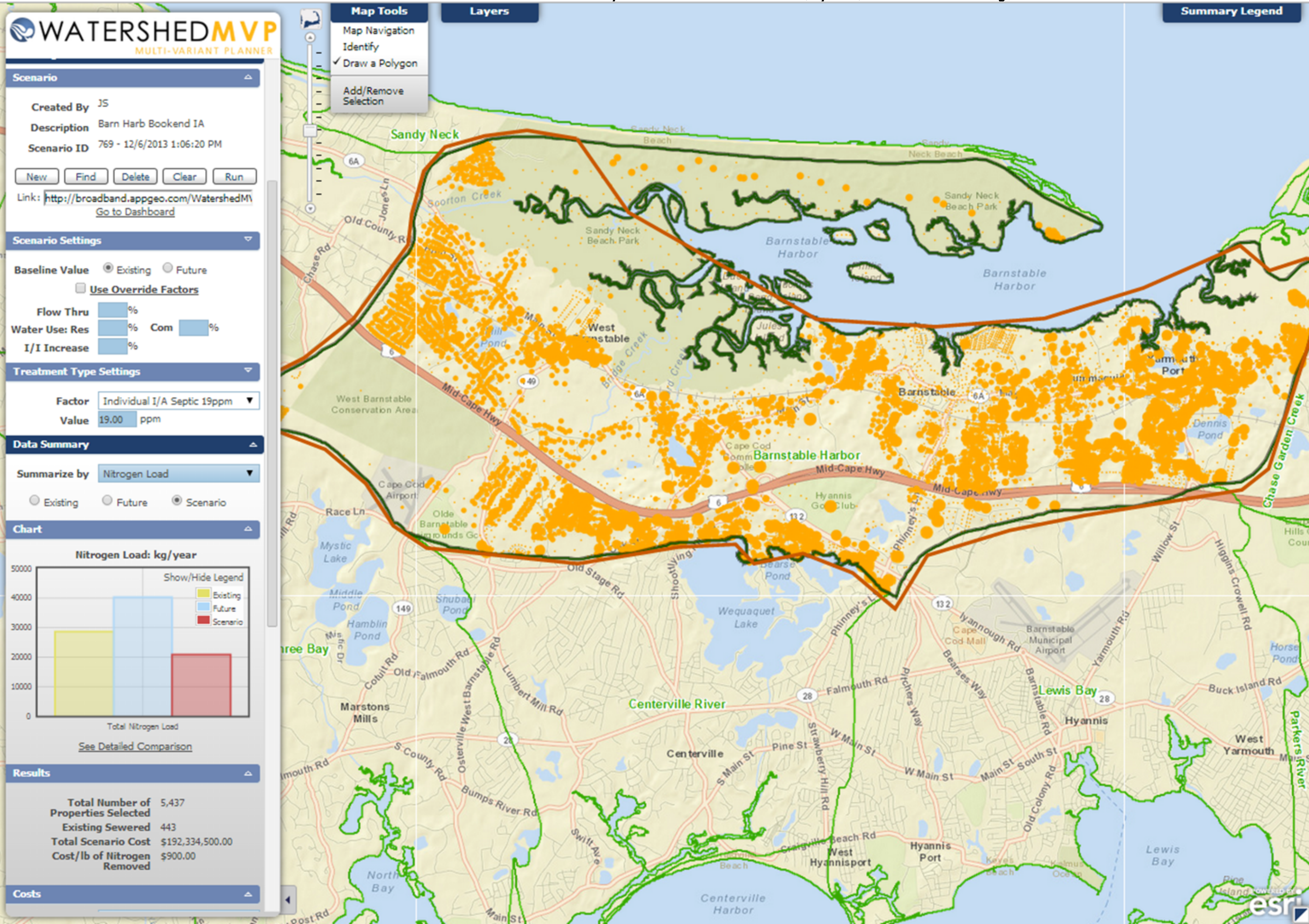
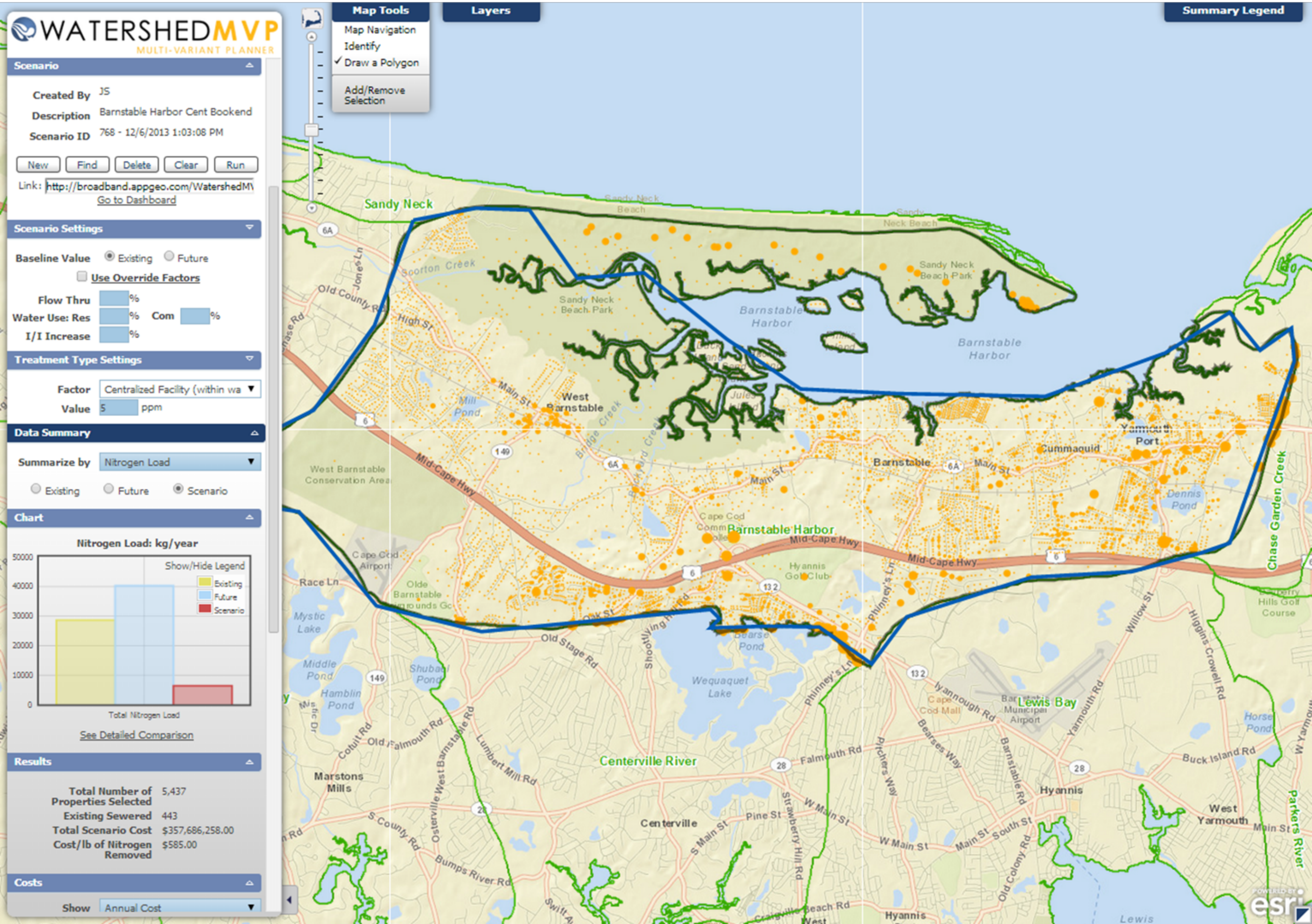
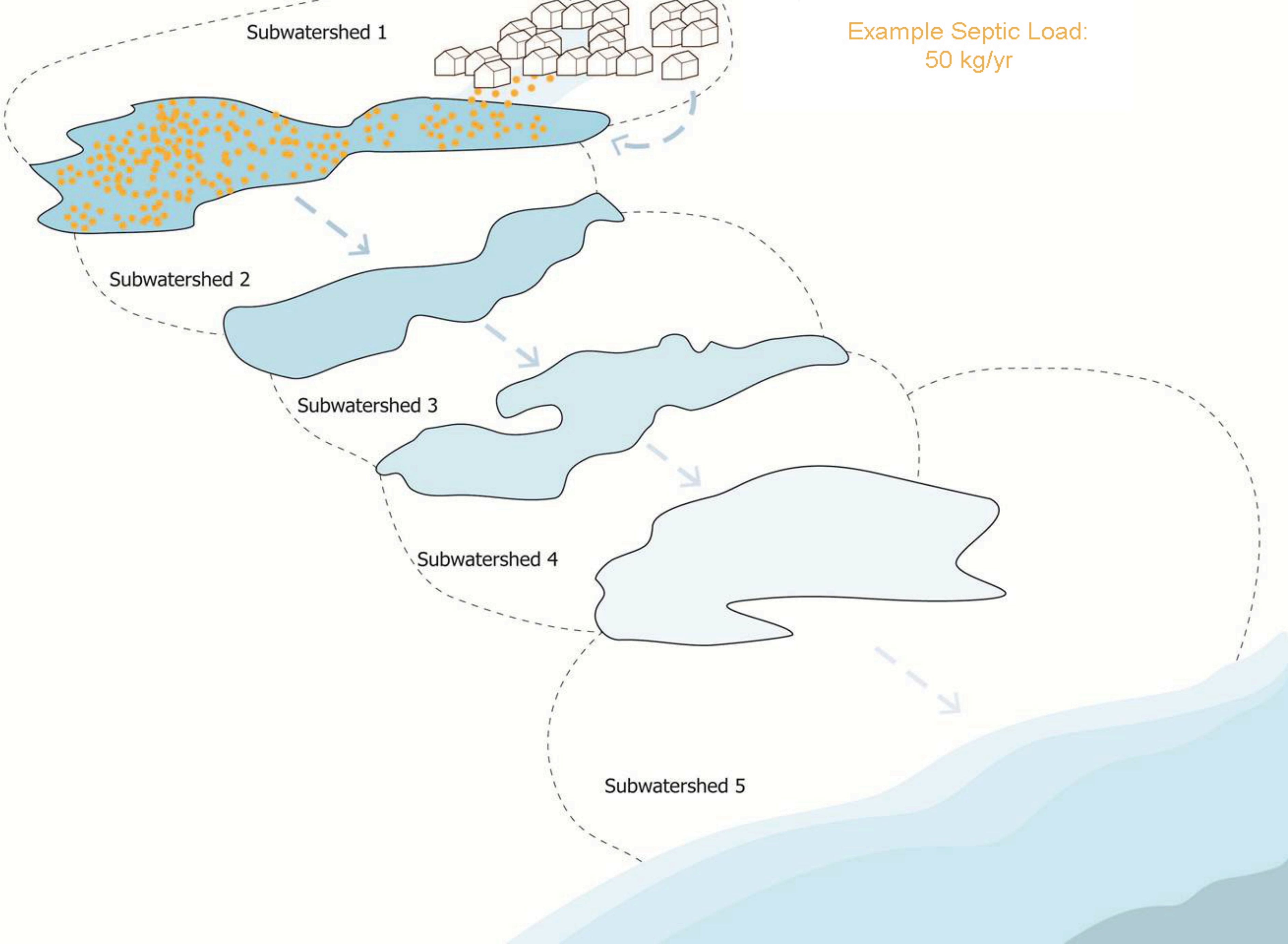
