3225 MAIN STREET • P.O. BOX 226
BARNSTABLE, MASSACHUSETTS 02630

(508) 362-3828 • Fax (508) 362-3136 • www.capecodcommission.org

CAPE COD COMMISSION

208 Area Wide Water Quality Management Plan Update
Upper Cape Sub Regional Group

Meeting One
February 25, 2014 1:00 pm – 5:00 pm
Mashpee Town Hall, 16 Great Neck Road North

Meeting Goals:

- **Identify regulatory, legal, and institutional challenges, constraints, and opportunities associated with the 208 Plan approach for water quality**
- **Clarify the definition and components of an adaptive management plan that can be permitted**

8:30	Welcome & Review of 208 Goals
8:40	Process Overview, Meeting Overview and Goals, & Introductions
9:00	Scenario Planning • *Use maps of technologies/approaches in one representative watershed to illuminate RLI and implementation discussions.*
9:30	Regulatory, Legal, and Institutional Interactions • *Presentation of existing permitting framework* • *What are some of the hurdles and opportunities associated with permitting the above scenario?*
10:45	Break
11:00	Implementation • *Presentation and discussion of adaptive management definition and graphic* • *What components of an adaptive management plan are needed to achieve permit-ability and water quality goals?*
12:15	Public Comment
12:30	Adjourn

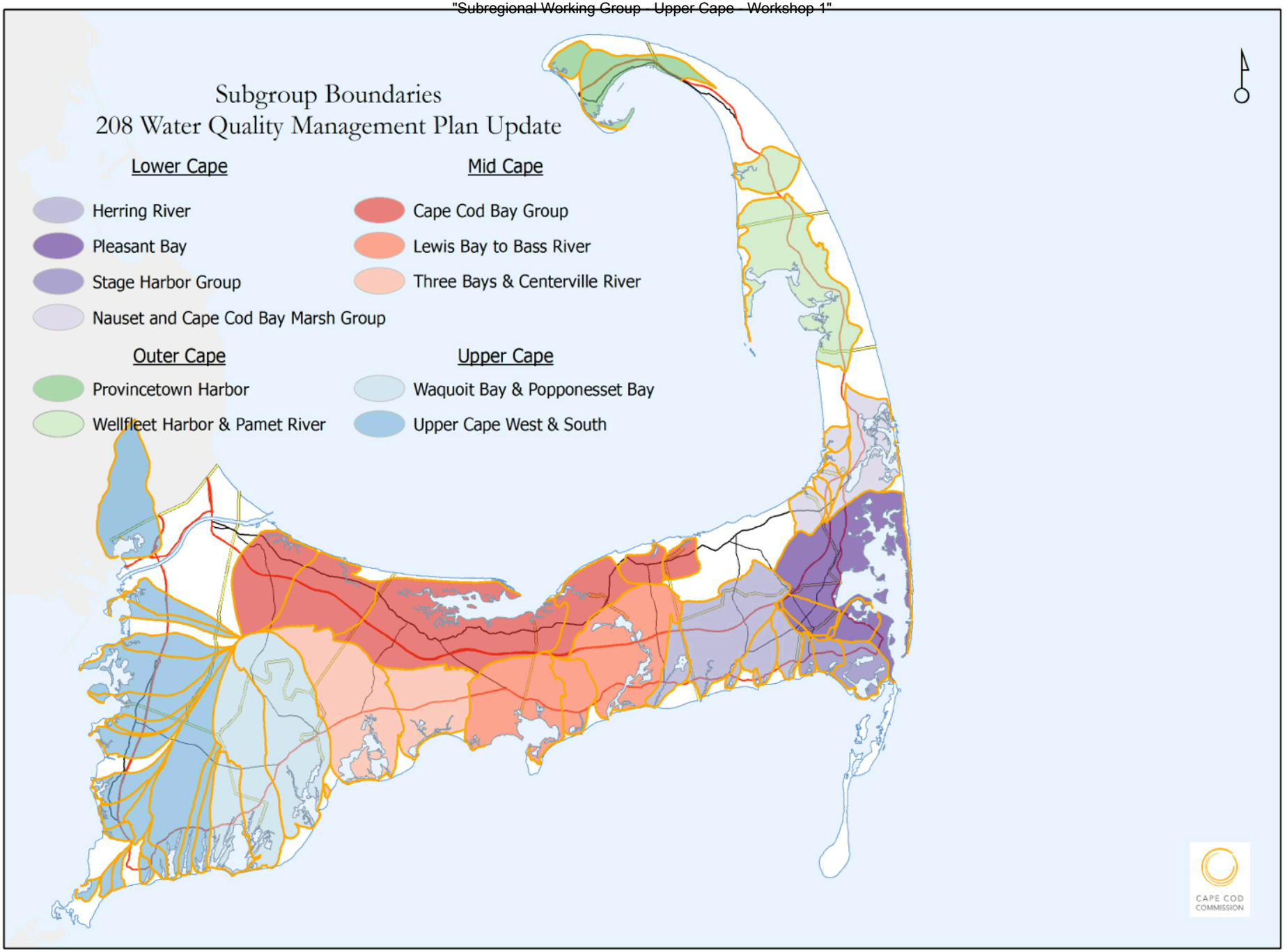
Upper Cape Sub Regional Group

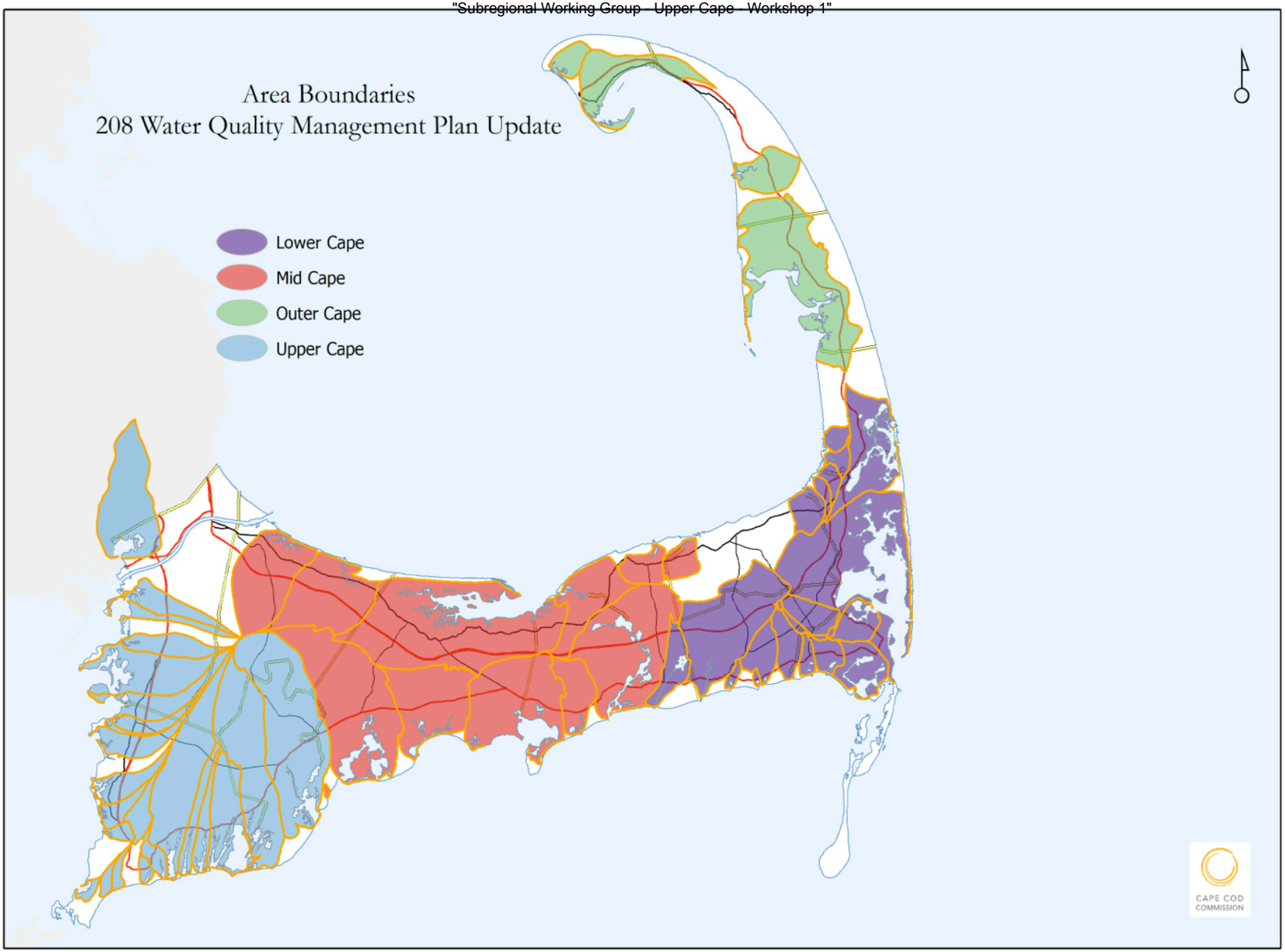
Meeting 1

Approach to the 208 Plan Update

- Watershed Based
- Stakeholder Engagement
- Maximize Benefits of Local Planning
- No Optimal Solutions

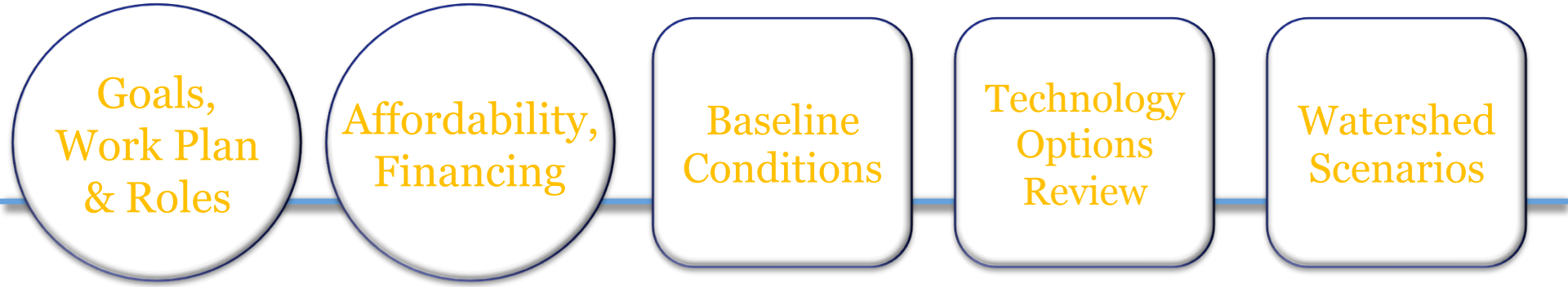
Goal:
To generate a series of approaches in each watershed that will meet water quality standards


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

Public Meetings

Watershed Working Groups



July

August

September

October

December

Watershed Working Group Process

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 1 Goals:

Identify regulatory, legal, and institutional challenges, constraints, and opportunities associated with the 208 Plan approach for water quality

