

Town of Mashpee

Watershed Nitrogen Management Plan

Final Recommended Plan/ Final Environmental
Impact Report CCC DRI Hearing



Recommended Plan components

Source Removal	Direct Environmental Mitigation	Land Management Strategies
<ul style="list-style-type: none">• Wastewater Management<ul style="list-style-type: none">• Regional facilities (JBCC)• New facilities• Improvements to existing private WWTF• Onsite systems• Stormwater Management<ul style="list-style-type: none">• BMPs• Fertilizer Management<ul style="list-style-type: none">• Bylaws	<ul style="list-style-type: none">• Shellfish Aquaculture<ul style="list-style-type: none">• Popponeset Bay (and associated embayments)• Jehu Pond• Hamblin Pond (including Great and Little River)• Other adaptive approaches	<ul style="list-style-type: none">• Landuse /zoning• Open space• Recharge and water resource sites• Seasonal/Year round use



Summary of Recommended Plan approach

Plan Components

- Shellfish aquaculture/propagation/restoration
- Site 4 (treatment and recharge) –initial small service area around Route 28
- System evaluations and collection system extensions for Mashpee Commons and Wampanoag WWTF
- Quashnet/Moonakis River evaluation
 - Possible soft solution – improved flushing
 - Joint Base Cape Cod (JBCC) :Fallback site at Back Road/High school
- Long-term monitoring, modeling and reporting of water quality

Balance of TMDL compliance depends on shellfish performance.

- Potential new WWTF (Site 6) and recharge sites (New Seabury/Willowbend)
- Improvements/modifications (Existing WWTFs)
- Continued Town coordination (Sandwich, Falmouth, Barnstable)
- Maintain a level of existing onsite systems
- Cape Cod Commission 208 planning and adaptive management

Implementation schedule

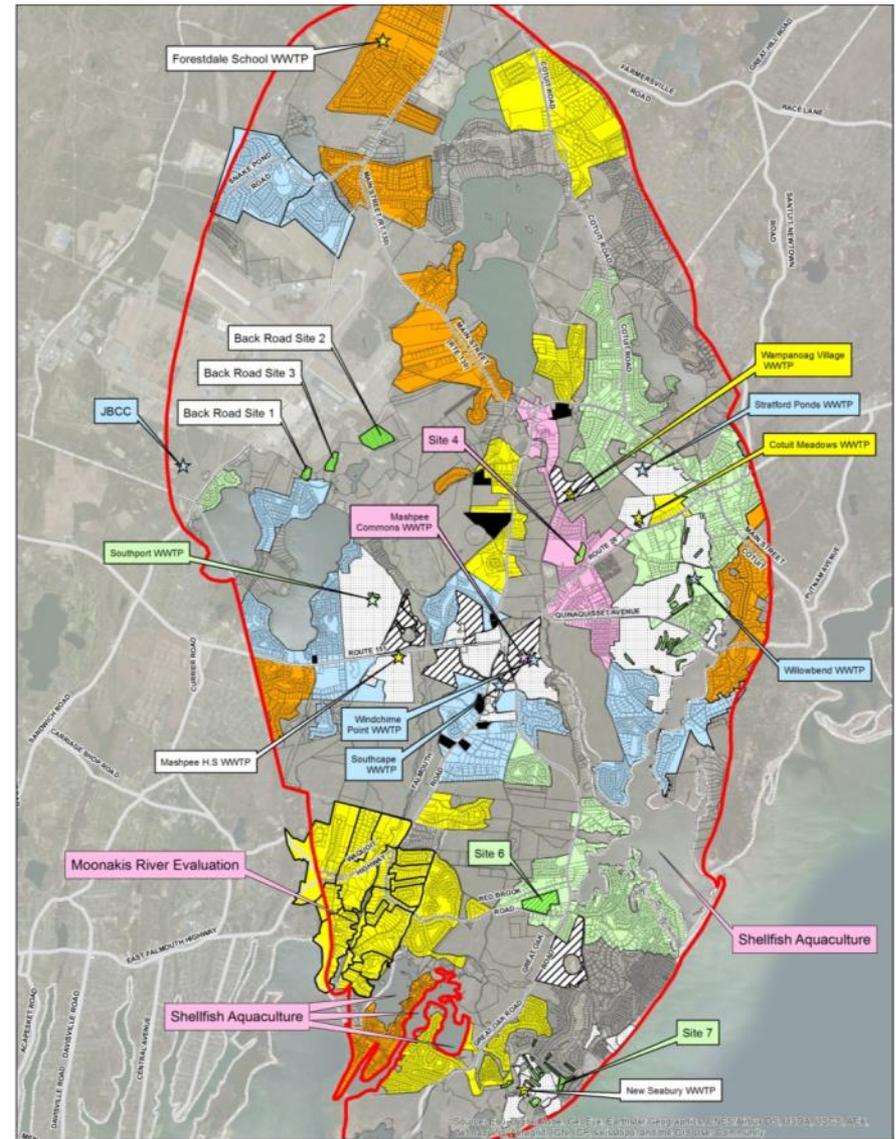
The implementation is envisioned in the following three categories:

