



Barnstable Town Council
May 23, 2024

The Nature Conservancy



Wastewater Treatment Technologies

OUR PARTNERS



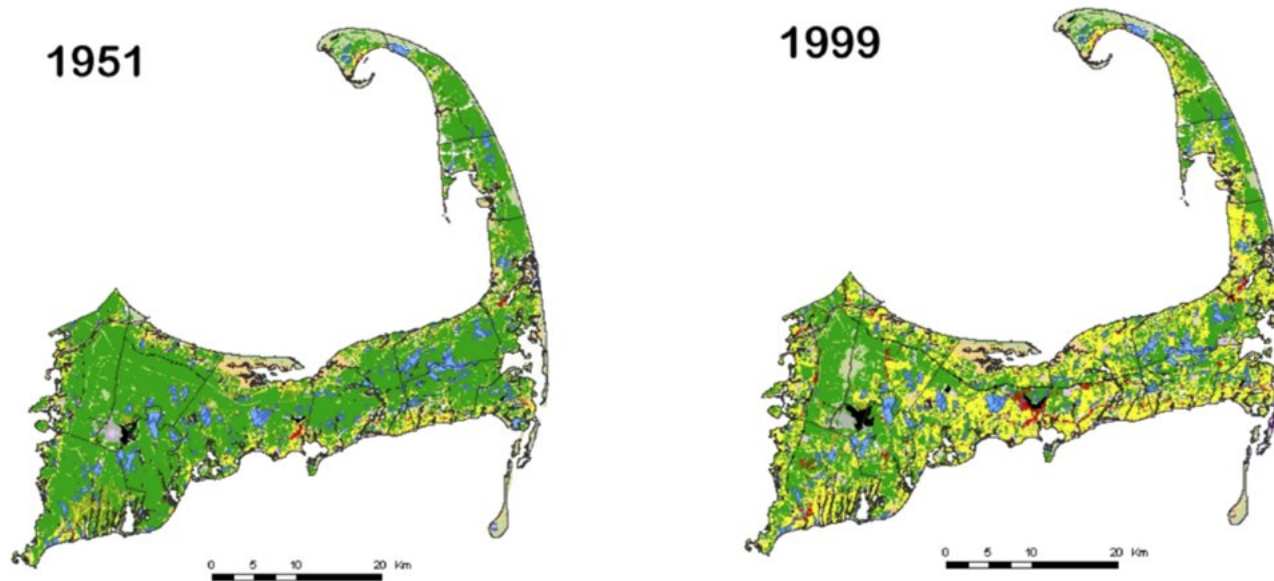
CAPE COD COMMISSION



School for Marine Science & Technology
UMass Dartmouth

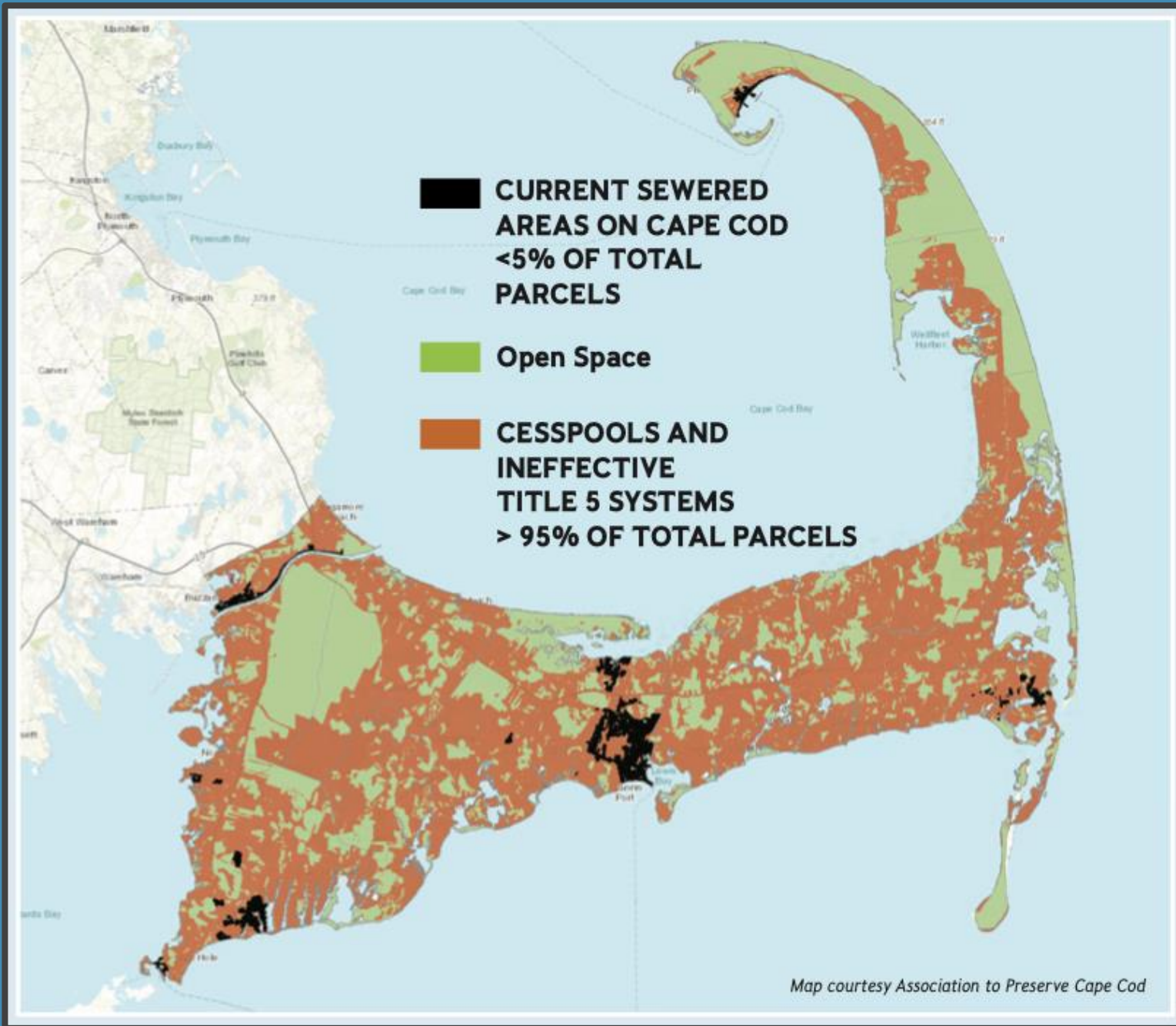