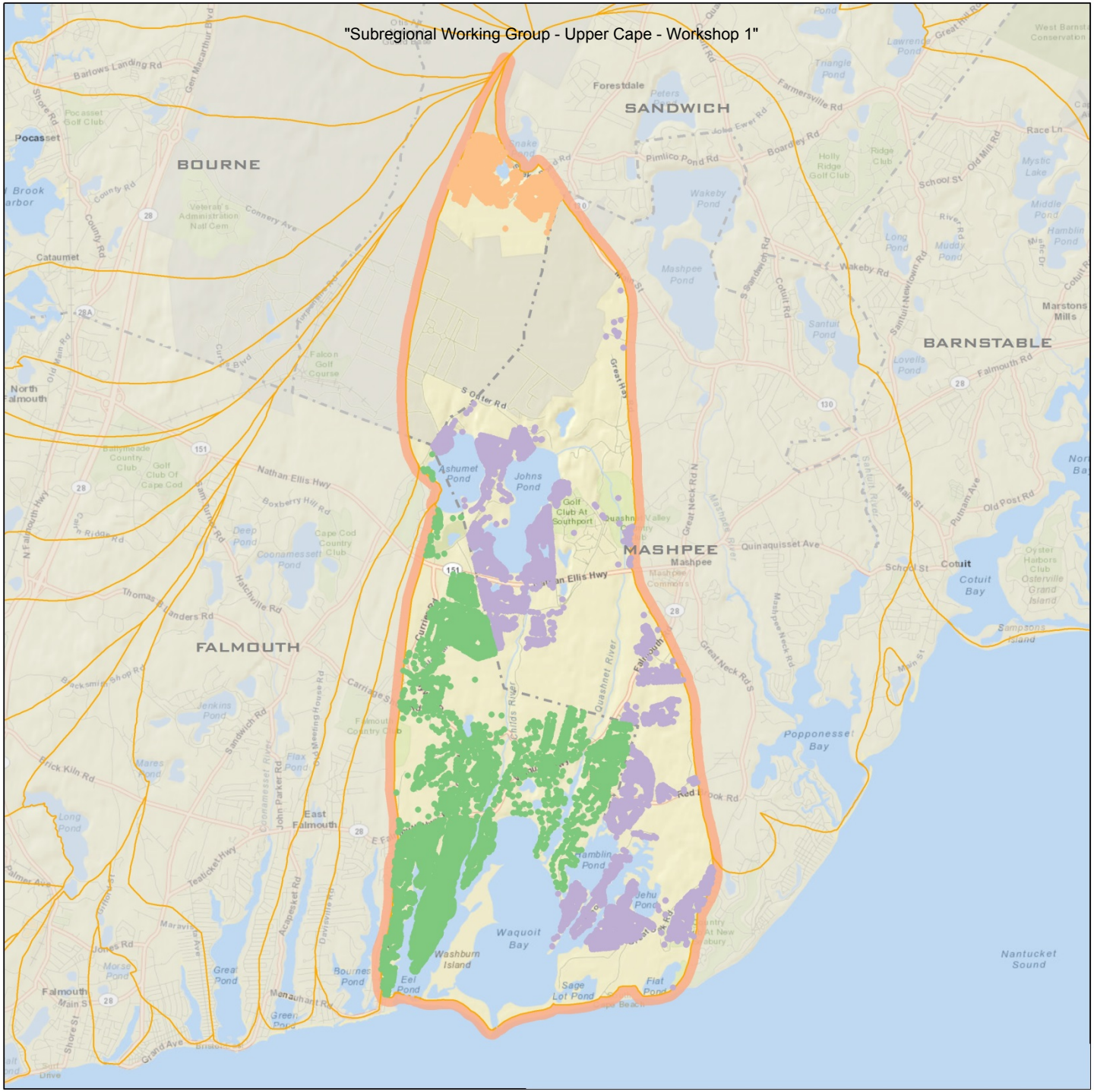
Clarify the definition and components of an adaptive management plan that can be permitted

Scenario Planning

Waquoit Bay

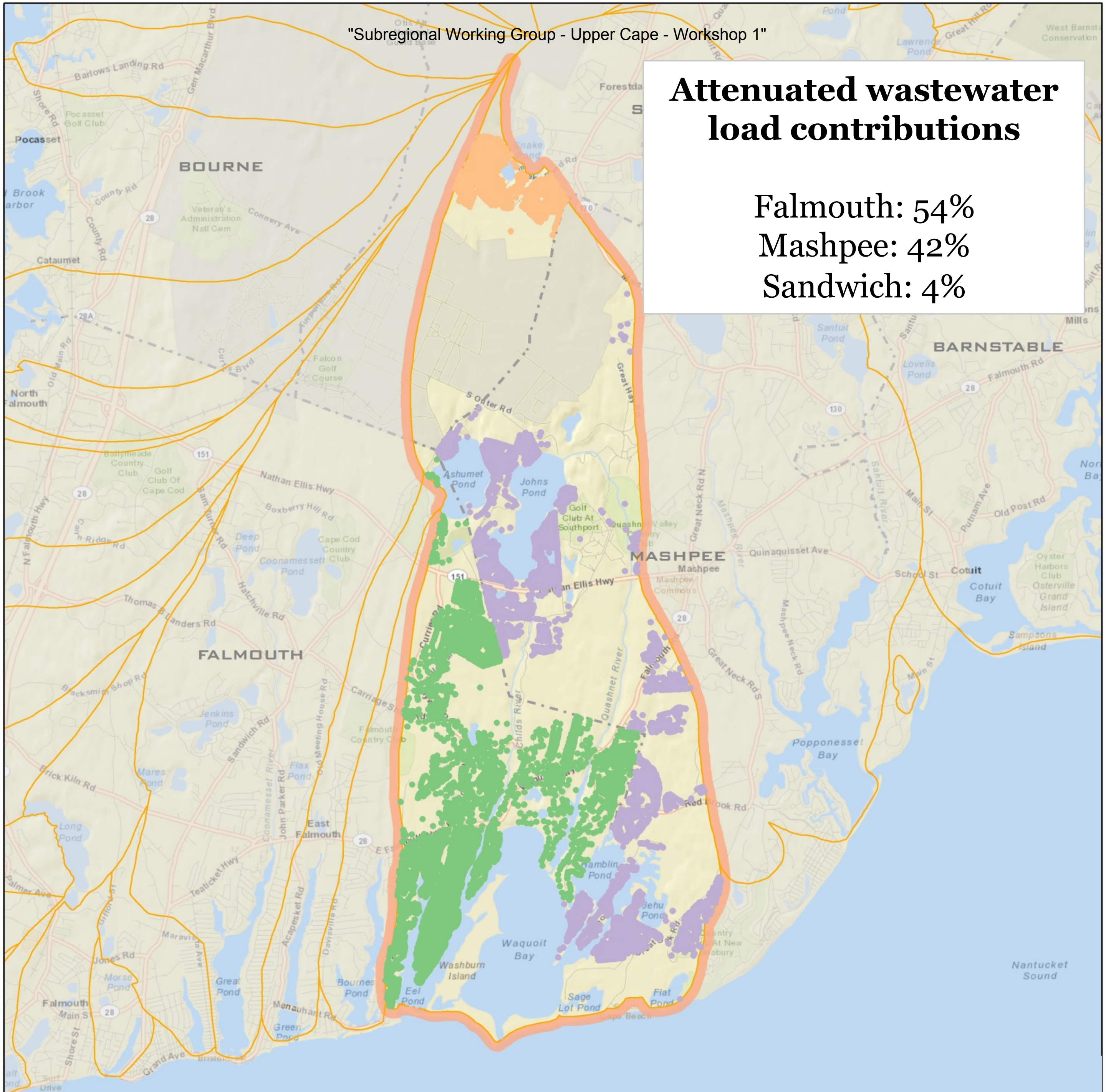
"Subregional Working Group - Upper Cape - Workshop 1"

"Subregional Working Group - Upper Cape - Workshop 1"



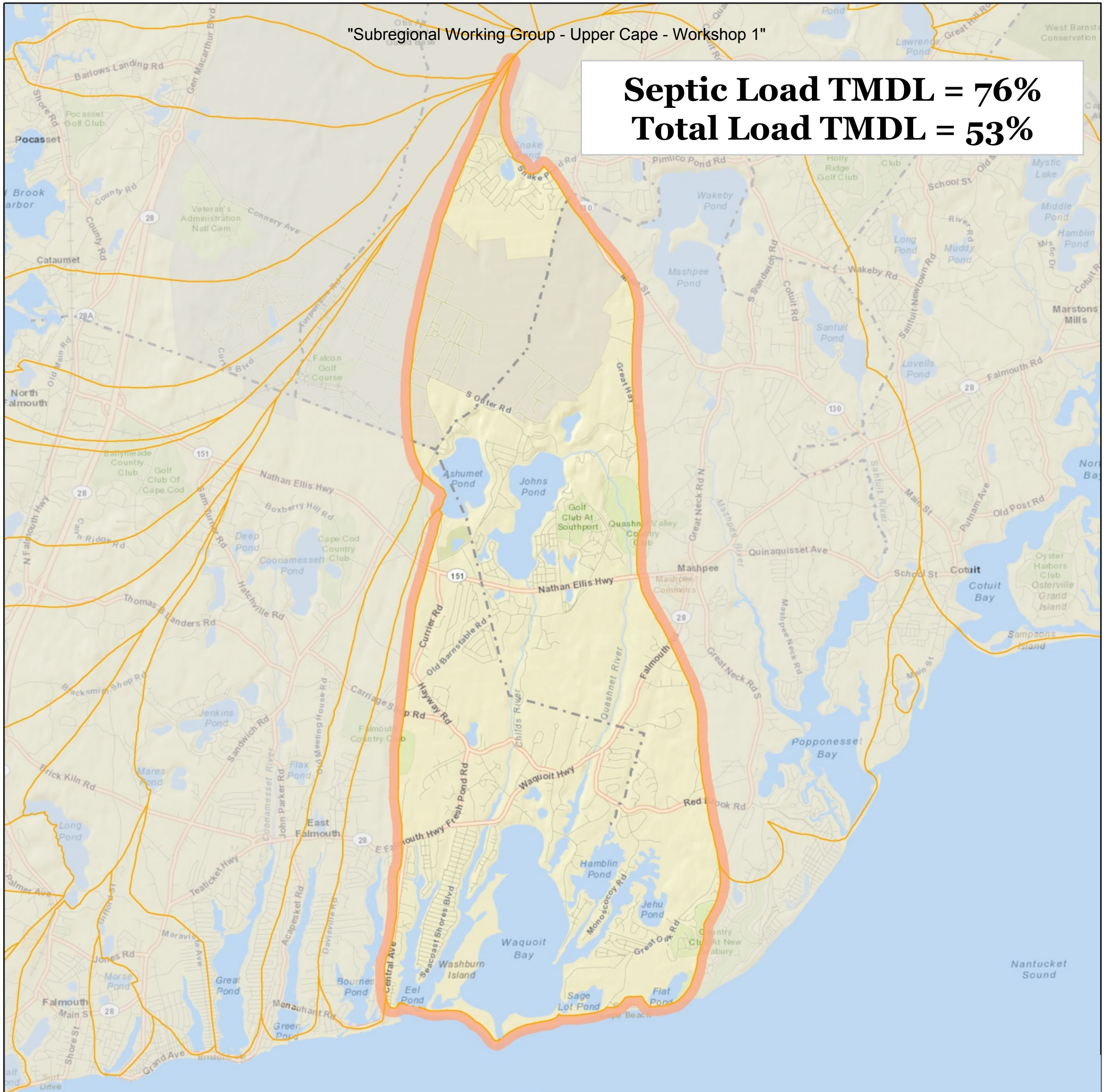
Attenuated wastewater load contributions