- **Short-Term Initiatives:** Current (2015-2016)
- **Phase 1 Implementation (5 Year):** approximately 2017 to 2021
- **Long-Term Implementation and Adaptive Management:** 2022 to 2041 and beyond

Plan outlines five “major” phases over the planning period: Implementation will likely be split into much smaller “phases” based on design and construction schedules.

Proposed phasing map

- Phase 1 (2017-2021)
- Phase 2 (2022-2026)
- Phase 3 (2027-2031)
- Phase 4 (2032-2036)
- Phase 5 (2037-2041)



2015-2016 short-term initiative

- Development of:
 - watershed permit(s)
 - management structure for facilities
 - MOU/IMAs with neighbors
- Continuation of:
 - shellfish aquaculture/propagation/restoration
 - WWTF ownership discussions
 - fertilizer and storm water BMPs
- Evaluation of:
 - Joint Base Cape Cod/MassDevelopment
 - Private WWTF facilities (use and expansion)

2017-2021 phase 1

- Shellfish Program:
 - Expanded Popponesset Bay (inclusive)
 - New Jehu Pond
 - New Hamblin Pond/Little River
- Feasibility Studies:
 - Wampanoag WWTF
 - Mashpee Commons sewer connection
 - Quashnet/Moonakis River flushing evaluation
- Mashpee River Watershed Improvements:
 - Design and Construction of Site 4 WWTF
 - Design and Construction of Site 4 Initial Service Area
 - Wampanoag WWTF sewer extension (following study)

Projected shellfish excess nitrogen removal rates

Watershed ⁽³⁾	Estimated Existing Attenuated Nitrogen to be Removed to meet TMDLs (m ton/yr)	Estimated Nitrogen Removal by Shellfish (m ton/yr)	Shellfish Type	Potential Percent of Existing WW Nitrogen Removal with Shellfish
Mashpee River	5.0	2.5	Oysters	50%
Popponeset ⁽¹⁾	1.5	1.5	Quahogs	100%
Ockway Bay	0.9	0.9	Quahogs	100%
Shoestring Bay	4.0	2.0	Oysters	50%
Great River	1.0	1.0	Quahogs	100%
Jehu Pond	1.0	1.0	Quahogs	100%
Hamblin Pond ⁽²⁾	3.7	3.7	Quahogs	100%
Quashnet River	3.0	0	0	0%

1. Includes Popponeset Creek.
2. Includes both Red Brook and Little River watersheds.
3. Watersheds are made up of multiple subwatersheds
4. Values based on MEP 2001 wastewater flow estimates.
5. All values based on “existing” conditions from MEP reports.