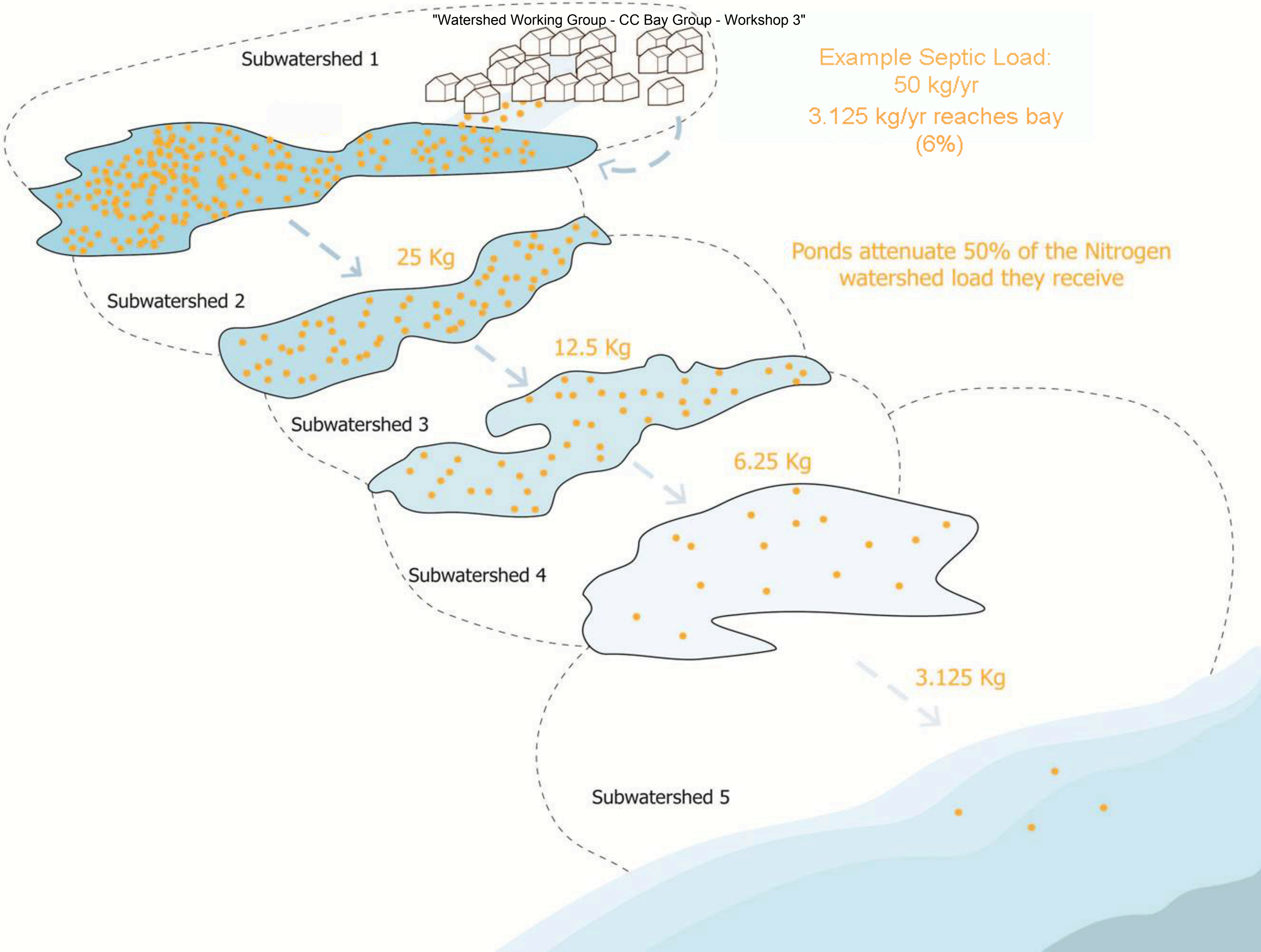
Watershed-Wide Innovative/Alternative (I/A) Onsite Systems