Falmouth: 54%
Mashpee: 42%
Sandwich: 4%

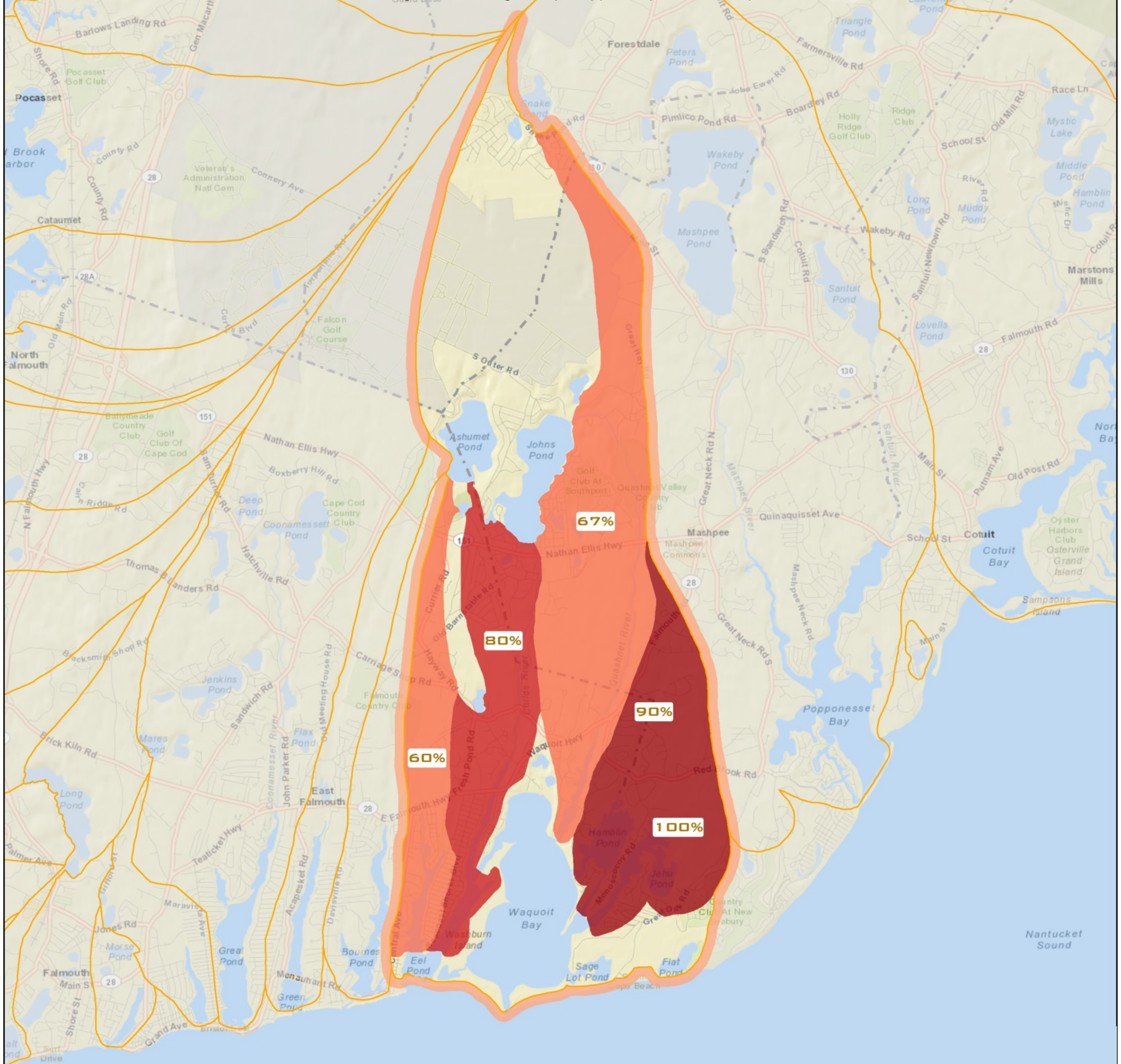


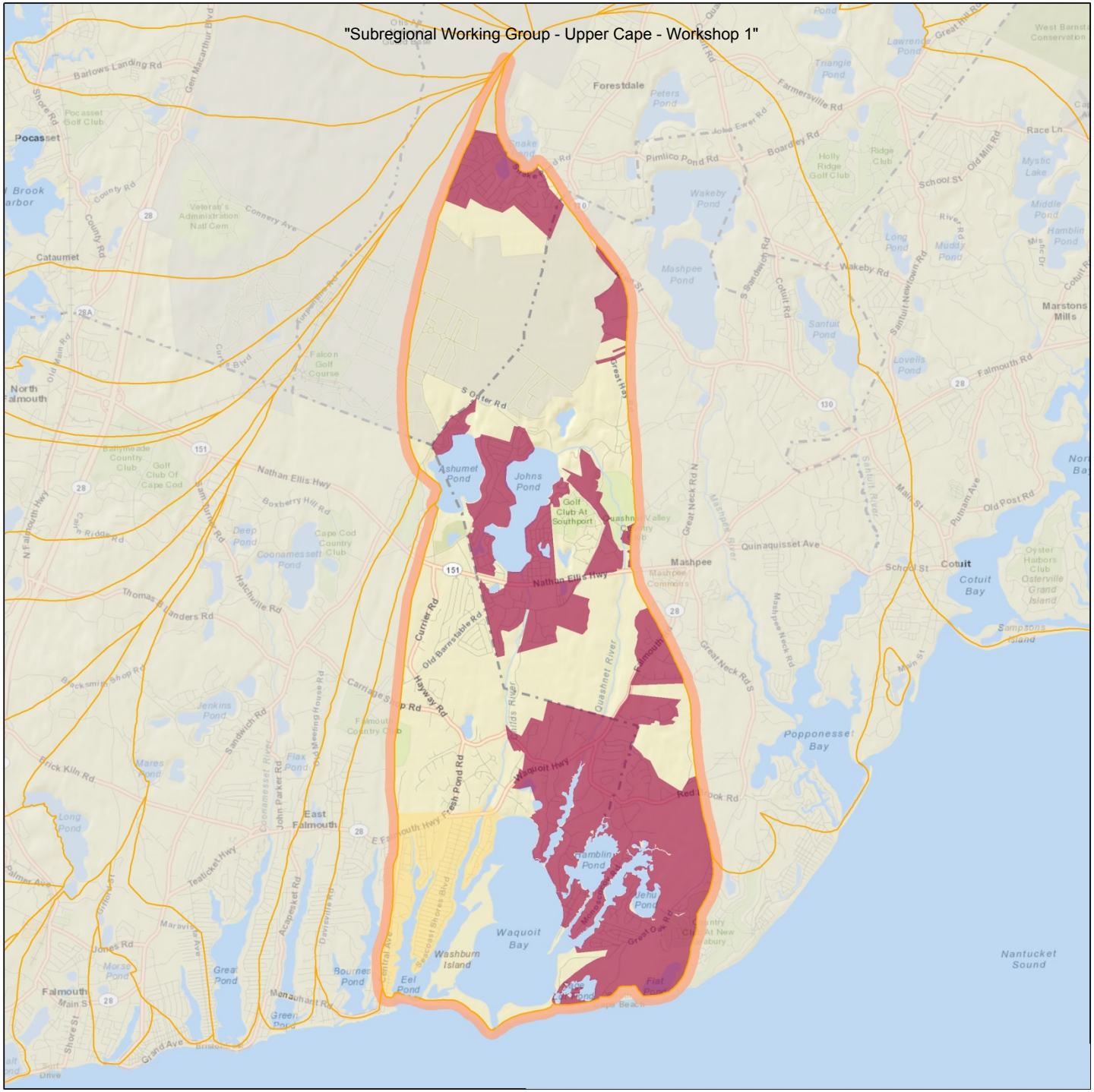
"Subregional Working Group - Upper Cape - Workshop 1"

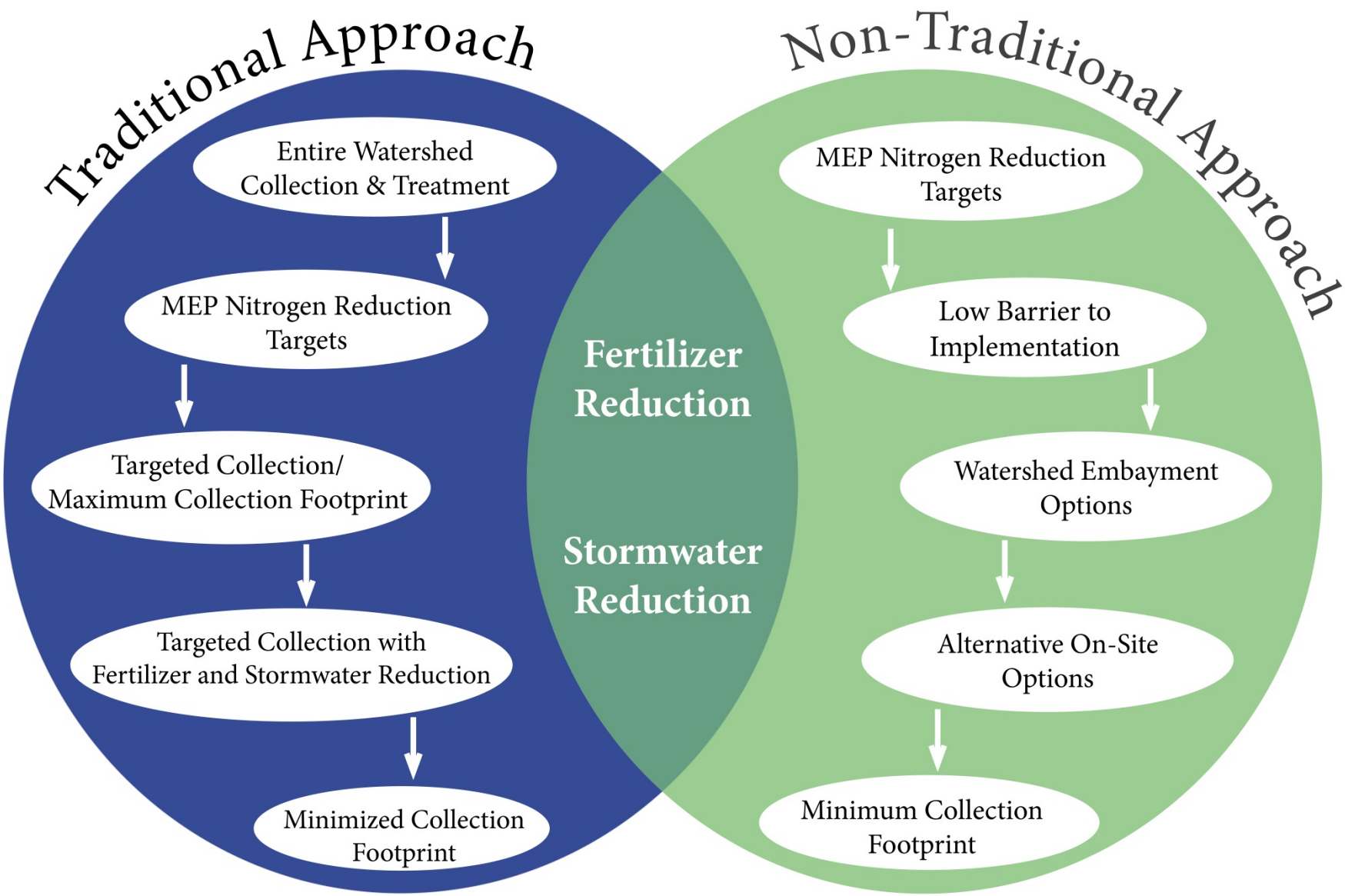
Septic Load TMDL = 76%
Total Load TMDL = 53%