HISTORY LESSON

1951 VS 1999 LAND COVER OF CAPE COD

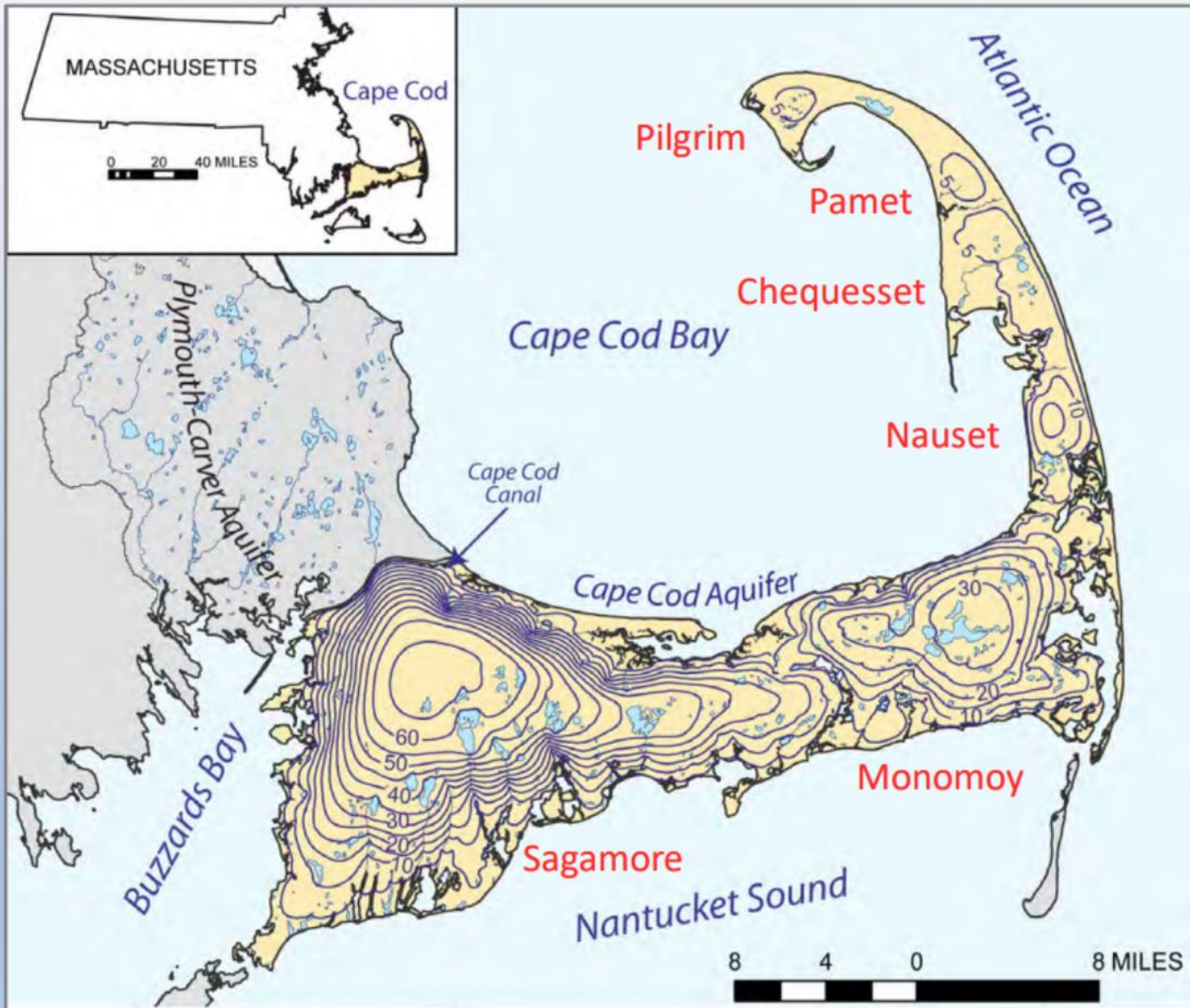


- Residential and commercial development has grown immensely
- Significant stress on our sole source aquifer and water supply
- Increased nutrient overload, primarily nitrogen and phosphorus