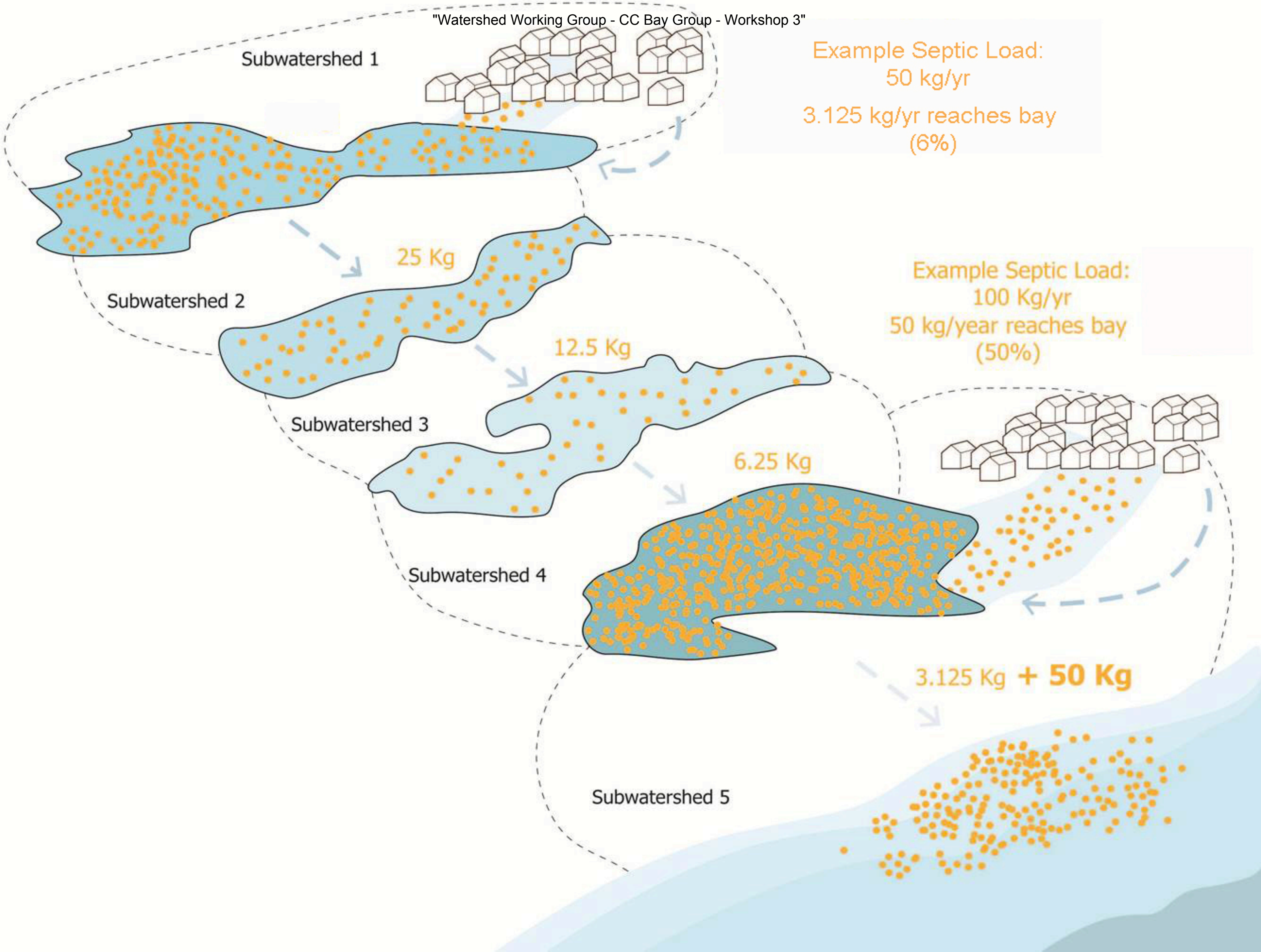


Watershed-Wide Centralized Treatment with Disposal Inside the Watershed




Example Septic Load:
50 kg/yr
Subwatershed 1
Subwatershed 2
Subwatershed 3
Subwatershed 4
Subwatershed 5


Subwatershed 1
Example Septic Load:
50 kg/yr
3.125 kg/yr reaches bay
(6%)
25 Kg
Subwatershed 2
Ponds attenuate 50% of the Nitrogen watershed load they receive
12.5 Kg
Subwatershed 3
6.25 Kg
Subwatershed 4
3.125 Kg
Subwatershed 5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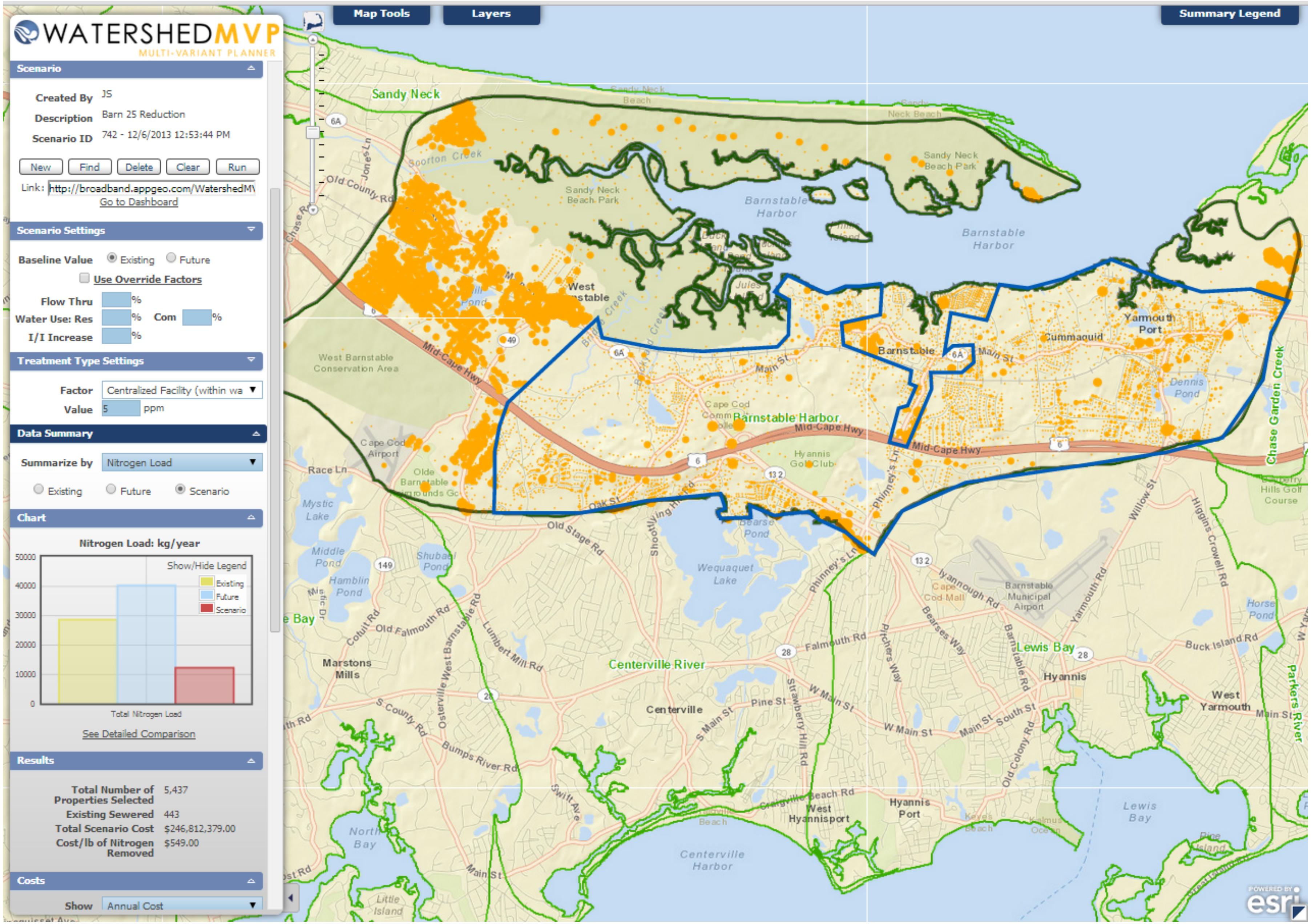
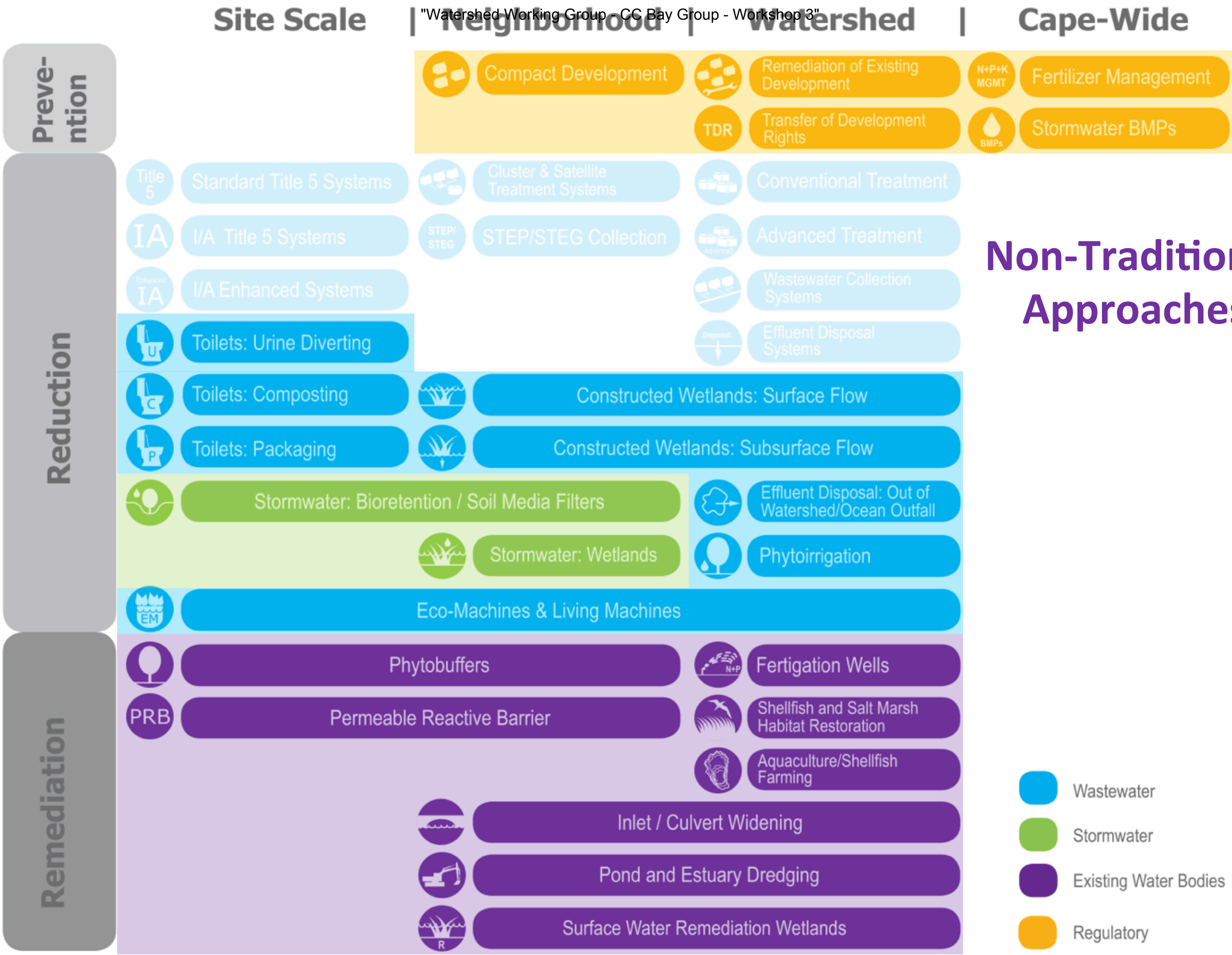
Subwatershed 5