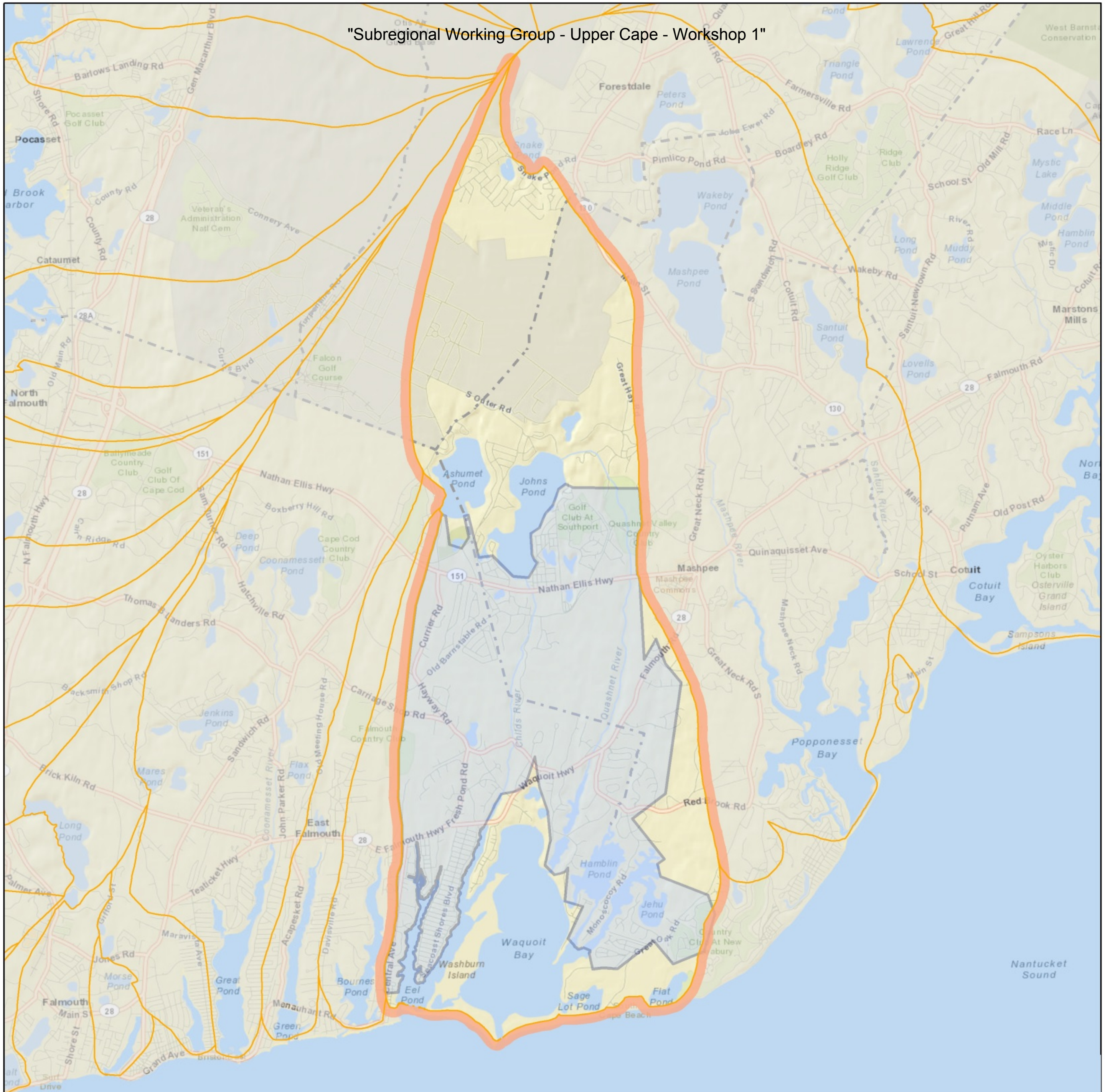
"Subregional Working Group - Upper Cape - Workshop 1"



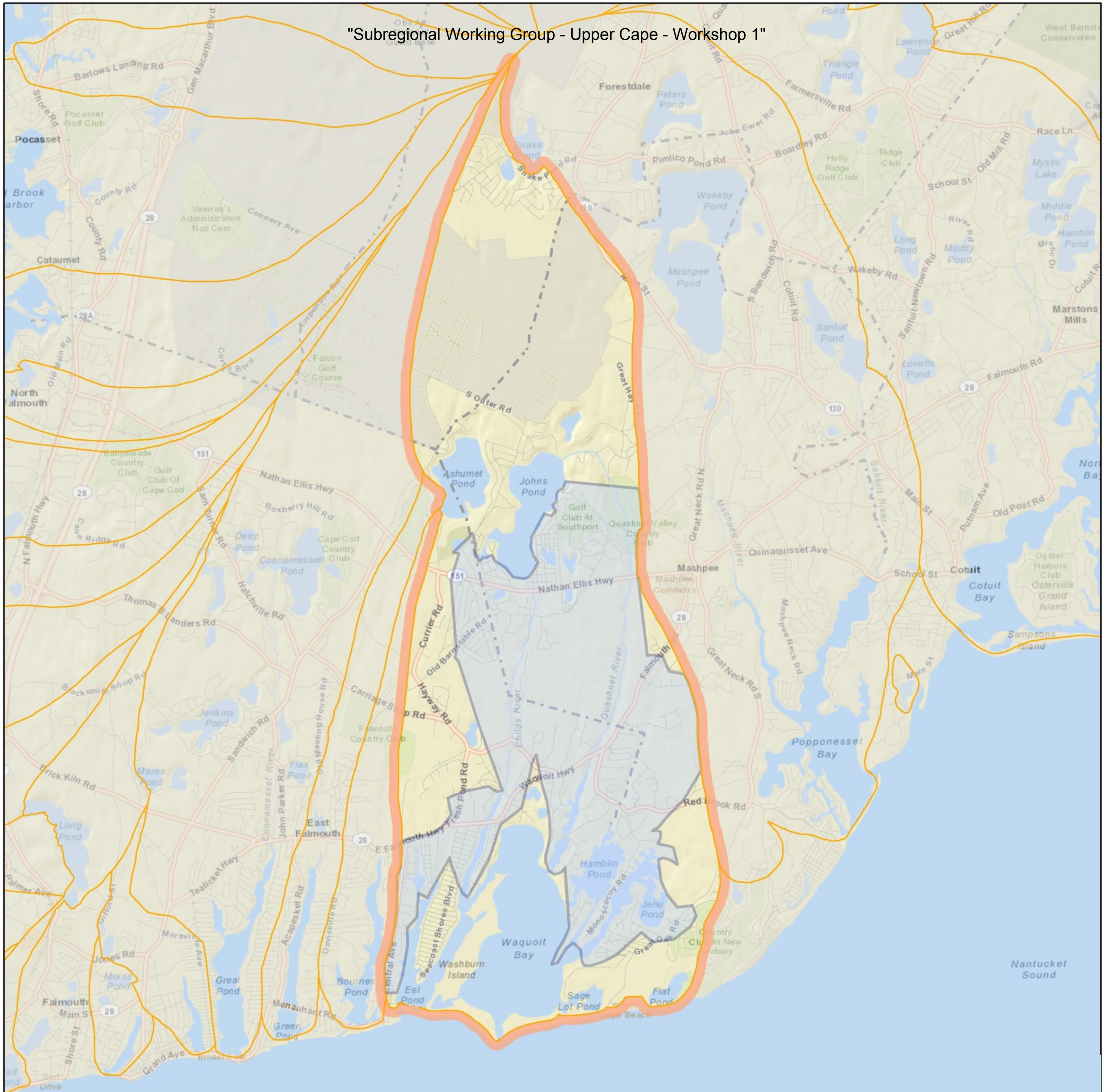

"Subregional Working Group - Upper Cape - Workshop 1"
Forestdale
Pocasset
Cataumet
North Falmouth
Mashpee
Cotuit
East Falmouth
Falmouth
Marstons Mills
Waquoit Bay
Washburn Island
Popponesset Bay
Cotuit Bay
Nantucket Sound
Nathan Ellis Hwy
Quinaquisset Ave
Falmouth Rd
Main St
Old Post Rd
Pimlico Pond Rd
Wakeby Rd
Currier Rd
Old Barnstable Rd
Hayway Rd
Waquoit Hwy
Quashnet River
Mashpee River
Ashumet Pond
Johns Pond
Mashpee Pond
Wakeby Pond
Santuit Pond
Lovells Pond
Golf Club At Southport
Falcon Golf Course
Cape Cod Country Club
Coonamessett Pond
Deep Pond
Jenkins Pond
Mares Pond
Flax Pond
Long Pond
Great Pond
Bournes Pond
Eel Pond
Hamblin Pond
Jehu Pond
Green Pond
Fiat Pond
Middle Pond
Mystic Lake
Muddy Pond
Lawrence Pond
Triangle Pond
Peters Pond
Holly Ridge Golf Club
Ridge Club
Pocasset Golf Club
Ballymeade Country Club
Golf Club Of Cape Cod
Falmouth Country Club
Mashpee Commons
Oyster Harbors Club
Osterville Grand Island
Sampsons Island
Veteran's Administration Natl Cem
Barlows Landing Rd
Gen Macarthur Blvd
Shore Rd
County Rd
Connery Ave
Old Main Rd
Currier Blvd
Boxberry Hill Rd
Sam Turner Rd
Old Riders Rd
N Falmouth Hwy
Thomas B Landers Rd
Hatchville Rd
Blacksmith Shop Rd
Carriage Shop Rd
Old Meeting House Rd
Sandwich Rd
Brick Kiln Rd
John Parker Rd
Coonamessett River
Teaticket Hwy
E Falmouth Hwy
Palmer Ave
Jones Rd
Maravista Ave
Acapesket Rd
Davisville Rd
Menauhant Rd
Grand Ave
Shore St
Surf Drive
Central Ave
Seacoast Shore Blvd
Fresh Pond Rd
Great Oak Rd
Red Brook Rd
Monument Rd
Great Neck Rd S
Mashpee Neck Rd
Great Neck Rd N
Main St
School St
Race Ln
Old Mill Rd
Boardley Rd
Farmersville Rd
Jobs Ewer Rd
River Rd
S Sandwich Rd
Santuit Newtown Rd
Cotuit Rd
Putnam Ave
Great Hay
S Otter Rd
Santuit River
Falmouth Rd
Nor Ba
West Barnstable Conservation
28
28A
130
151


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

"Subregional Working Group - Upper Cape - Workshop 1"



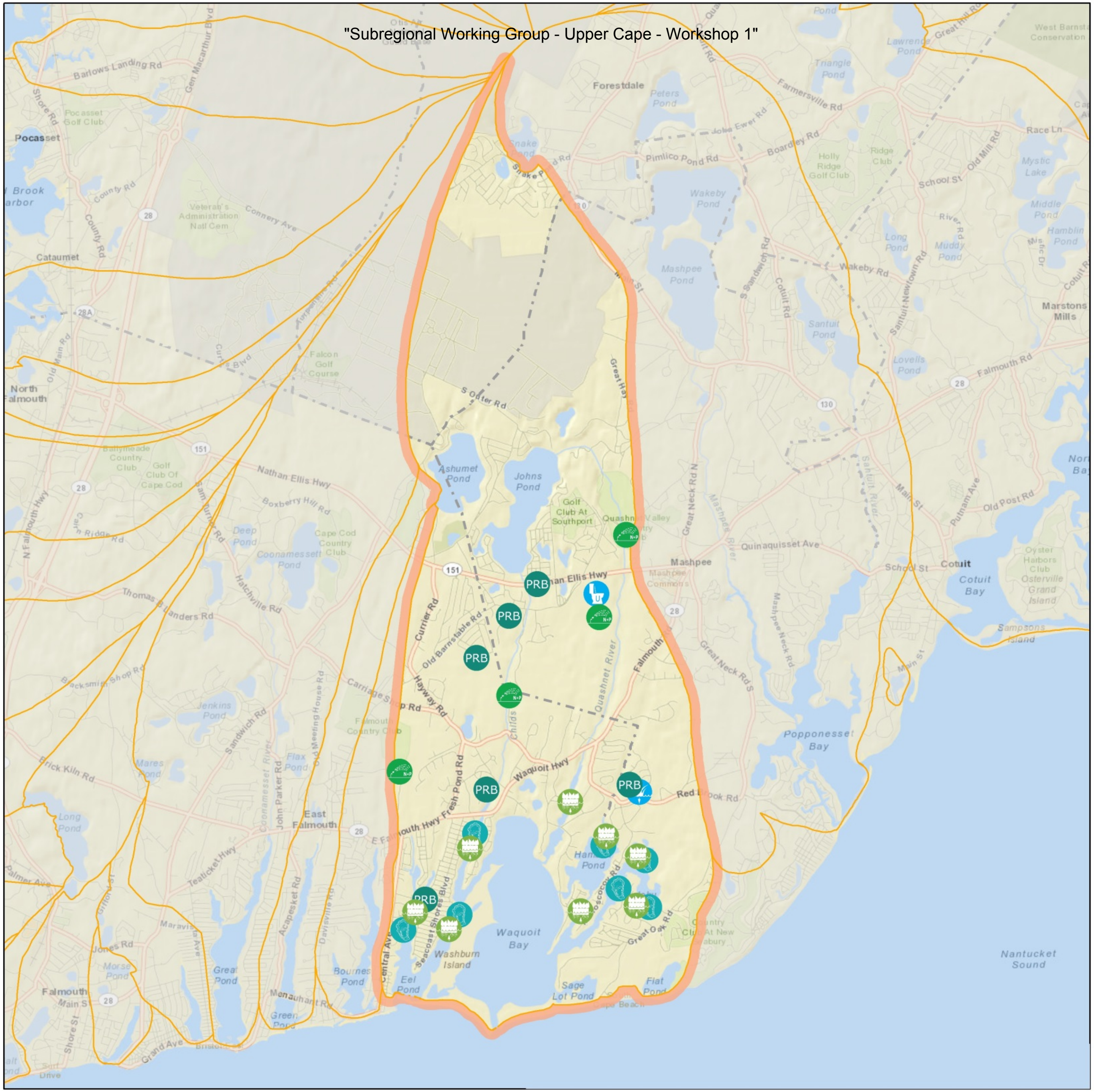
"Subregional Working Group - Upper Cape - Workshop 1"

