



# Martha's Vineyard Coastal Conference

June 6, 2018

Tisbury Board of Health Regulations  
Governing Nitrogen Septic Discharge





# Scope of Tisbury's Nitrogen Problem

(Annual Data)

	Sustainable N Influx	Current N Influx	Targeted N Removal			
	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>%</u>		
<u>TASHMOO</u>	6.4	9.5	3.1	32%		
<u>LAGOON</u>	4.6	7.2	2.5	35%		
<u>TOTAL</u>	11	17	5.6	33%		



# Nitrogen Discharge from New Development

## History:

- In 1975, in response to septic contamination of the harbor, the Tisbury Board of Health established a moratorium on the issuance of new septic permits in the downtown commercial area. Today the downtown district is sewerred and the moratorium lifted.
- In 2014, the island's Boards of Health established regulations restricting the amount and type of nitrogen that could be applied to lawns. The regulations were approved island-wide with only 1 voter in dissent.





# Scope of Tisbury's Nitrogen Problem

(Annual Data)

	Sustainable N Influx	Current N Influx	Targeted N Removal		Septic Waste	
	<u>TONS</u>	<u>TONS</u>	<u>TONS</u>	<u>%</u>	<u>TONS</u>	<u>%</u>
<u>TASHMOO</u>	6.4	9.5	3.1	32%	7.6	80%
<u>LAGOON</u>	4.6	7.2	2.5	35%	5.5	76%
<u>TOTAL</u>	11	17	5.6	33%	13	78%



## Public Concerns Voiced at Three Tisbury Public Hearings

### Cost

- Board of Health regulations are too great a financial burden on Tisbury and the effected homeowners.

### Fairness

- Board of Health regulations should spread the denitrification costs over a broad voter base, not just those living in the watershed as in sewerage.

### Falsification

- Board of Health should seek to falsify the MEP study by demonstrating the relative absence of nitrogen in groundwater.





## Tisbury Board of Health Denitrification Initiatives

Voted 10-15-16

- Passed regulations governing the use of denitrifying septic systems as it relates to new nitrogen; (IA systems with <19ppm N discharge)
- Voted to seek grant funding in support of:
  - A program to install and monitor groundwater nitrogen at the Lagoon Pond shorelines. (Supporting MVC PRB grant)
  - A program to pilot the development of 2 new septic systems capable of removing nitrogen with the same efficiency as sewerage and at a substantially lower cost.





# NitROE™ Technology Concept for Individual Homes

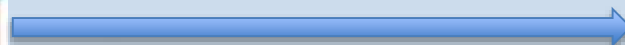
(Addition to Existing Title 5 Septic System to Achieve Significant Nitrogen Reduction)

Existing Title 5 Septic Tank



**Influent**

- 35 ppm N
- 16 Lb/Yr



Existing Title 5 Leach Field



**Without NitROE**

- 26 ppm N
- 12 Lb/Yr N to Subsurface





# NitROE™ Technology Concept for Individual Homes

(Addition to Existing Title 5 Septic System to Achieve Significant Nitrogen Reduction)

Existing Title 5 Septic Tank



**Influent**

- 16 Lb/Yr
- 35 ppm N

**NitROE Tank**

Existing Title 5 Leach Field



**Without NitROE**

- 26 ppm N
- 12 Lb/Yr N to Subsurface

**With NitROE**

- 5 ppm N
- 2.3 Lb/Yr N to Subsurface







# Public-Private Partnership Between Tisbury and CES Clean Water

- Public Private Partnership's overall goal to produce a new denitrification tool that is as effective as sewerage....with improved siting versatility and at a substantially lower cost per LB of nitrogen removed.
- CES Clean Water's NitROE denitrifying technology was successfully tested at MassTC.
  - NitROE Reactants are Air, Limestone and Woodchips;
  - Annual operating costs are those associated with operating a 60 watt air pump, and with the BoH and State required performance monitoring.
- Partnership supported by a MASS-CEC Grant and by the Martha's Vineyard Commission and Tisbury Waterways Inc.