Targeted Centralized Treatment to Achieve a 25% Reduction in Total Nitrogen Load[1]



[1] Cape Cod Surface Water Nutrient Management Study Final Report June, 2002

Non-Traditional Approaches



Wastewater | Existing Water Bodies | Regulatory

Problem Solving Approach

1 Targets/Reduction Goals

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

2 Other Wastewater Management Needs

A. Title 5 Problem Areas
B. Pond Recharge Areas
C. Growth Management

3 Low Barrier to Implementation

A. Fertilizer Management
B. Stormwater Mitigation

4 Watershed/Embayment Options

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

5 Alternative On-Site Options

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

6 Priority Collection/High-Density Areas

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

7 Supplemental Sewering

Watershed Calculator THREE BAYS "Watershed Working Group - CC Bay Group - Workshop 3"

MEP Targets and Goals:		**kg/day**	**Nitrogen (kg/yr)**
Present Total Nitrogen Load:		130.7	64,492
wastewater		0	23,923
fertilizer			9,243
stormwater			6,449
Target Nitrogen Load:		0	48,369
Nitrogen Removal Required:		**0**	**16,123**
Total Number of Properties:	5437		

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Stormwater Mitigation	3,225	8,277	

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Watershed Calculator THREE BAYS "Watershed Working Group - CC Bay Group - Workshop 3"

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Ecotoilets (UD & Compost)	272	homes	1,076.5	-949	$1,265

Watershed Calculator THREE BAYS "Watershed Working Group - CC Bay Group - Workshop 3"

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Sewering	-216	homes		-949	0	$1,000

Adaptive Management:

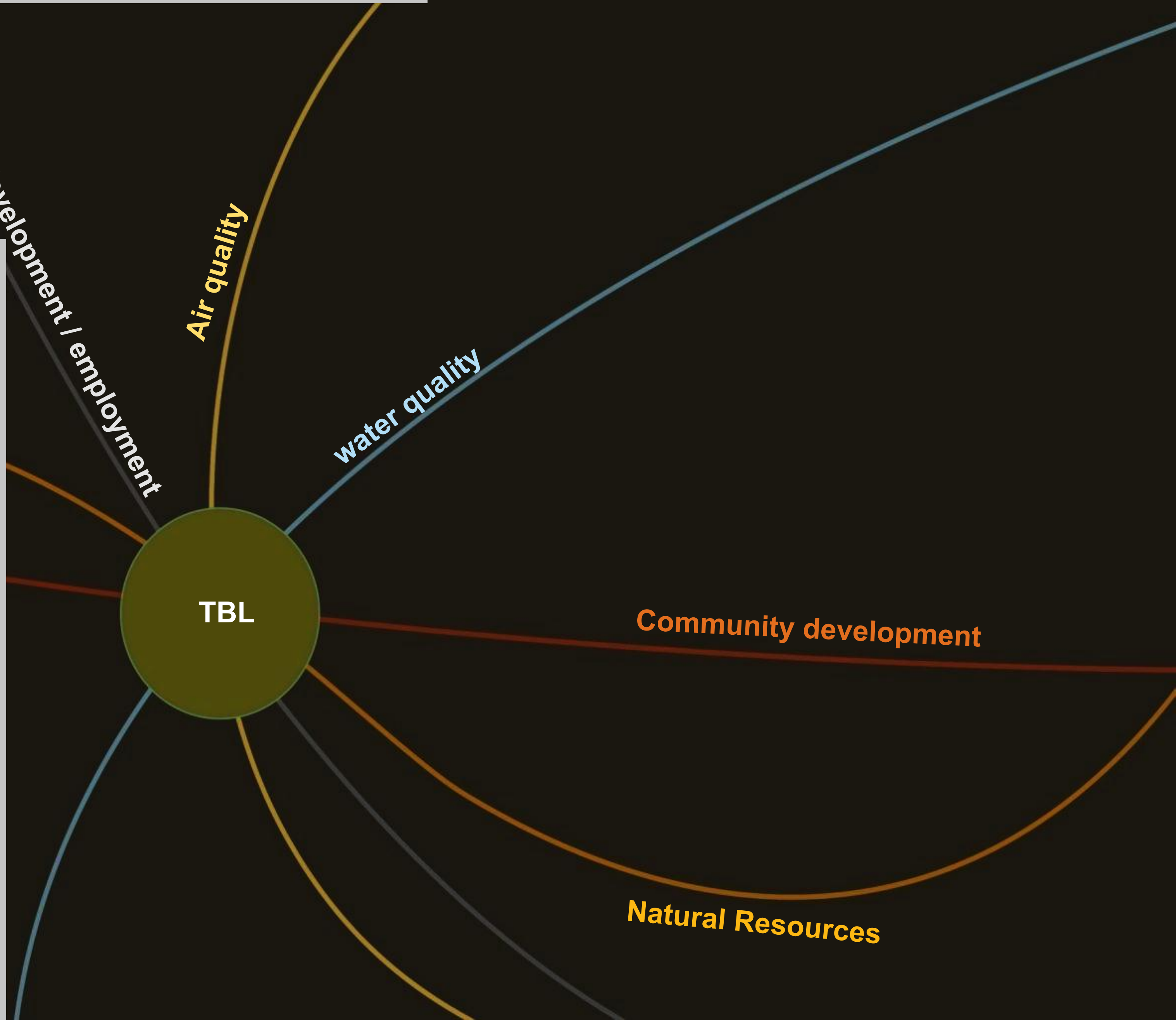
A structured approach for addressing uncertainties by linking science and monitoring to decision-making and adjusting implementation, as necessary, to increase the probability of meeting water quality goals in a cost effective and efficient way.

Triple Bottom Line (TBL) Introduction

What is triple bottom line analysis?