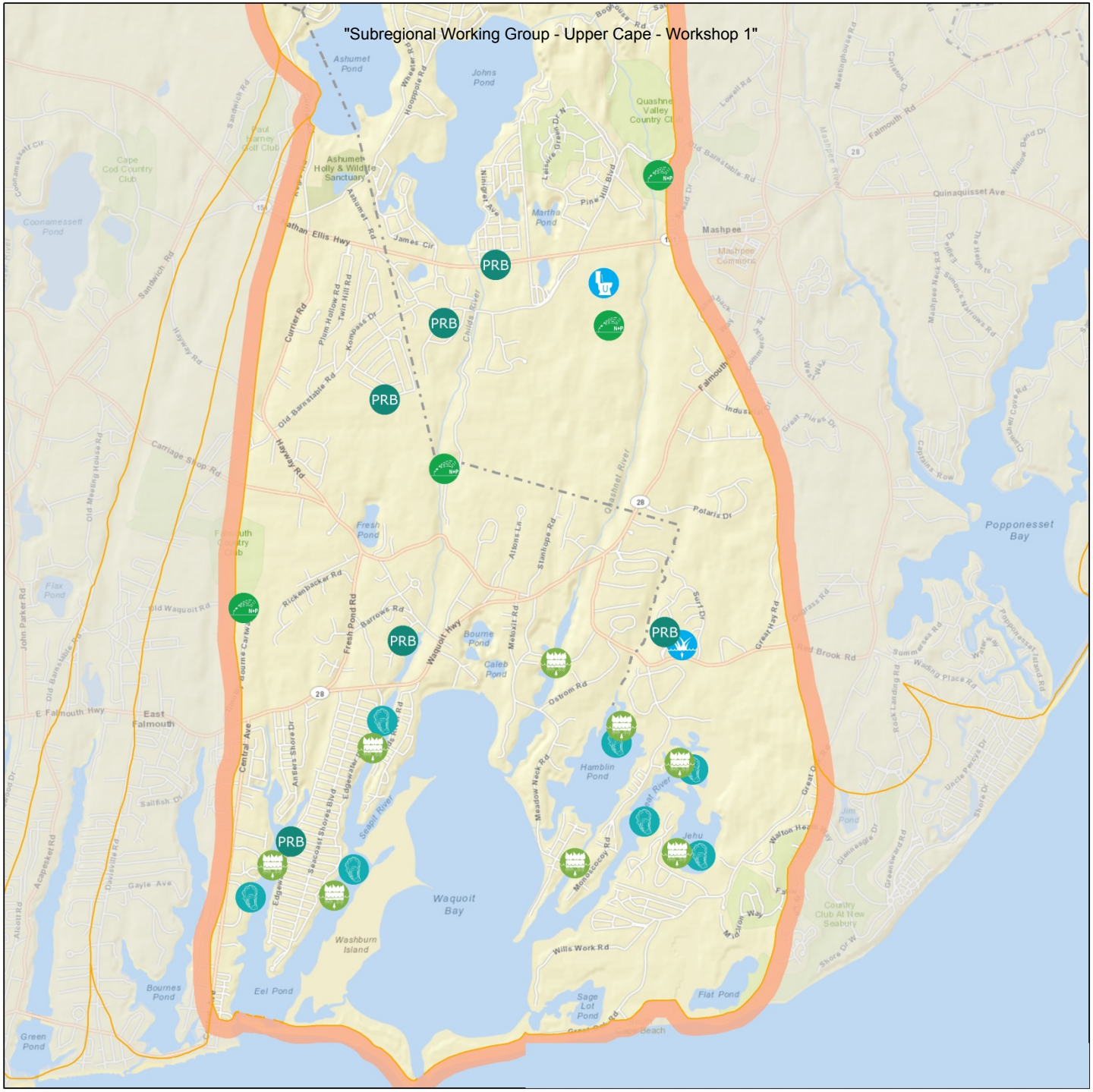


"Subregional Working Group - Upper Cape - Workshop 1"


Wastewater
Existing Water Bodies
Regulatory
Problem Solving Approach
1
Identify Current N Removal Needs (Targets/Reduction Goals)
Present Load: X kg/day
Target: Y kg/day
Reduction Required: N kg/day
2
Additional N Removal Needs
A. Title 5 Problem Areas
B. Pond Recharge Areas
C. Growth Management
3
Low Barrier Technologies
A. Fertilizer Management
B. Stormwater Mitigation
N+P+K MGMT
BMPs
4
Watershed Alternative Technologies
A. Permeable Reactive Barriers
B. Inlet/Culvert Openings
C. Constructed Wetlands
D. Aquaculture
PRB
GW
SW
5
On-Site Alternative Technologies
A. Eco-toilets (UD & Compost)
B. I/A Technologies
C. Enhanced I/A Technologies
D. Shared Systems
IA
Title 5
Enhanced IA
6
Priority Collection/Sewer Areas
A. Greater Than 1 Dwelling Unit/acre
B. Village Centers
C. Economic Centers
D. Growth Incentive Zones
Advanced
Disposal
7
Supplemental Collection / Sewer Areas
Advanced

"Subregional Working Group - Upper Cape - Workshop 1"




"Subregional Working Group - Upper Cape - Workshop 1"
PRB
PRB
PRB
PRB
PRB
Ashumet Pond
Johns Pond
Ashumett Holly & Wildlife Sanctuary
Martha Pond
Quashnet River
Mashpee
Popponesset Bay
Fresh Pond
Bourne Pond
Caleb Pond
Hamblin Pond
Waquoit Bay
Washburn Island
Eel Pond
Flat Pond
Sage Lot Pond
Green Pond
Bournes Pond
East Falmouth
Seapit River
Jehu
Jim Pond
Nathan Ellis Hwy
Falmouth Rd
Old Barnstable Rd
Fresh Pond Rd
Waquoit Hwy
Meadow Neck Rd
Wills Work Rd
Surf Dr
Great Hay Rd
Central Ave
Quinaquisset Ave
Pine Hill Blvd
Polaris Dr
Ostrom Rd
Moonstruck Rd
Seacoast Shores Blvd
Rickenbacker Rd
Barrows Rd
Stanhope Rd
Meiosit Rd
Alsons Ln
Carriage Shop Rd
Old Meeting House Rd
Sandwich Rd
Coonamessett Pond
Cape Cod Country Club
Paul Harney Golf Club
Quashnet Valley Country Club
Mashpee Commons
Captains Row
Great Pines Dr
Summersea Rd
Red Brook Rd
Wading Place Rd
Popponesset Island Rd
Rock Landing Rd
Uncle Percys Dr
Shore Dr
Greenward Rd
Grainseagle Dr
Country Club At New Seabury
Shore Dr W
Flax Pond
John Parker Rd
Old Waquoit Rd
E Falmouth Hwy
Sailfish Dr
Gayle Ave
Acapesket Rd
Alcott Rd
Davisville Rd
Edgewater Dr
Ansels Shore Dr
Willis Work Rd
Beach
28
15
151

	ACOE	DEP			BOH	ConComm	MEPA
	401/404	*GWDP*	*WMA*	*I&A*	*Title 5*	*WPA*	*Thresholds*
Technology/Approach							
Stormwater Mngmnt						●	●
Fertilizer Mngmnt							
Oyster/Aquaculture	●					●	●
Ecotoilets				●	●		
PRBs						●	●
Constructed Wetlands	●	●				●	●
Fertigation Wells		●	●				●
Phytoremediation						●	●
Habitat Restoration	●					●	●
Inlet Widening	●					●	●
Dredging	●					●	●

Additional permits may apply. Other agencies involved could include:

- MA Natural Heritage and Endangered Species Program
- MA Historical Commission
- US Fish & Wildlife Service/Division of Marine Fisheries
- MassDOT

Regulatory, Legal, and Institutional Interactions

What are some of the hurdles and opportunities associated with permitting the above scenarios?

Implementation

What components of an adaptive management plan are needed to achieve permit-ability and water quality goals?

Adaptive Management

Definition

A structured approach for meeting water quality goals that monitors outcomes, assesses progress over time, and requires recalibration of plans and projects, as necessary, based on review and evaluation of monitoring.

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

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

Total acreage: 13,057 acres

Total acreage: 13,057 acres

Acreage by town:

Falmouth	4,062 acres
Mashpee	6,921 acres
Sandwich	2,075 acres

Total built parcels: 5,827 parcels

Total built parcels: 5,827 parcels

Built parcels by town:

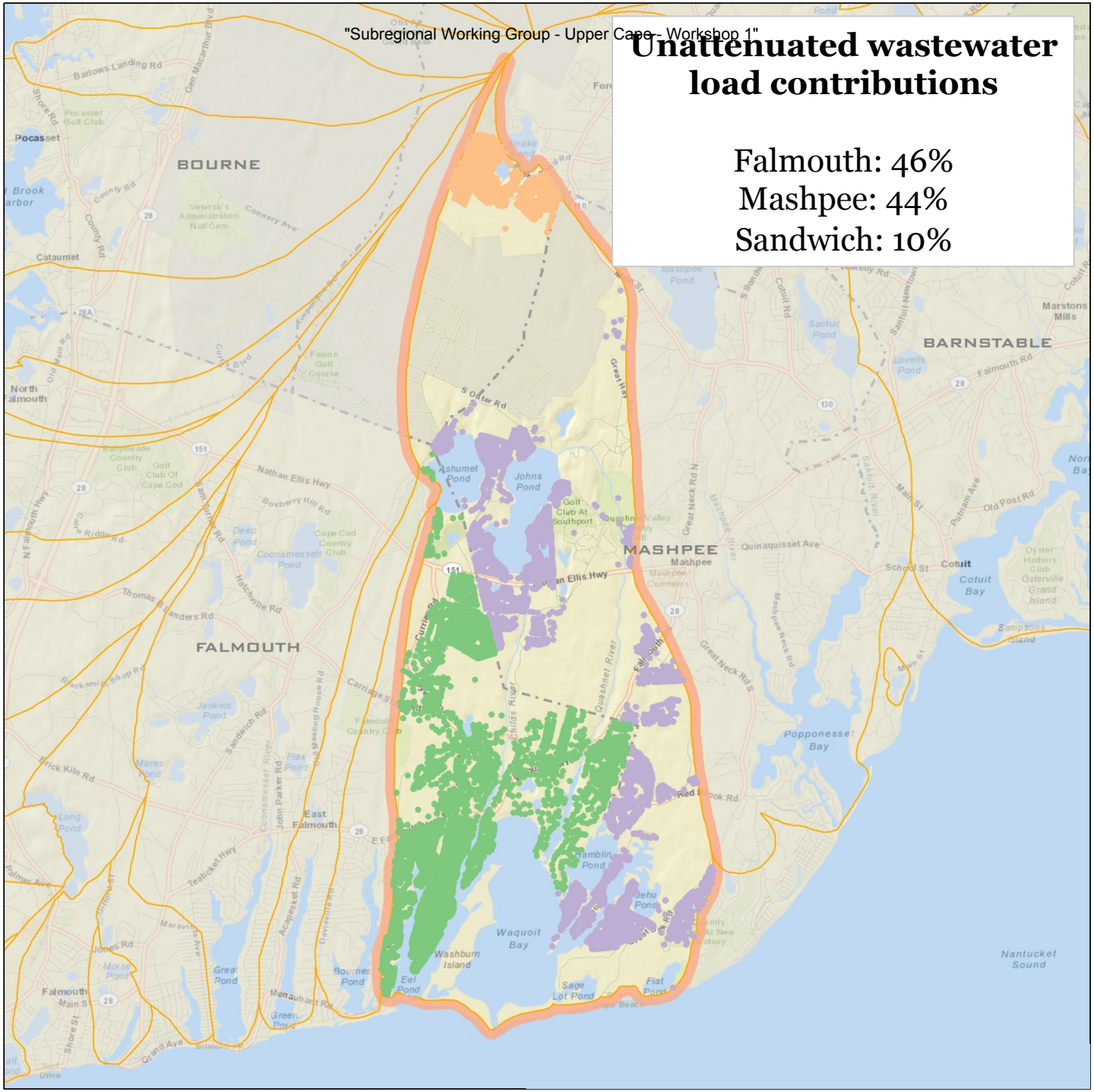
Falmouth 3,036 parcels (green)

Mashpee 2,301 parcels (purple)

Sandwich 490 parcels (orange)

Unattenuated wastewater load contributions

Falmouth: 46%
Mashpee: 44%
Sandwich: 10%

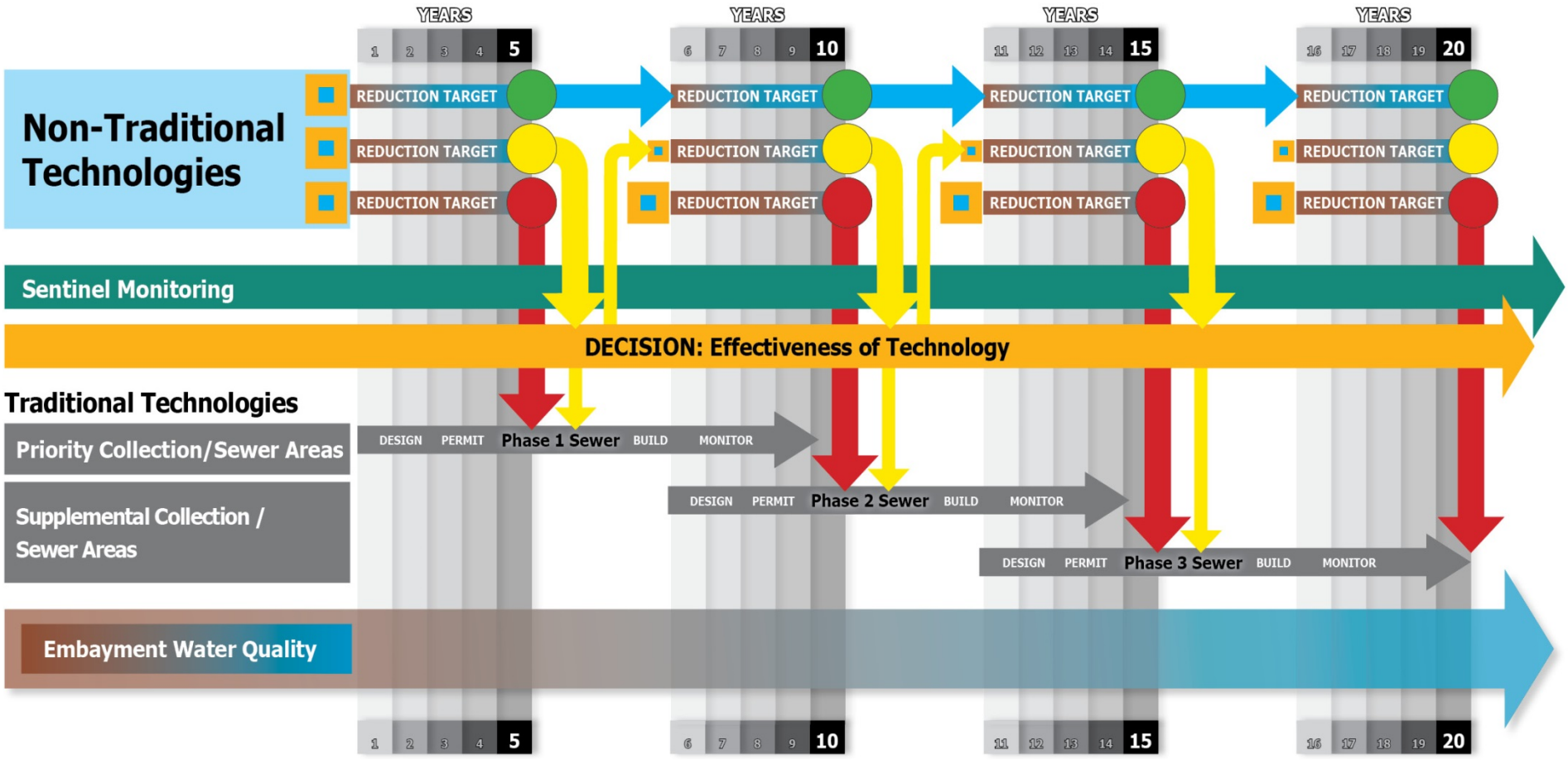


"Subregional Working Group - Upper Cape - Workshop 1"

Permit likely required

Permit may be required, depending on location

How do you implement adaptive management?



Cape Cod 208 Area Water Quality Planning
Upper Cape Sub Regional Group

Meeting One
February 25, 2013
1:00 pm – 5:00 pm
Mashpee Town Hall, Mashpee MA

Meeting Summary Prepared by the Consensus Building Institute

I. ACTION ITEMS

Working Group

- Provide feedback on the draft meeting summary created by the Consensus Building Institute.

Consensus Building Institute

- Circulate a draft meeting summary from Meeting #1 for review by the sub regional group.

Cape Cod Commission

- Create a glossary of terms to help participants with acronyms and technical terminology and concepts. **NOTE – The Commission created this glossary for the remaining meetings in the other sub-regional groups. It is included at the end of these notes as Appendix 2*

II. WELCOME AND OVERVIEW

The meeting opened with a welcome from Paul Niedzwiecki, Executive Director of the Cape Cod Commission.

Carri Hulet, the facilitator from the Consensus Building Institute, introduced herself as the facilitator of the Upper Cape meetings for the sub-regional group process. She reviewed the agenda and led introductions. A participant list can be found in Appendix A. She explained that each of the three meetings of the sub regional group meetings would consist of three parts: scenario planning; regulatory, legal, and institutional issues (RLI); and implementation issues. Each of these three parts would be handled differently in each of the three meetings, as would be explained in greater detail by Paul Niedzwiecki. Dan Milz, a PhD student from the University of Illinois – Chicago, spoke to the group by speakerphone to notify participants that, although he was unable to attend, his camera was there to record the meeting, purely for his own academic use, and asked if there were any questions or concerns. Group members registered no objections to Mr. Milz' request.

Mr. Niedzwiecki placed the meeting in the context of the larger 208 Plan update process. He explained that the 208 Update process is watershed based. The process places a high priority on stakeholder engagement as such an orientation is required by the Clean Water Act and is also important to the Cape Cod Commission. He stated that the process is seeking to maximize the benefits of existing local wastewater planning efforts such as the Comprehensive Wastewater Management Plans (CWMPs) that many towns have developed. And Mr. Niedzwiecki explained that the 208 Plan is not a drive towards any one "optimal outcome." Instead, the intention is to identify a range of approaches that could meet water quality standards and then leave the choice about which one(s) to select to the local, or even hyper-local level. The goal of the 208 Plan Update is "to generate a series of approaches in each watershed that will meet water quality standards."

Mr. Niedzwiecki reviewed the timeline of the 208 Plan update process, which began with public meetings in July and August of 2013 and proceeded to meetings of 11 watershed working groups from September through December, 2013. The structure of the process has shifted from being organized by 11 "watershed subgroups" to 4 "sub-regional" groups in the current set of meetings. Mr. Niedzwiecki said that the meetings had shifted from looking at the "jurisdiction of the problem" at the watershed subgroup level to, now, the "jurisdiction of the solution" at the sub-regional level. He also noted that, although all of the stakeholders who participated in working group meetings at the watershed subgroup level would not be able to participate in meetings at the sub-regional level, the Cape Cod Commission is seeking to keep stakeholders involved in the process by releasing a new section of the narrative that will accompany the 208 Plan each week on the Commission's website for public review.

Mr. Niedzwiecki explained that the current series of three sub-regional meetings would proceed according to a unified format. Each of the three meetings, in each sub-region, would begin with a presentation of a concrete scenario or scenarios; proceed to discussion of regulatory, legal, and institutional concerns; and conclude with discussion of a topic related to implementation. Figure 1, shown here, outlines the process over the three meetings of each of the sub-regional groups.

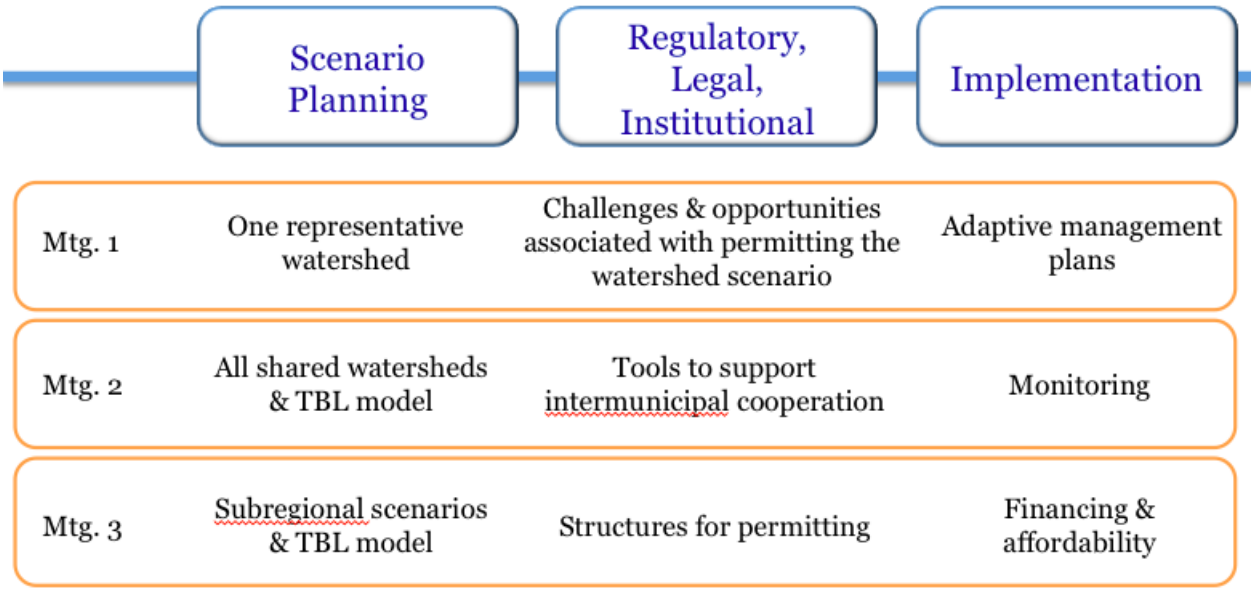


Figure 1

Mr. Niedzwiecki recounted the goals of the first meeting:

- Identify regulatory, legal, and institutional challenges, constraints, and opportunities associated with the 208 Plan approach for water quality.
- Clarify the definition and components of an adaptive management plan that can be permitted.