Estimated annual shellfish seed cost for supporting shellfish aquaculture (worst case if not self-sustaining)

• Mashpee River :	\$140,000
• Popponesset Creek:	\$233,000
• Ockway Bay:	\$140,000
• Shoestring Bay:	\$112,000
• Great River:	\$160,000
• Jehu Pond:	\$160,000
• Hamblin Pond/Little River:	\$547,000

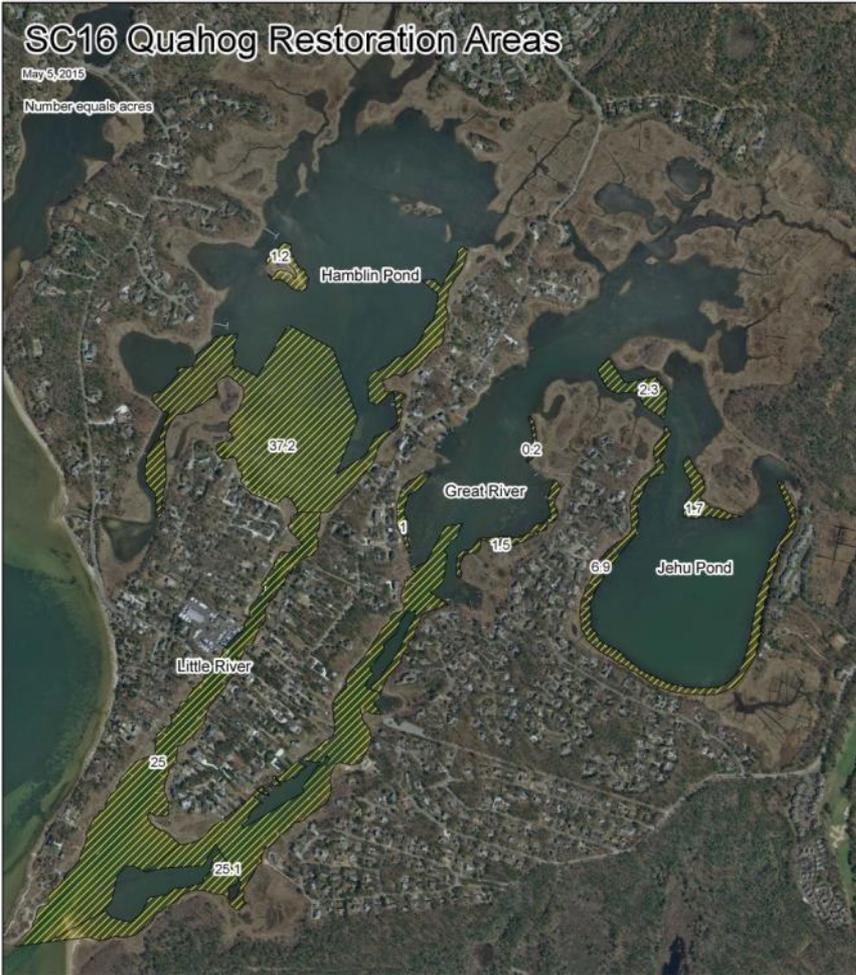
Total \$1,492,000

Total (rounded) \$1,500,000

SC16 Quahog Restoration Areas

May 3, 2015

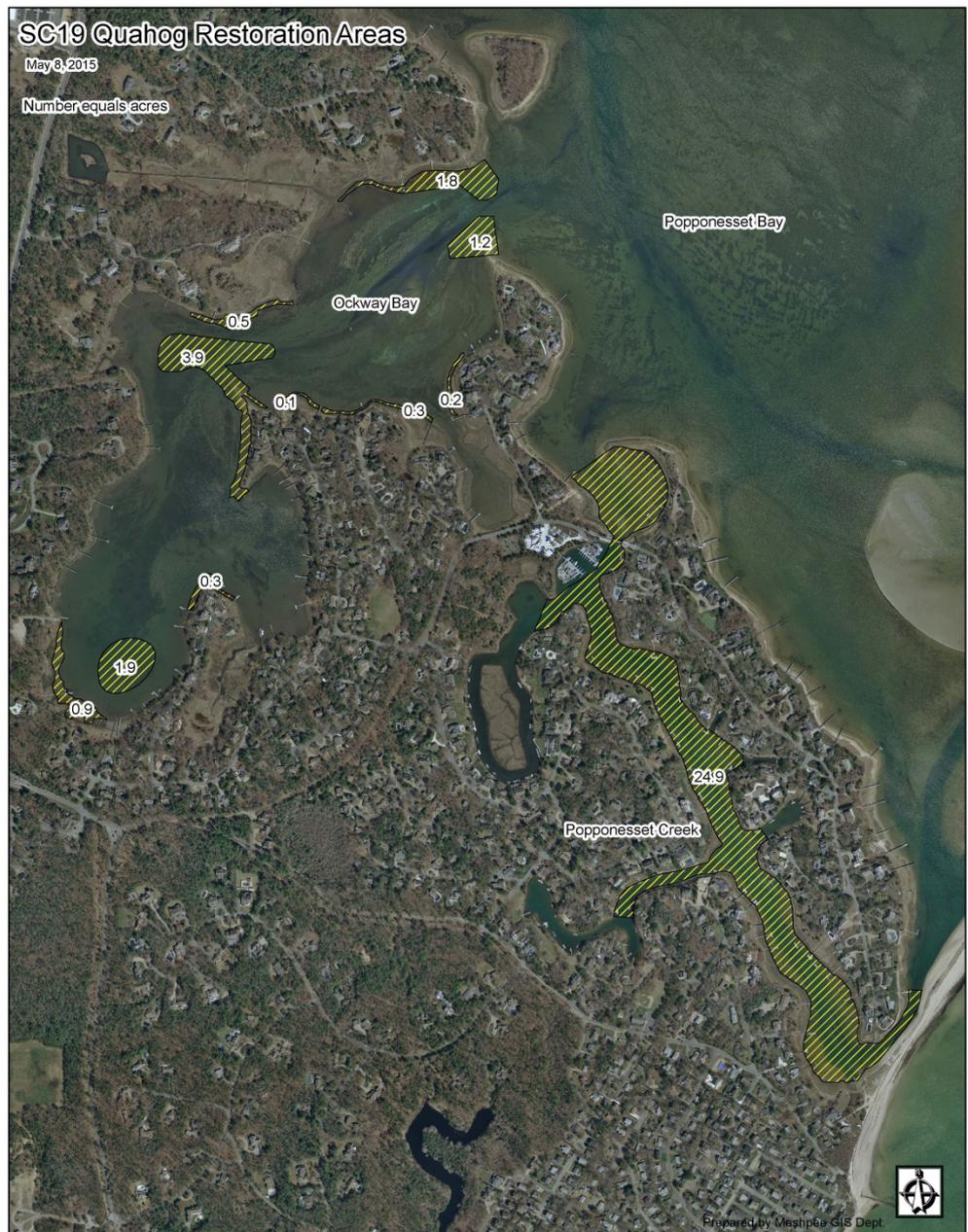
Number equals acres



SC19 Quahog Restoration Areas

May 8, 2015

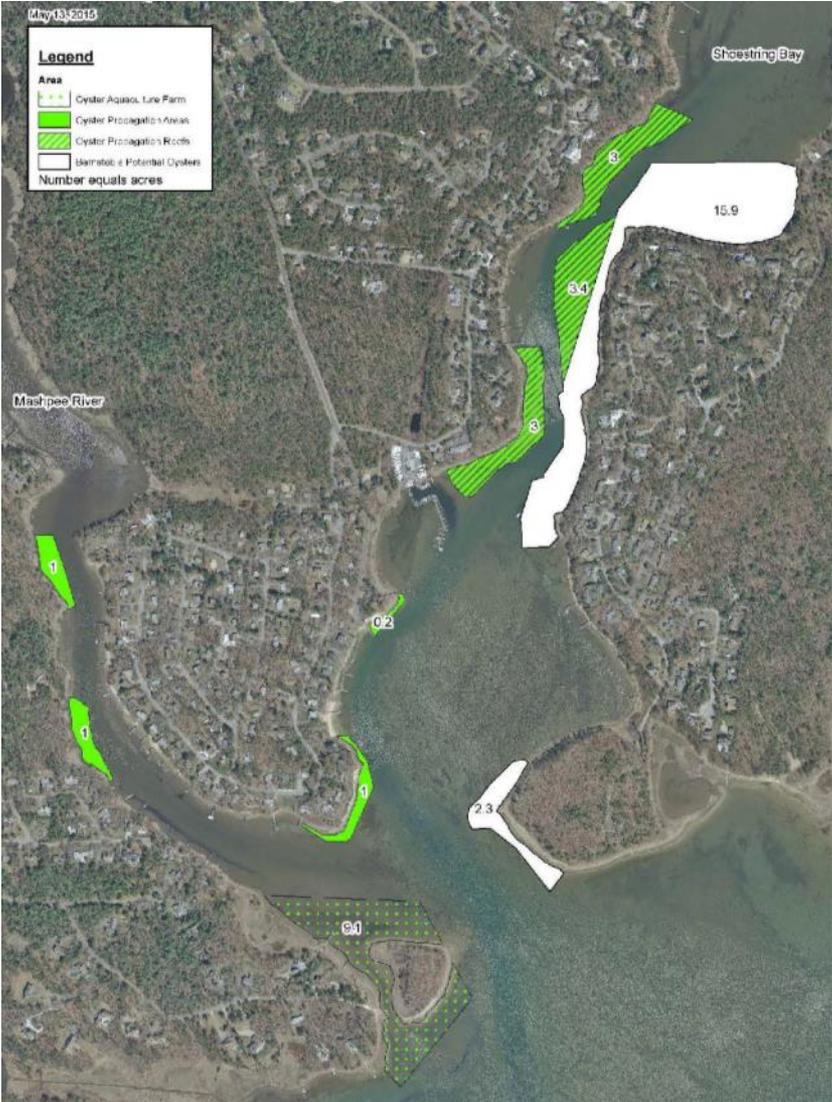
Number equals acres



SC16 & SC19 quahog restoration areas

Prepared by Mashpee GIS Dept.

SC20 oyster propagation areas



Shellfish initial implementation 2016

- Continue Mashpee River oyster Town propagation* and Tribe oyster farm
 - Continue Great River quahog seeding (Community Preservation Funds)
 - Create oyster reefs in Shoestring Bay (Tribe: \$200,000 EPA funds)
 - Initiate quahog seeding in Little River, Hamblin and Jehu Ponds **
 - Initiate quahog seeding in Ockway Bay and Popponesset Creek **