Triple Bottom Line Analysis
Provides a full accounting of the financial, social, and environmental consequences of investments or policies

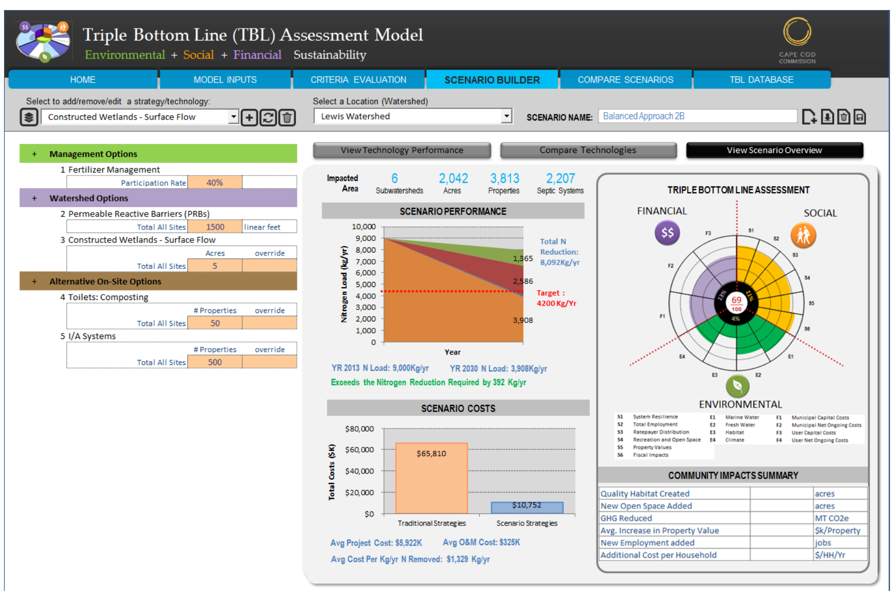
Often "TBL" analysis is used to identify the best alternative and to report to stakeholders on the public outcomes of a given investment.

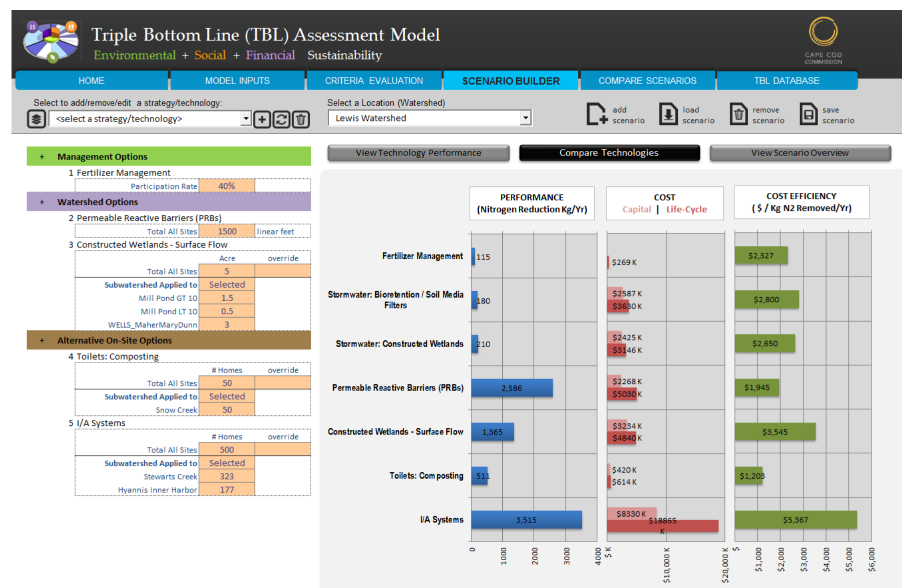


Why develop a TBL model?

- To consider the financial, environmental, and social consequences of water quality investments and policies in Cape Cod.

- TBL Model evaluates the “ancillary” or downstream consequences of water quality investments not the direct Phosphorous or Nitrogen levels.





"Watershed Working Group - CC Bay Group - Workshop 3"

Triple Bottom Line (TBL) Assessment Model

Environmental + Social + Financial Sustainability

CAPE COD COMMISSION

	Scenario 1	Scenario 2	Scenario 3
	Minimum Cost	Cost Effective	Maximum Performance

Criterion Scores

SOCIAL	
System Resilience	S1
Employment	S2
Ratepayer Distribution	S3
Recreation and Open Space	S4
Property Values	S5
Fiscal Impacts	S6
ENVIRONMENTAL	
Marine Water	E1
Fresh Water	E2
Habitat	E3
Climate	E4
FINANCIAL	
Municipal Capital Costs	F1
Municipal Other Costs	F2
Property Owner Capital Costs	F3
Property Owner Other Costs	F4