III. SCENARIO PLANNING

Cape Cod Commission representatives presented Waquoit Bay as a sample scenario for the Upper Cape working group. Mr. Niedzwiecki noted that the towns of Falmouth, Mashpee, and Sandwich each make up a portion of the Waquoit Bay watershed, with each constituting different portions of the watershed's land area, built parcels, and attenuated wastewater load. Falmouth contributes 54% of the attenuated wastewater load, Mashpee contributes 42%, and Sandwich contributes 4%. Mr. Niedzwiecki noted that these differential contributions are important to understand in order to appreciate respective contributions to the nitrogen-load problem faced by the watershed. He explained that, in order to meet regulatory requirements for nitrogen load reduction, the towns could either collectively reduce total maximum daily load (TMDL) of nitrogen from septic sources by 76% or could reduce total maximum daily load (TMDL) of nitrogen from all human waste-contributed sources by 53%. In other words, if the towns can get credit for reducing nitrogen from practices such as fertilizer reduction and stormwater reduction, then the volume of septic load that they will have to reduce will be lower, thereby resulting in cost savings. Mr. Niedzwiecki also showed a map illustrating the higher percentage of nitrogen load that needs to be mitigated in the areas of the watershed closer to Nantucket Sound as compared to areas further inland from the Sound and another map illustrating existing local wastewater planning efforts.

Mr. Niedzwiecki explained that the Commission modeled two approaches, a "traditional approach" and a "non-traditional approach," for meeting the Waquoit Bay watershed's nitrogen load reduction targets. He explained that the traditional approach relies on using targeted collection of septic waste using sewerage, combined with fertilizer and stormwater reduction measures, to meet Massachusetts Estuaries Project (MEP) nitrogen reduction targets. The non-traditional approach uses a combination of fertilizer and stormwater reduction measures, watershed technologies such as permeable reactive barriers and aquaculture, on-site technologies such as eco-toilets and innovative/alternative Title 5 technologies, with minimal sewering in priority areas, to meet MEP nitrogen reduction targets.

Traditional Approaches to Wastewater Management
Tom Cambareri, Watershed Management Director at the Cape Cod Commission, presented the model named the "traditional approach." He noted that each watershed, such as the Waquoit Bay watershed, is itself made up of sub-watersheds, and that the MEP prescribes nitrogen-removal targets both for the whole watershed and its subwatersheds, accounting for factors such as nitrogen load and natural attenuation rates. Modeling to create the traditional approach considered different technologies, including conventional sewering, innovative/alternative Title 5 systems, and cluster systems. Using the Commission's Watershed MVP tool, the traditional approach found that centralized wastewater treatment using sewering would have the smallest footprint. Mr. Cambareri showed maps illustrating two different likely footprints for sewering, one (larger) footprint to deal exclusively with septic loads and a smaller footprint dealing with septic load after taking into account reductions from fertilizer and stormwater reduction measures.

In response to questions from working group members, Commission representatives explained that:

- Post-treatment water would be reintroduced back into the watershed.
- The Commission considered atmospheric nitrogen to be "neutral and non-controllable" for the purpose of creating its scenarios.
- Centralized treatment of septic load would need to cover approximately 5,200 parcels in the watershed to meet MEP targets without fertilizer and stormwater reduction measures and would need to cover approximately 4,200 parcels with those measures.

Non-Traditional Approaches to Wastewater Management
Scott Horsley, consultant to the Cape Cod Commission, presented the model named the "non-traditional approach." He noted that the Commission's examination of non-traditional approaches includes a wide variety of different technologies that would be implemented at different points in the watershed, thereby mitigating nitrogen loads over different timeframes. Mr. Horsley reviewed the Commission's seven-step problem solving approach, which begins with identifying nitrogen removal needs, progresses through consideration of different non-traditional technologies, and finally considers installation of sewer infrastructure, as needed per

local conditions or to meet nitrogen mitigation targets that are not met by the non-traditional technologies.

Mr. Horsley showed maps of the Waquoit Bay watershed illustrating possible locations for various technologies such as permeable reactive barriers, constructed wetlands, fertigation wells, shellfish bed restoration or aquaculture, and floating wetlands. He noted that the model also assumes that 5 percent of homes in the watershed would install ecotoilets. Mr. Horsley mentioned that in the Waquoit Bay watershed, as in many other Cape Cod watersheds, the Commission expects wastewater reduction targets could be met without resorting to any sewering.

Mr. Horsley also showed a table illustrating the different types of permitting that would be required before installing the various non-traditional technologies. He explained that the following bodies or statutes may exercise permitting authority over many non-traditional technologies, particularly with regard to projects that exceed certain threshold sizes or located in certain areas: the US Army Corps of Engineers, the Massachusetts Department of Environmental Protection, local Boards of Health, local Conservation Commissions, the Massachusetts Environmental Protection Act, the Massachusetts Natural Heritage and Endangered Species Program, the Massachusetts Historical Commission, US Fish & Wildlife Service/MA Division of Marine Fisheries, and the Massachusetts Department of Transportation (MassDOT). Figure 2, shown here, outlines the types of permitting that may be required for different technologies.

	ACOE		**DEP**		**BOH**	**ConComm**	**MEPA**
	401/404	*GWDP*	*WMA*	*I&A*	*Title 5*	*WPA*	*Thresholds*
Technology/Approach							
Stormwater Mngmnt						●	●
Fertilizer Mngmnt							
Oyster/Aquaculture	●					●	●
Ecotoilets				●	●		
PRBs						●	●
Constructed Wetlands		●				●	●
Fertigation Wells			●				●
Phytoremediation		●				●	●
Habitat Restoration	●					●	●
Inlet Widening	●					●	●
Dredging	●					●	●

Additional permits may apply. Other agencies involved could include:

- MA Natural Heritage and Endangered Species Program
- MA Historical Commission
- US Fish & Wildlife Service/Division of Marine Fisheries
- MassDOT

Figure 2

**One participant commented on this chart, saying that it should be changed to show that EPA is the permit issuing authority for storm water permits. He said, "EPA may issue individual or general permits jointly with DEP. In the past EPA has not been willing to allow partial delegation of the surface discharge permit program."*

Following Mr. Horsley's presentation, working group members and Commission representatives discussed the following topics:

- Communities need to keep abreast of permitting requirements.
- Whether seasonal analyses should be conducted in order to account for differential rates of nitrogen uptake by different technologies in different seasons and nitrogen molecules behaving differently in water during different seasons.
- The observed decrease in the level of nitrogen in rainfall and the different possibilities for how this impacts nitrogen mitigation targets for different watersheds. Commission representatives explained that a separate working group is looking into this issue and that this separate group's scientific analysis would feed into the larger 208 Update process.
- A variety of different considerations for the different technologies beyond permitting, including maintenance, operations, management, etc. In addition, participants suggested that the timeframe for permitting of different technologies should be considered; for example, if a given technology is likely to take a long time to permit, alternatives may need to be considered.
- The importance of coordinating with state and federal agencies, particularly since many agencies are moving toward an ecosystem approach to habitat management. Commission representatives noted that the Commission has been meeting with representatives of many state and federal agencies during the past couple of years.

IV. REGULATORY, LEGAL, AND INSTITUTIONAL INTERACTIONS

Ms. Patty Daley, Deputy Director of the Cape Cod Commission, provided greater detail on the current regulatory framework that is in place for permitting different types of wastewater plans and technologies. Building on the information provided by Mr. Horsley, she explained the animating purpose behind a few types of regulatory review:

- Massachusetts Environmental Policy Act (MEPA) review is performed by the Commonwealth of Massachusetts in order to recognize the environmental impacts of different projects, especially larger ones, and to scope alternatives that may be less environmentally impactful. Following MEPA review, review under the Massachusetts Department of Environmental Protection, the Massachusetts Historical Commission, the US Fish & Wildlife Service/MA Division of Marine Fisheries, and other agencies may still be required.
- The Cape Cod Commission is charged with conducting a type of review called "Development of Regional Impact" (DRI) review in order to provide for environmental protection and ensure that adequate infrastructure is in place for projected growth,

especially for larger projects on the Cape. The Commission and MEPA have a Joint Review Process to coordinate the Commission's DRI review with MEPA review, however, the formal DRI review takes place after the conclusion of the MEPA review.

- The Massachusetts Department of Environmental Protection issues permits for groundwater discharge and groundwater withdrawals. The agency also administers the State Revolving Fund program to pass federal funds on to local communities for water projects. Ms. Daley noted that SRF loans often have a 2% interest rate but that municipalities can secure 0% financing in cases where they can demonstrate that the addition of new wastewater infrastructure will be "flow –neutral".

Ms. Daley identified a number of factors that could be changed about the current permitting process to better accommodate non-traditional technologies and the needs of towns on the Cape in dealing with their wastewater challenges:

- Currently the Cape Cod Commission's DRI review is oriented toward a parcel-based review and is not a town-wide or watershed-wide approach. The Commission will explore how to revise this over the next year.
- Identify how to get credit for fertilizer and stormwater reduction measures from the state permitting agencies.
- Permitting is currently done based on town boundaries because towns are the fiscal agents that are responsible for implementing plans. Most watersheds cross town boundaries, however, meaning that there is a disconnect between current permitting and implementing nitrogen mitigation measures on a watershed basis.
- Comprehensive Wastewater Management Plans (CWMPs) only include conventional technologies that are already permitted but do not incorporate the non-traditional approaches currently being explored.
- CWMPs tend to include town-wide approaches that require 30-year engineering analyses, which prove to be very (and arguably, unrealistically) costly, thereby provoking opposition at town meetings. Creating an easier pathway for permitting smaller, lower-cost technologies that enjoy widespread support would be helpful.

Ms. Daley also identified a couple of positive recent developments with regards to the permitting process for wastewater projects. Falmouth has been able to secure a MEPA certificate for two smaller projects while the larger plan is still under review. The plan itself incorporates principles of adaptive management. The Cape Cod Commission is also exploring the creation of a MEPA / CCC Special Review Procedure that would streamline the review process across all Cape towns. The Special Review Procedure could apply to projects that can commence early due to their limited scale and high level of public support, and benefit to the environment, and also for projects that need coordination between MEPA and other agency considerations, such as the 208 Plan.

In response to a question from a participant, Commission representatives explained that the Commission is trying to leverage the 208 Update process to push for creation of a harmonized

review process that is appropriate for permitting at the watershed-level instead of the current approach of permitting only at the town level.

Following Ms. Daley's presentation, working group participants worked to identify regulatory, legal, and institutional hurdles and opportunities associated with permitting non-traditional technologies.