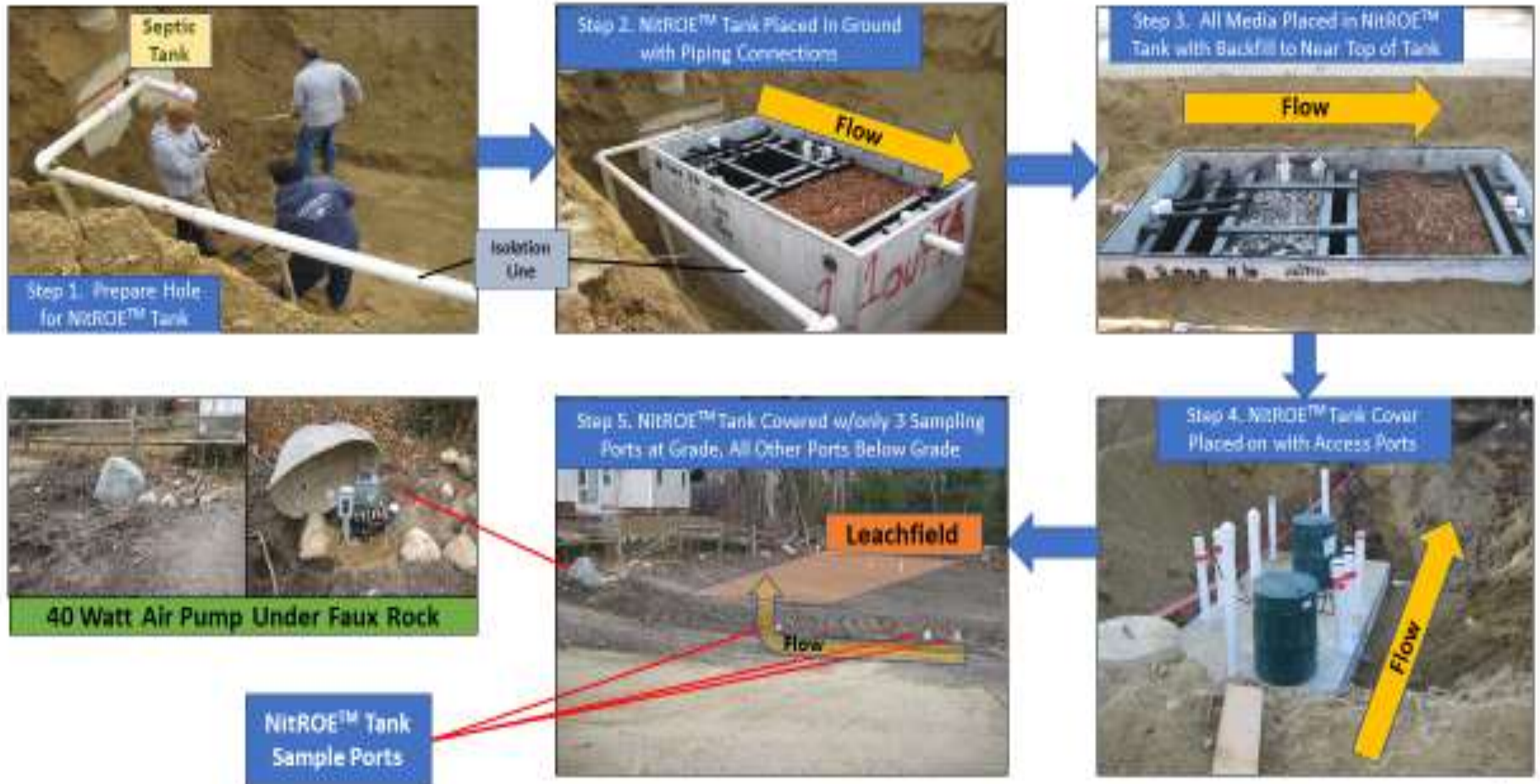
# Tisbury/CEC Clean Water Public Private Partnership

	<u>MassTC Demo Results</u> Total Nitrogen (ppm)	
<b>NitROE Tank Influent (ppm)</b>	<b>39</b>	
<b>NitROE Tank Effluent (ppm)</b>	<b>4.5</b>	
<b>Nitrogen Reduction (%)</b>	<b>88%</b>	





# First NitROE™ Tank Installed in Town of Tisbury on Martha's Vineyard - December 1, 2017 (Tisbury Model #T-550:660, Serial #1)





# Tisbury/CEC Clean Water Public Private Partnership

	<u>MassTC Demo Results</u> Total Nitrogen (ppm)	<u>MA DEP Pilot Results</u> Total Nitrogen (ppm)
<b>NitROE Tank Influent (ppm)</b>	<b>39</b>	<b>90</b>
<b>NitROE Tank Effluent (ppm)</b>	<b>4.5</b>	<b>10.5</b>
<b>Nitrogen Reduction (%)</b>	<b>88%</b>	<b>88%</b>





## Near and Long Term Goals

- Complete Piloting of 10-15 NitROE Units and assist CES Clean Water in their Provisional and later General MA-DEP applications.
- Continue Testing of George Heufelder's Layer Cake Technology.
- Seek Voter agreement to
  - Share denitrification costs between watershed homeowners and Tisbury voters;
  - Lower BoH septic watershed discharge limits from 19ppm to 10ppm nitrogen.
  - Identify low cost financing for advanced denitrifying systems.
  - Create septic monitoring function on-Island.
  - Begin to retrofit existing septic systems as they fail.
- Begin the CWMP planning process.





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