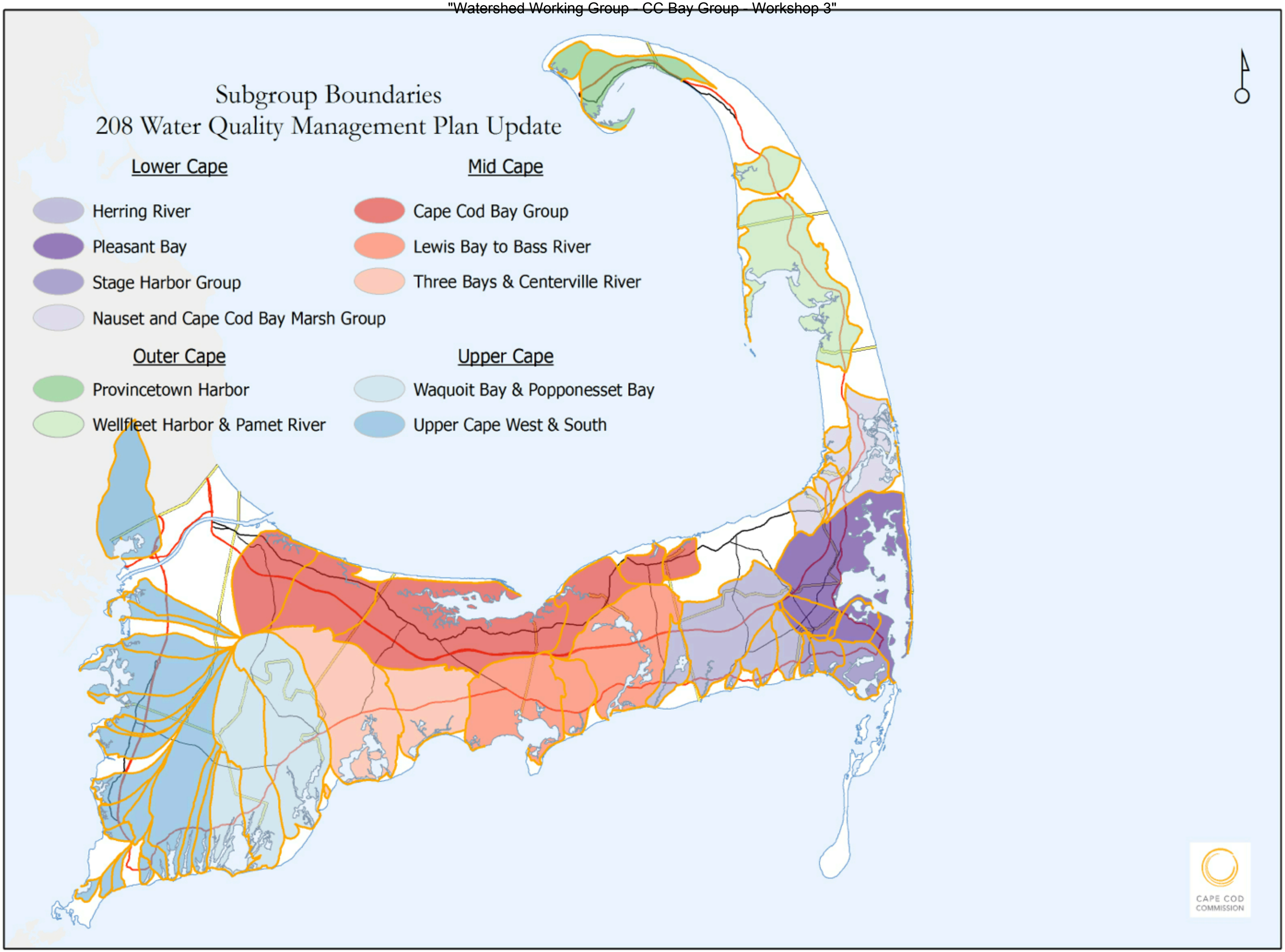
Scenario 1 – Minimum Cost

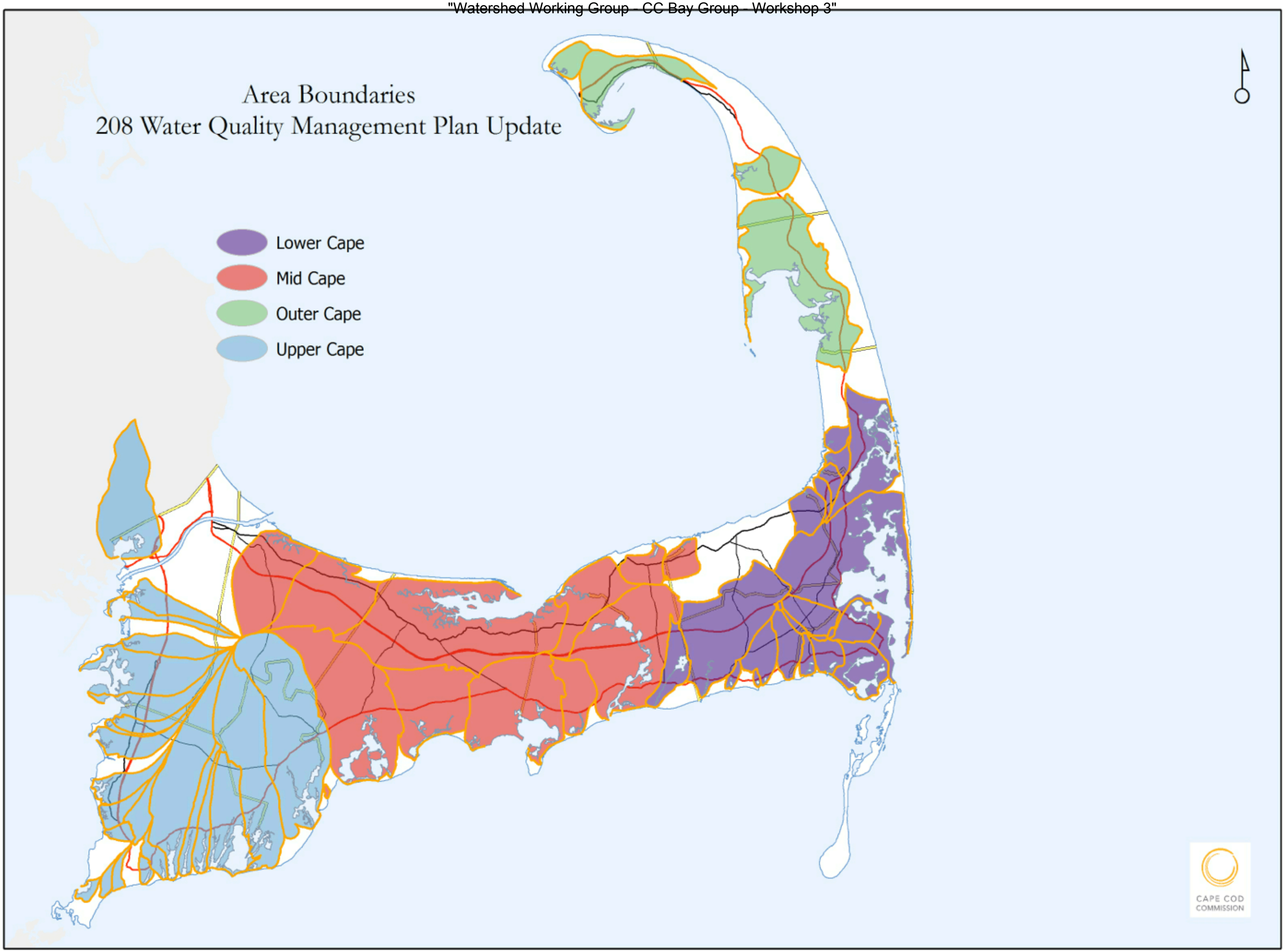
Scenario 2 – Cost Effective

Scenario 3 – Maximum Performance

Strategy/Technology Distribution

COST & PERFORMANCE	Scenario 1	Scenario 2	Scenario 3
Nitrogen Reduction %	30%	52%	61%
Remaining Nitrogen Load (Kg N)	8,400	5,760	4,680
Life Cycle Costs ($K)	$5,922	$7,350	$9,800
Municipal O&M Cost ($K)	$325	$425	$610
Municipal Project Cost ($K)	$1,329	$1,600	$1,800
Property Owner O&M Cost ($K)	$98	$128	$183
Property Owner Project Cost ($K)	$397	$480	$540
COMMUNITY BENEFITS			
Quality Habitat (acres)	0.5	1.8	2.4
New Open Space Added (acres)	1.5	4.6	5.0
GHG Reduced (MT CO2e/yr)	2.1	3.1	3.3
Avg. Increase in Property Value ($/pty)	$200	$1,200	$2,000
New Employment Added (jobs)	152	188	252
Additional Cost per Household ($/HH/yr)	$20	$26	$37


Subgroup Boundaries
208 Water Quality Management Plan Update
Lower Cape
Herring River
Pleasant Bay
Stage Harbor Group
Nauset and Cape Cod Bay Marsh Group
Mid Cape
Cape Cod Bay Group
Lewis Bay to Bass River
Three Bays & Centerville River
Outer Cape
Provincetown Harbor
Wellfleet Harbor & Pamet River
Upper Cape
Waquoit Bay & Popponesset Bay
Upper Cape West & South
CAPE COD COMMISSION


Area Boundaries
208 Water Quality Management Plan Update
Lower Cape
Mid Cape
Outer Cape
Upper Cape
CAPE COD COMMISSION

Cape Cod 208 Area Water Quality Planning
Cape Cod Bay Watershed Working Group

Meeting Three
Monday, December 9, 2013
8:30 am to 12:30 PM
Cape Cod Commission
3225 Main Street, Barnstable, Massachusetts 02630

Meeting Summary Prepared by the Consensus Building Institute

I. ACTION ITEMS

Working Group

- Provide comments or revisions to the Meeting 2 draft notes to Carri Hulet
- Notify Carri Hulet if you'd like to volunteer or nominate someone else to represent this working group in the larger sub-basin working group meeting over the next several months.

Consensus Building Institute

- Extract the map images of the scenarios from the presentation and send to the group as a PDF.
- Distribute Alex Marx's research on Barnstable Harbor.

Cape Cod Commission

- Include the opportunity for fertigation wells at both golf courses in the alternative technologies scenario.
- Eliminate dredging from the alternative technologies scenario.

II. WELCOME AND OVERVIEW

Ms. Carri Hulet, the facilitator from the Consensus Building Institute, welcomed the participants and led introductions. Appendix A includes a list of attendees. The meeting was filmed by a representative from the Cape Cod Commission. Portions of the film may be used in the Cape Cod Commission's outreach process. Ms. Hulet then reviewed the meeting agenda and goals:

- To discuss the approach for developing watershed scenarios that will remediate water quality impairments in the Cape Cod Bay watersheds.
- To identify preferences, advantages and disadvantages of a set of scenarios of different technologies and approaches, and
- To develop a set of adaptive management principles to guide sub-regional groups in refining scenarios for the 208 Plan.

She explained that the Working Group would be asked to provide input on possible approaches/scenarios for wastewater management in the watershed study area but would not be asked to "vote" on a specific approach.

Mr. Scott Horsley, Area Manager and Consultant to the Cape Cod Commission, welcomed participants and offered an overview of the 208 Update stakeholder process.[1] In July, public meetings were held across the Cape to present the 208 Plan Update goals, work plan, and participant roles. Public meetings were also held in August to present information on the affordability and financing of the updated comprehensive 208 Plan. The first meetings of the eleven Watershed Working Groups were held in September and focused on baseline conditions in each of the watersheds. The second meetings of the Watershed Working Groups were held in October and early November and are focused on exploring technology options and approaches. These third meetings of the Watershed Working Groups will focus on evaluating watershed scenarios. These scenarios are informed by Working Groups' discussions at previous meetings about baseline conditions, priority areas, and technology options/approaches.

Mr. Horsley said the Advisory Board continues to provide guidance to the process and the Regulatory, Legal, and Institutional Work Group is interfacing with the state. These groups have also been engaged in discussions about adaptive management.