The working group identified the following hurdles:

- Municipalities may not currently have the expertise and staffing in place to implement and manage non-traditional technologies.
- The current permitting process for non-traditional approaches is daunting.
- Voters at the town level have rejected many promising projects due to concerns about cost.
- The long timeframe for permitting non-traditional approaches may disincentivize municipalities from pursuing these and, even if they do, can mean that data is outdated by the time permitting comes through.
- Historically, many towns on the Cape have not worked together very much and may have governing structures that do not easily mesh. Similarly, communities that share a watershed may not be knit together and so may have cultural challenges to working together.
- Some think the Massachusetts Estuaries Project (MEP) approach and data is flawed, and so it may not make sense to base decision-making and modeling on this data.
- Property rights and property uses may make citizens wary of some approaches that could impact these rights and uses.
- It will likely be difficult to engage the public around wastewater issues and convince people of the importance of taking action. On this topic, in particular, many people may even be averse to talking about issues such as wastewater, sewage, etc.
- Regulatory agencies are often very risk-averse and therefore require the adoption of approaches that are guaranteed to be effective (such as sewering) rather than allowing for experimentation with non-traditional technologies. This hurdle applies not only to permitting but also to granting of State Revolving Fund monies.
- Regulatory agencies pursue permitting with each town individually, which means that currently each town has to incur the costs of trying to secure permits for non-traditional approaches.

The working group identified the following opportunities:

- Regulatory agencies could use discretionary enforcement to allow towns time to try out non-traditional approaches instead of effectively mandating use of already-permitted technologies. There may also be areas where regulatory agencies are applying the text of regulations unnecessarily literally.
- Learn from the experiences of other jurisdictions and projects, such as the Massachusetts Water Resources Authority (MWRA).

- Shift the responsibility from permitting wastewater management programs from the many towns on the Cape to a fewer number of entities, or even a single entity for the entire Cape.
- Explore options for managing projects at the watershed level. For example, “watershed districts” could be created to explore templates for how different functions could be monitored and managed, whether at the town level or at the watershed level.
- Take advantage of the absence of a deadline to meet nitrogen-reduction targets under state law, thereby potentially creating an opportunity to pursue low-hanging fruit and try non-traditional approaches.
- Some technologies, such as eco-toilets, are already permitted by local Boards of Health.
- Develop an inter-agency team made up of representatives from each of the different permitting agencies so there is greater continuity and coordination between the permitting agencies. The Environmental Management Commission dealing with the Joint Base Cape Cod is an example of this.
- Towns can begin implementing certain technologies, such as oyster beds, independently of the 208 process.
- The septic tank tax credit could be expanded in order to provide greater incentive to implement on-site technologies.
- Efforts at public education could be increased, for example around efficient and responsible fertilization.
- Focus on non-traditional forms of outreach, such as through schools, places of worship, social media, and targeting “social influencers” in different communities.
- Common, easily-understandable concepts and measures such as how deep in the water you can go and still see your feet, improving shellfish catches, etc. can be used to communicate around nitrogen loads and ecosystem improvements with the general public.

A participant suggested that there are three categories of projects, in terms of implementation:

- Large municipal projects that are expensive and therefore may be hard to fund,
- Projects that do not cost that much and may be pretty easy to secure public approval for (such as shellfish beds),
- Projects that are implemented at the individual or household level (e.g. innovative/alternative septic systems, ecotoilets, etc.).

V. IMPLEMENTATION

Mr. Niedzwiecki said that the implementation topic for this meeting would focus on adaptive management and framed the topic with the following question: “What components of an adaptive management plan are needed to achieve permitability and water quality goals?”

Mr. Niedzwiecki noted that adaptive management is a concept that can have many different definitions and suggested that the working group try to identify the key components of an

adaptive management strategy. He provided the following definition of adaptive management as a starting point: “A structured approach for meeting water quality goals that monitors outcomes, assesses progress over time, and requires recalibration of plans and projects, as necessary, based on review and evaluation of monitoring.” The working group identified the following key components of an adaptive management strategy:

- A structured approach. An adaptive management plan has a structure that lends itself to permitting;
- There have to be monitoring protocols for every technology selected;
- The plan has to lead to meeting water quality goals, and the exact goals will differ from watershed to watershed;
- The plan has to assess progress over time, and the timeframe for monitoring must be agreed upon with regulators to give them confidence that the permitee is moving toward meeting water quality goals;
- The plan should recalibrate plans and projects according to the results of monitoring in order to meet specific outcomes; this is how the process remains science-based;
- Openness to risk and support for scientific inquiry. One approach could be to agree upon “confidence ratings” for different technologies with regulators to identify the level of uncertainty associated with different approaches;
- Monitoring has to be enforceable and “actionable,” in that regulators can take action to change course if a given approach is not performing as expected or promised;
- The adaptive management plan must give regulators sufficient confidence in its potential for success.

Mr. Niedzwiecki presented the diagram shown in Figure 3 as a graphic representing a possible adaptive management strategy.

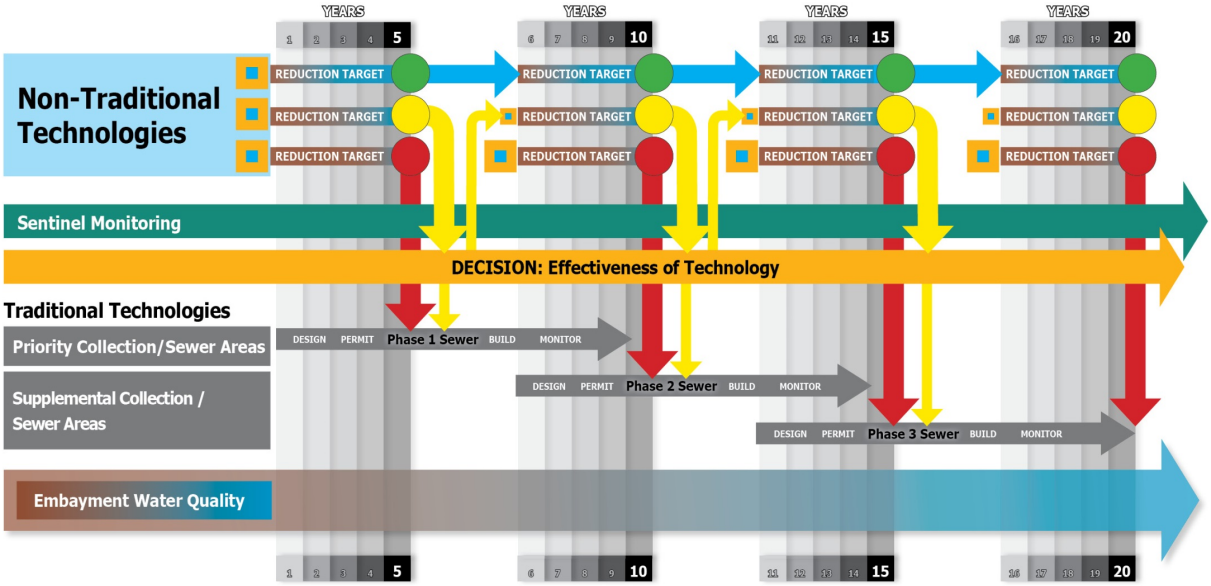


Figure 3

Mr. Niedzwiecki explained that the diagram represents five-year cycles of feedback loops such that, if a given non-traditional technology is not meeting expected performance goals, decisions can be made to continue working with that technology, and/or implementing another non-traditional technology, and/or implementing traditional technologies (such as sewering). As time progresses, if non-traditional technologies are not performing adequately to meet nitrogen reduction goals, the permittee would default to sewering. Mr. Niedzwiecki noted that real-time monitoring of nitrogen in embayments and estuaries, which would be possible to perform in the near future, would facilitate adaptive management.

Participants discussed a number of challenges and strategies related to monitoring the performance of different technologies:

- Effective monitoring would require a survey of what monitoring is already being performed, collection of that data, and then making that data available to the public in a way that non-scientists can easily understand;
- At what level would monitoring be conducted? For household-level systems, how could monitoring be conducted at the household level?
- Monitoring should be performed at the level of granularity that is “necessary” for assessing performance (and not beyond this level).

The group also discussed the following additional issues related to implementation:

- Facilitating decision-making at the local level by reducing bureaucracy.
- A Commission representative explained that Falmouth and Chatham have incorporated the retiring of debt service into the timetable for program implementation such that

additional bonds could be floated in the same amount in order to shield taxpayers from an increase in the tax levy.

- The Massachusetts Estuary Project's models will need to be verified at some point in the future to ensure that Cape towns are taking action to mitigate nitrogen loads only to the extent needed. In addition, state regulatory agencies should make some sort of commitment to towns that if they invest in meeting current targets they will not have to meet different targets in the future.
- The degree to which meeting total maximum daily load (TMDL) requirements correlates with ecosystem health. Some participants and Commission representatives stated that TMDLs are based on models and scientific data regarding the level of nitrogen that would negatively impact an ecosystem. Some participants suggested that simply meeting TMDLs would not lead to healthy ecosystems.
- Participants noted that some technologies would also create secondary benefits beyond nitrogen mitigation, such as improving water quality or reducing the loads of other nutrients or contaminants.
- Creation of a clearinghouse that hosts data on different technologies, best practices, etc. could be useful for monitoring nitrogen mitigation efforts and wastewater management more broadly.
- Selection of technologies should be tailored to maximizing the value of a technology in a specific location (i.e. getting the "biggest bang for the buck").

VI. PUBLIC COMMENTS

The following public comments were made:

- Simply trying to meet TMDL goals does not ensure that we will create healthy ecosystems, increase biodiversity, etc.
- We should see nitrogen as a resource to be used, not as a waste product.
- On the slide that showed which technologies are permitted and how, it said that ecotoilets are not permitted, but many are by local Boards of Health. This should be corrected.
- The technology options matrix still needs to be updated and errors corrected.

- **APPENDIX ONE: MEETING PARTICIPANTS**

Name	Affiliation
Working Group Members	
Earle Barnhart (primary)	The Green Center
Michael Ciaranca	Joint Base Cape Cod
Cynthia Coffin	Town of Bourne
David Dow	Sierra Club
Tom Fudala	Water District, Mashpee
Sia Karplus	
Alison Leschen	Waquoit Bay National Estuarine Research Reserve
Win Munro	Town of Falmouth
Korrin Petersen	Save Buzzards Bay
Jerry Potamis	Town of Falmouth
Sallie Riggs	Town of Bourne
Virginia Valiela	Falmouth Water Quality Management Committee
Linda Zeurn	Board of Selectmen, Bourne
Ron Zweig	Town of Falmouth
Staff	
Patty Daley	Cape Cod Commission
John D. Harris	Cape Cod Commission
Anne McGuire	Cape Cod Commission
Paul Niedzwiecki	Cape Cod Commission
Erin Perry	Cape Cod Commission
Carri Hulet	Consensus Building Institute
Tushar Kansal	Consensus Building Institute
Observers	
Dale Saad	Town of Barnstable
Tonna-Marie Rogers	Waquoit Bay NERR
Ed Gardella	Concerned Resident
Alison Robb	The Green Center
Hilde Maingay (alternate)	The Green Center
Ed Nash	Golf Course Superintendents of Cape Cod
Janet Nuever	The Green Center
Paul Gobell	Mashpee Sewer Commission

APPENDIX TWO – GLOSSARY OF TERMS

CCC – Cape Cod Commission
CWA – Clean Water Act
DEIR – Draft Environmental Impact Report
DEP – MA Department of Environmental Protection
DRI – Development of Regional Impact
EIR – Environmental Impact Report
ENF – Environmental Notification Form
FEIR – Final Environmental Impact Report
GWDP – Groundwater Discharge Permit
I & A – Innovative and Alternative
MADOT – Massachusetts Department of Transportation
MEPA – Massachusetts Environmental Policy Act
SRF – State Revolving Fund
TWMP – Targeted Watershed Management Plan
WMA – Water Management Act
WPA – Wetlands Protection Act