 - Water Quality Technician Position created (Oct. 2015 Town Meeting)
 - \$35,000 additional water quality monitoring (SMAST; Oct. Town Meeting)
 - Additional staffing (May 2016 Mashpee Town Meeting)
- * Funds: Mashpee Shellfish Propagation (permit fees), Barnstable County/State
- ** Funds: \$250,000 Mashpee October Town Meeting allocation for seed

Feasibility studies

- Feasibility Studies:
 - Wampanoag WWTF
 - Consider the connection of neighboring parcels
 - Assessment of performance of RBC
 - Future expansion potential
 - Collection system routing and capacity
 - Mashpee Commons sewer connection
 - Consider the connection of schools and adjacent neighborhoods
 - Assessment of performance of new MBR
 - Future expansion potential
 - Collection system routing and capacity
 - Quashnet/Moonakis River flushing evaluation
 - Improved flushing to reduce nitrogen
 - Parallel evaluation to consider shellfish and finfish restoration

Design and construction in phase 1

- Mashpee River Watershed Improvements:
 - Design and Construction of Site 4 WWTF
 - Modular facility for expansion for future phases
 - Technology selection/siting and design
 - Design and Construction of Site 4 Initial Service Area
 - Collection system technology, routing, pumping station siting (if necessary)
 - Wampanoag WWTF sewer extension (following study)
 - A follow up to the evaluations discussed previously if not feasible, will likely be connected to Site 4 facility

Implementation schedule (continued)

In general for all phases

- File Notices of Project Change and DRI modifications (as needed)
- Shellfish aquaculture/propagation/restoration (continuation and future expansion)
- Water quality data collection
- Compliance reporting and MEP model runs
- Neighboring communities addressing their areas of need in conjunction with their planning efforts
 - Outlined implementation dependent on performance

Additional steps

- Development of growth neutral policy
- Secure collection, treatment and recharge locations (MOUs and ownership transfers)
- Develop Adaptive Management and compliance monitoring protocols



Questions & Discussion