III. INITIAL SCENARIOS FOR BARNSTABLE HARBOR WATERSHED

Scott Horsley explained the Commission's process to develop watershed scenarios. Two teams were formed: one team is exploring "conventional" technologies and approaches (e.g. sewering and I/A systems) and another team is exploring "alternative" technologies and approaches. The teams are both working under the assumption that fertilizer and stormwater reductions will be incorporated into all of the scenarios.

Conventional Scenarios

James Sherrard, Hydrologist in the Water Resources Department at the Cape Cod Commission, led the discussion of "conventional" technologies and approaches. He explained that the scenarios were developed using the Commission's Watershed MVP Tool. This tool allows the user to determine how much nitrogen is in a specific geographic area, then apply specific technologies to discover the approximate reduction in the overall nitrogen load for the area. The tool can show costs, but costs were not the focus of the presentation. He described the following scenarios, all of which estimate the total existing nitrogen load in the Barnstable Harbor Watershed to be approximately 30,000 kg/year:

- Watershed-wide/Alternative (I/A) Onsite Systems: Implementation of the Alternative I/A systems throughout the watershed is estimated to reduce the total nitrogen load to approximately 20,000 kg/per year
- Watershed-wide Centralized Treatment and Disposal Inside the Watershed: Implementation of watershed wide centralized treatment and disposal inside the

[1] The PowerPoint Presentation made at this meeting is available at: http://watersheds.capecodcommission.org/index.php/watersheds/mid-cape/cape-cod-bay-group

watershed is estimated to reduce the total nitrogen load to approximately 6,500 kg/year.

- Targeted collection and treatment to achieve a 25% reduction in nitrogen: This scenario is estimated to reduce the total nitrogen load to approximately 11,000 kg/year by focusing on the areas delineated by the blue line on the map. This delineated area avoids the areas that are already sewered. The 25% reduction target is from the 2002 Cape Cod Commission Surface Water Nutrient Management Study Final Report.

Mr. Sherrard briefly talked about attenuation in freshwater ponds. He said that ponds attenuate approximately 50% of the nitrogen entering the pond ecosystem and the remaining nitrogen eventually flows to the bay. Therefore, it would not be ideal to construct sewers in areas with high amounts of attenuation. The scenarios he described focus on areas of the watershed with little to no attenuation.

Ms. Hulet clarified that the goal of this exercise was to create a spectrum of options whereby the scenarios created by the Cape Cod Commission serve as bookends. Traditional technologies are utilized on one end of the spectrum. Newer technologies could be added to the traditional technologies until ultimately reaching the other bookend, where the issue is addressed primarily through new, innovative technologies. Mr. Horsely said similar scenarios will be created for the watersheds in the vicinity of Brewster, Sandwich, and Dennis.

Working Group members had the following questions and comments about the conventional scenarios are below (italicized):

- *How many options or treatment technologies can you build into the maps and analysis with MVP?* Mr. Sherrard said multiple scenarios can be ran simultaneously with multiple treatment technologies in each.
- *The number of people on Title V systems and the number of new systems added to Title V might play a role in the management discussion. Does anyone know what percentage of the houses actually have Title V systems, or the percentage of those that do not?* Mr. Sherrard said they knew the locations that are sewered (not on Title V) but the data on cess pools is less certain. Mr. Tom Cambareri, Cape Cod Commission Water Resources Program Manager, said approximately 133,000 systems are not on the sewer system and are likely on Title V or using cess pools; however an exact percentage is not known. He noted that the majority of systems were upgraded to Title V in 1995.
- *Would it make sense for the Cape Cod Commission to inventory the number or percentage of systems that are Title V?* Mr. Sherrard explained that the Cape Cod Commission has acquired this data from approximately half of the towns; but much of the data is not in digital format. Some towns have hard copies while other towns do not have any records.
- *It is concerning that the Cape Cod Commission says there is no TMDL for Bar Harbor, but we know the TMDL is under development and we have been promised we will receive it. It is worth noting that the entire area of Barnstable Harbor is not part of Barnstable's*

Comprehensive Wastewater Management Plan (CWMP). Finally, it is concerning that alternative systems may become the only alternative because so much of the area is in one acre zoning and being developed and subdivided rapidly. Mr. Sherrard said the MEP reports came out in relation to the need or priority, so the TMDL is not crucial although it will certainly be reviewed once it is released to the public. The member responded that market changes in the past 10 years may indicated that tidal flush is not sufficient for the amount of discharge entering Barnstable Harbor.

Alternative Technology and Approaches

Mr. Horsley led the discussion of "alternative" technologies and approaches. He explained that the scenarios were developed for discussion purposes and encouraged Working Group members to offer their own modifications and suggestions. The scenarios follow the whole watershed 7-step process, which targets fertilizer and stormwater reductions first, then explores watershed/embayment options, and then alternative on-site options. Lastly, traditional sewering options were added. The MVP was not used for this analysis because it was not set up for all the alternative technologies.

He offered the following scenario for Barnstable Harbor:

- Nitrogen reduction goals: The analysis started with an assumed 25% reduction target in the absence of a final MEP report. In this particular scenario, the estimated initial nitrogen loading was 48,369 kg/year. The 25% target was 16,123 kg of nitrogen per year.
- Low barrier options: After implementing fertilizer management and stormwater mitigation, 8,277 kg per year of nitrogen would need to be eliminated to achieve the target.
- Watershed/embayment options: A mixture of permeable reactive barriers, constructed wetlands, fertigation wells, dredging, and oyster beds/aquaculture reefs reduced the remaining target to an estimated 127 kg/year.

  The yellow lines on the map represent the areas where PRBs are feasible due to water table levels at a depth of 20 feet or less. Areas where PRBs are feasible but sewers are already constructed were not included.

  Areas for potential constructed wetlands were screened by criteria including depth to ground water greater than four feet, protected habitat areas, parcels greater than five acres, and parcel cent not in the 100-year floodplain.

  Mr. Horsley pointed out one particular site that could be ideal for a constructed wetland. In response to a group member question, he said the municipality owns the land. He noted that a two-acre wetland is estimated to reduce nitrogen by approximately 1000 kg/year.

Mr. Horsley commented that the golf courses in the area already were, or were planning, to utilize fertigation wells.

Mr. Horsley said there is a lot of shellfish and aquaculture projects already operating in Barnstable Harbor and that the addition of a 10-acre oyster bed could reduce nitrogen by approximately 2,500 kg/year.

- Alternative on-site options (description and figures summary): the addition of ecotoilets (Urine Diversion and Composting) is estimated to surpass the target and reach -949 kg/year. Mr. Horsley noted this assumed an adoption rate of five percent in the next 10-20 years.

Mr. Horsley explained that this analysis is still preliminary and would require further detailed site reconnaissance and verification. Average nitrogen removal rates were used for some of the technologies while the lowest recorded removal rate was utilized for others in the analysis. Mr. Horsley said this scenario illustrates a possible opportunity to undertake watershed transfers of treated wastewater from Hyannis since the measures surpass the nitrogen reduction target.

Working Group members had the following questions and comments about this Barnstable Harbor scenario (italicized):

- *Natural attenuation enters the equation in step four, the watershed and embayment option. Since each town has a specific amount of land area available for natural attenuation, is it intended that the town that has the most natural attenuation will get the benefit of all the natural attenuation? There are talks of sharing attenuation in the Popponessett Bay.* Mr. Horsley said this would be a possibility and that constructed wetlands could enhance attenuation.
- *How many people voluntarily add the I/A portion of systems today?* Mr. Horsley said very few. In most cases these technologie are added as a result of the regulatory process that require them.
- *Although this scenario surpasses the target, it does not surpass the target by a very large number. This should be considered if thinking about watershed transfer.*
- *Utility corridors such as the places where NSTAR has their power lines could be good candidates for PRB locations or other technologies. Since NSTAR is attuned to the pesticide issue at this time, it may be worth reaching out to them. Another member noted that the land in the right of way is not owned by NSTAR.*
- *The Town of Sandwich is supportive of the nontraditional approaches used in the scenarios.*
- *These technologies are good for general reduction of nitrogen, but the towns have some areas of special concern, one in particular which has tight tank system instead of sewers. Complicating the issue is that land in the area is rapidly developing through subdivisions. How does this scenario solve targeted problems like this?* Mr. Horsley said this would mostly likely be addressed through a satellite system, Title 5, or growth management. In

response to the initial comment, another group member said *this type of issue highlighted the amount of worker hours that will be required to address these issues on a site-specific basis.*

Mr. Horsley asked the group if transferring treated wastewater from Hyannis to Cape Cod Bay watershed is an idea the stakeholders would entertain. Group members made the following comments:

- *The towns must work with the water districts down gradient of the land areas and be mindful of dispersing nutrients into the watershed which is currently dependent upon private wells as a drinking water source. Conversations with the fire district and rigid monitoring would be required, too.*
- *Transfer should be kept on the table as a potential option to negotiate.*
- *Transferring this water to the north side will cause some distress among the people living there and this will cause political challenges.*
- *This idea is currently proposed with the McMannis property.*
- *Flame retardents such as Perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS) were detected in some Cape Cod water supplies by the Silent Spring Institute and might be in the water and would be of great concern if transferred to the north side.*
- *We should not put it into the scenario now, but we should not discourage it from being a potential option either.*

Carri Hulet 1/13/14 11:31 AM
Comment [1]: Is this the correct spelling?