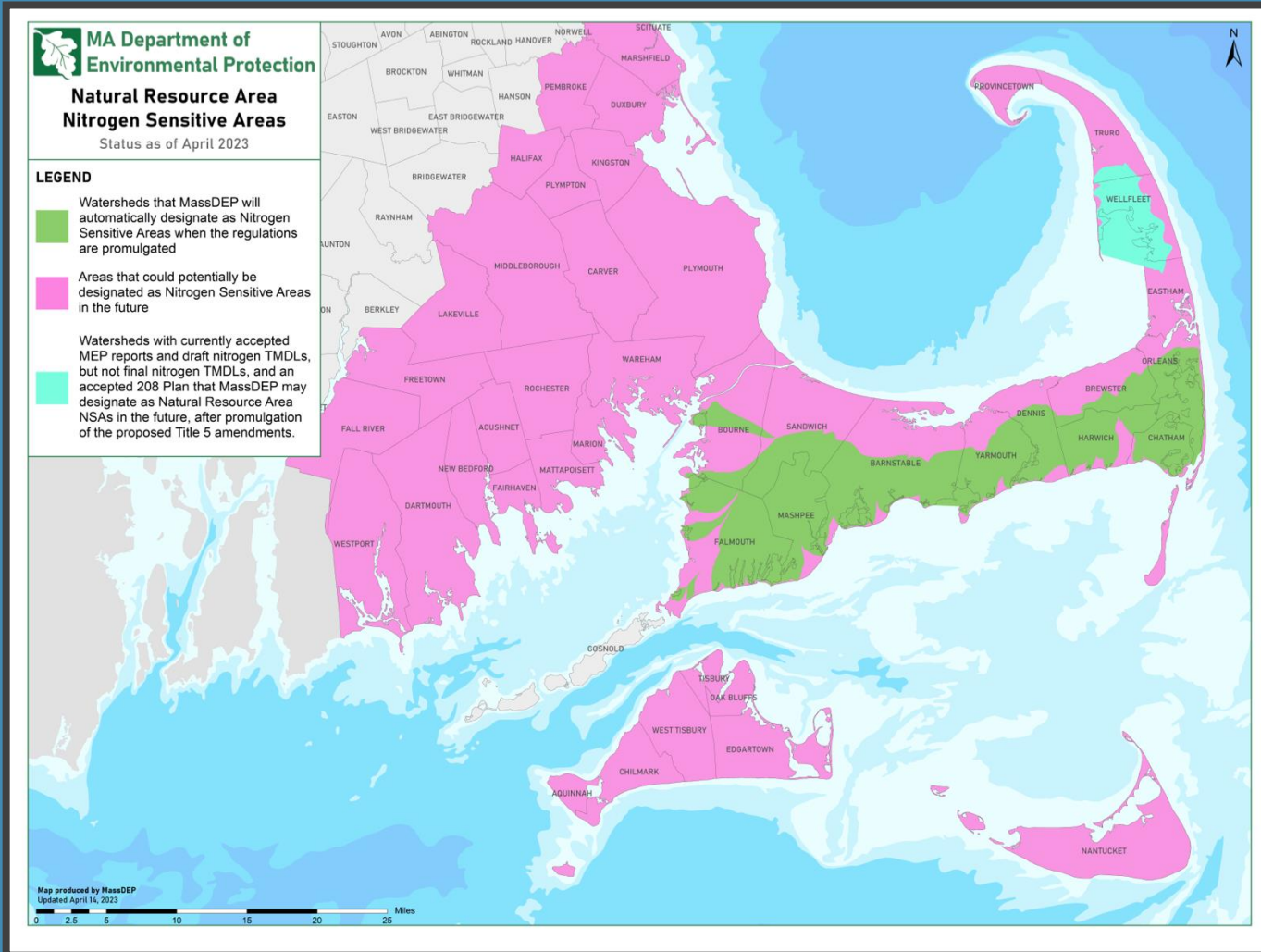
Source: Woods Hole Research Center



**Source Reduction
is Key to
Clean Water on
Cape Cod**



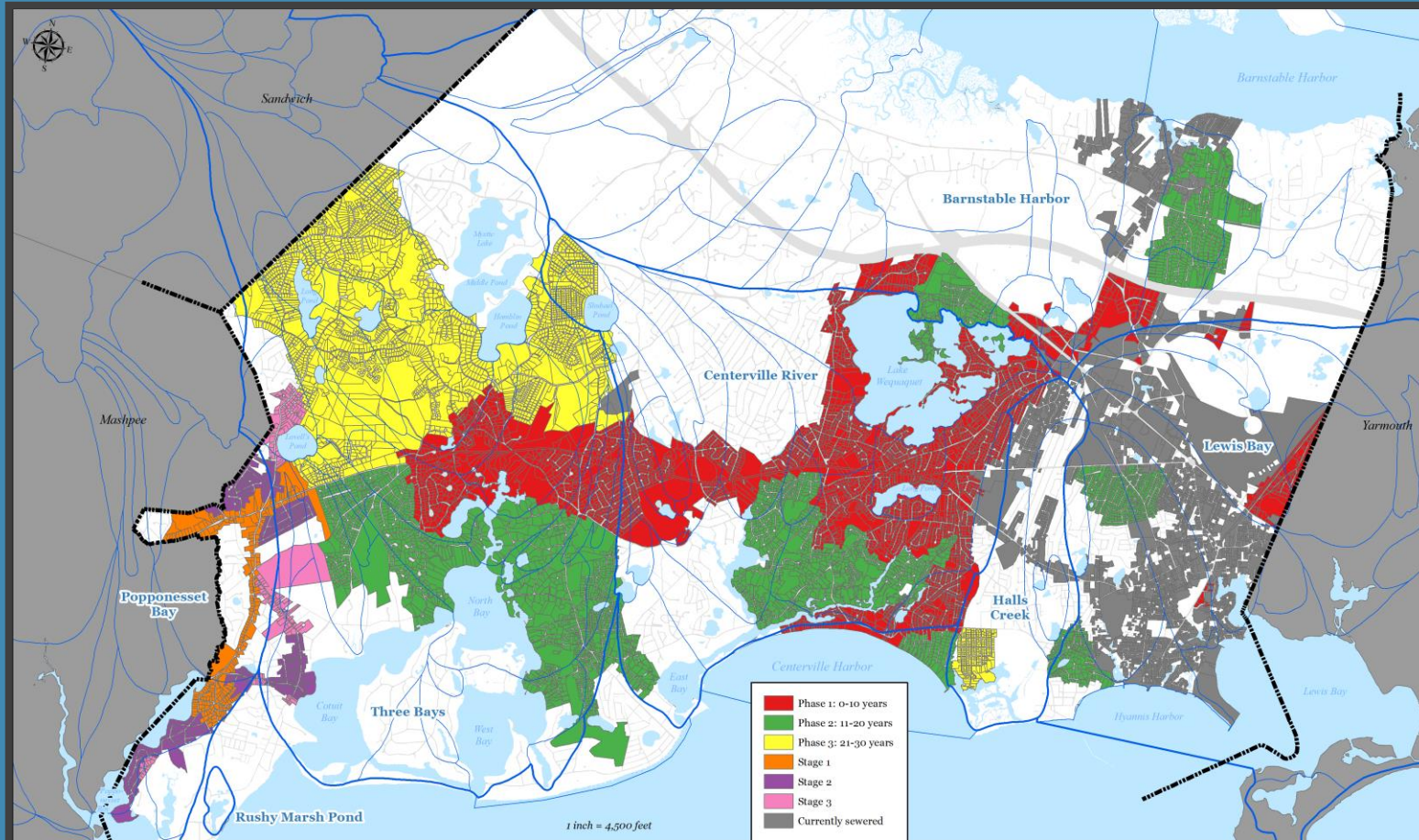
CHANGES TO MA DEP TITLE 5 REGULATIONS