Ms. Hulet asked the participants what types of issues might arise if the transfer scenario created beneficial outcomes such as the use of nitrogen rich water for fertilizer. Alex Marx, an MIT student visiting as a member of the public, questioned if there might be other groundwater recharge areas that need extra water and suggested considering this as another variable. Group members made the following comments:

- *Will the transfer tilt eh balance so that flushing could not handle the flux from the south side?* Mr. Horsley said restoration of salt marsh habitat could be possible, but restoration is probably less likely in this part of the Cape due to its decent quality.
- *A member said that Barnstable is considering restoration of Hinckley Pond.*

Ms. Hulet asked the participants if there were any technologies not included in the scenarios that they thought should have been included. Participants made the following comments.

- *A member suggested looking at the Cape Cod Village Condominium situation as a satellite system in MVP.*
- *Expansion of oyster beds by Wianno and Barnstable Seafarms could be included.*
- *Extension of public water supply to the well systems on the north side of Route 6A could also be included. It might help remove some of the politics of effluent discharge.*

Mr. Alex Marx, graduate student at MIT's Department of Urban Studies and Planning, briefly presented some of the findings of his research on Barnstable Harbor. His final report reviewed the hydrologic budget, estimated current conditions, current loadings, and also proposed long term strategies. One of his proposed strategies was to construct a wetland in the same spot as the potential area identified by the Cape Cod Commission. He also commented that finding the right balance of salt marsh loading would be necessary given that marshes comprise 20% of the sub watershed. Regarding climate change and sea level rise, Mr. Marx commented that many of the salt marshes may migrate with sea level rise. Group members made the following comments:

- *It sounds like we do not want to change the balance between attenuation and flushing.*

IV. ADAPTIVE MANAGEMENT

Mr. Horsley defined adaptive management as a structured approach for addressing uncertainty by linking science and monitoring to decision-making and adjusting implementation as necessary to increase the probability of meeting water quality goals in a cost effective and efficient way. He said adaptive management is not waiting longer to review more data. He asked working group members to help the Commission to think through what an adaptive management plan for this watershed might look like. In response to a question from a group member, Mr. Horsley said the group could also consider the adverse effects of sewering or the impacts of disposing nitrogen rich water in a particular location. Mr. Horsley asked the group to to consider the set of prioritized actions they would promote if they were to present a plan to the DEP next week. Group members suggested the following prioritization:

1. Oysters and Aquaculture - A participant suggested that a first priority might be to install more oysters and aquaculture projects and noted that implementing this would require establishing a baseline, developing partnerships with people in the aquaculture field, and regulatory changes to promote it.
2. Targeted analysis of the area would be required to identify specific areas that may be more adaptable to the different alternatives.
3. Constructed wetlands
4. PRBs
5. I/A and cluster systems
6. Targeted sewering

Group members then commented on the actions that could be done simultaneously and the timeline. One member said oysters and wetland construction could be done in year one. Another participant said none of the options are mutually exclusive. A member said Sandwich was looking to implement their projects over a 40-year time horizon. In response, another member commented that it might take 40 years to achieve the results, but 7 years would be more realistic for implementation because new technologies and refinements to models are certain to happen over a 40 year time period.

Group members identified the following adaptive management considerations:

- Centralized management – Group members suggested that adaptive management would require a centralized management structure to know if the systems were operating as intended.

- Inter municipal data sharing – Group members commented on the usefulness of a technology clearinghouse that could possibly help monitor the performance of technologies and share lessons learned across the Cape. A member also suggested that a centralized 'technology clearinghouse' utilized by all the towns on the Cape may attract more funding than individual, town-by-town monitoring programs for installed technologies.
- Continuing resolution of the issues – A group member suggested that the selected approach should not simply attempt to meet the target of the MEP. Instead, the approach should proactively anticipate the need for further reductions and strive for more nitrogen reduction than initially targeted.
- Continuing scientific data collection and monitoring – Group members noted that the targets will be based on the best science to date, but data collection to monitoring the effectiveness of the approaches will be required.
- Integration with growth management – A participant questioned how growth management strategies would be integrated with a selected approach and adaptive management strategy. Mr. Horsley replied that the current scenarios only address existing conditions, but the issue of growth management will be addressed in more detail in January.

DEP oversight was briefly discussed as a related piece of management considerations. Group members suggested the DEP approval would be dependent on the towns' or any other managing organization's capacity to implement and monitoring a proposed approach. Financing the adaptive management and monitoring program was identified as another potential key concern of the DEP.

Group members also identified the following topics of consideration:

- Growth management
- Contaminants of emerging concern
- Fertilizer and stormwater management
- Relationships between local and regional water quality plans
- Variability of a technology's effectiveness – for example, ocean acidification may reduce the ability of oysters to reduce nitrogen levels in the long term
- Models will become more precise over the next 40 years and as data is collected, nutrient management approaches will need to adapt
- Rising sea levels and water tables which might cause salt marsh migration, Title 5 compliance issues, or other unforeseen complications
- Specific and detailed plans will increase potential for funding

A group member asked if what is ultimately presented to the DEP will become an obligation for the town and enforced by Cape Cod Commission. Mr. Horsley said the Cape Cod Commission does not have the ability to require the adoption of the plans.

V. PREPARING FOR 2014 JAN-JUNE

Ms. Kristy Senatori, Cape Cod Commission Deputy Director of Administration, shared the Commission's plans for a triple bottom line analysis and continuing stakeholder engagement into 2014.

The Cape Cod Commission is collaborating with AECOM to develop a triple bottom line (TBL) model that will analyze the social, environmental, and economic impacts of a proposed water quality plan. A stakeholder group will inform the selection of criteria used to rank the models, as will information collected during the watershed working group meetings. After the approaches are developed in each of the 57 watersheds, the approaches will be evaluated with the TBL model. The TBL will model three particular scenarios: the minimum cost scenario, the most cost effect scenario, and a scenario focused on maximum performance. The model is expected to be complete in January.

Ms. Senatori described the anticipated process over the next six months. After this third round of meetings with the watershed working groups, the groups will be condensed into four working groups. A stakeholder summit will be held in January and all 175 stakeholders will be invited to participate. At this meeting, the Cape Cod Commission will present lessons learned from the process thus far, share principles and ideas from across the watershed working groups, and discuss the TBL criteria in more depth. The four working groups will meet in February, March, and April to continue refining and developing the update. These groups will tackle some of the regulatory, institutional, and legal framework questions, as well as the financing and affordability questions. The DEP and EPA will also be more involved in these discussions.

A group member asked if the Cape Cod Commission will have the authority to establish the program and require the towns to implement it. Ms. Sentori said the Commission does not have this authority.

VI. PUBLIC COMMENTS

No public comments were made.

APPENDIX A: MEETING PARTICIPANTS

Name	**Affiliation**
Working Group Members	
Ann Canedy	Barnstable Town Council
Elizabeth Jenkins	Principle Planner, Town of Barnstable
David Mason	Sandwich Public Health Department
Peter McDowell	Dennis Water District Wastewater Committee
Sue Phelan	Barnstable
Charles Spooner	Yarmouth Port
Public Observers	
Alex Marks	Tufts University
Staff and Consultants	
Scott Horsley	Area Manager for the Mid Cape Groups and Consultant to the Cape Cod Commission
Kristy Senatori	Cape Cod Commission
Sean Goulet	Cape Cod Commission
James Sherrard	Cape Cod Commission
Carri Hulet	Consensus Building Institute
Eric Roberts	Consensus Building Institute