Key Highlights

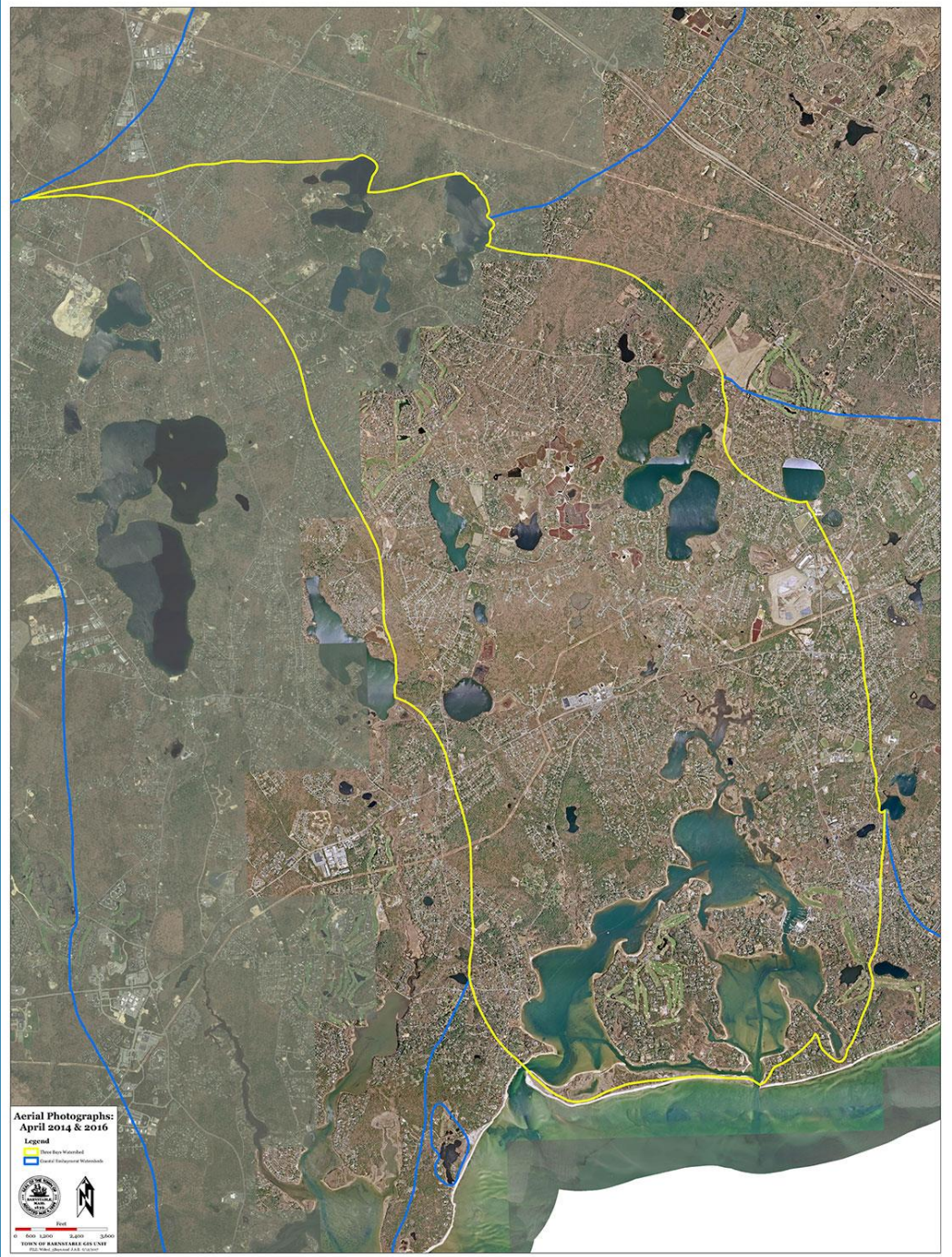
- Designated Nitrogen Sensitive Areas (NSAs) on Cape Cod and Southeast MA
- Two choices for Towns
 - Implement a Watershed Permit within 20 years (town responsibility) **OR**
 - Mandatory upgrades of current septic systems to I/A septic systems within 5 years (homeowner responsibility)

BARNSTABLE COMPREHENSIVE WASTEWATER MANAGEMENT PLAN (CWMP)

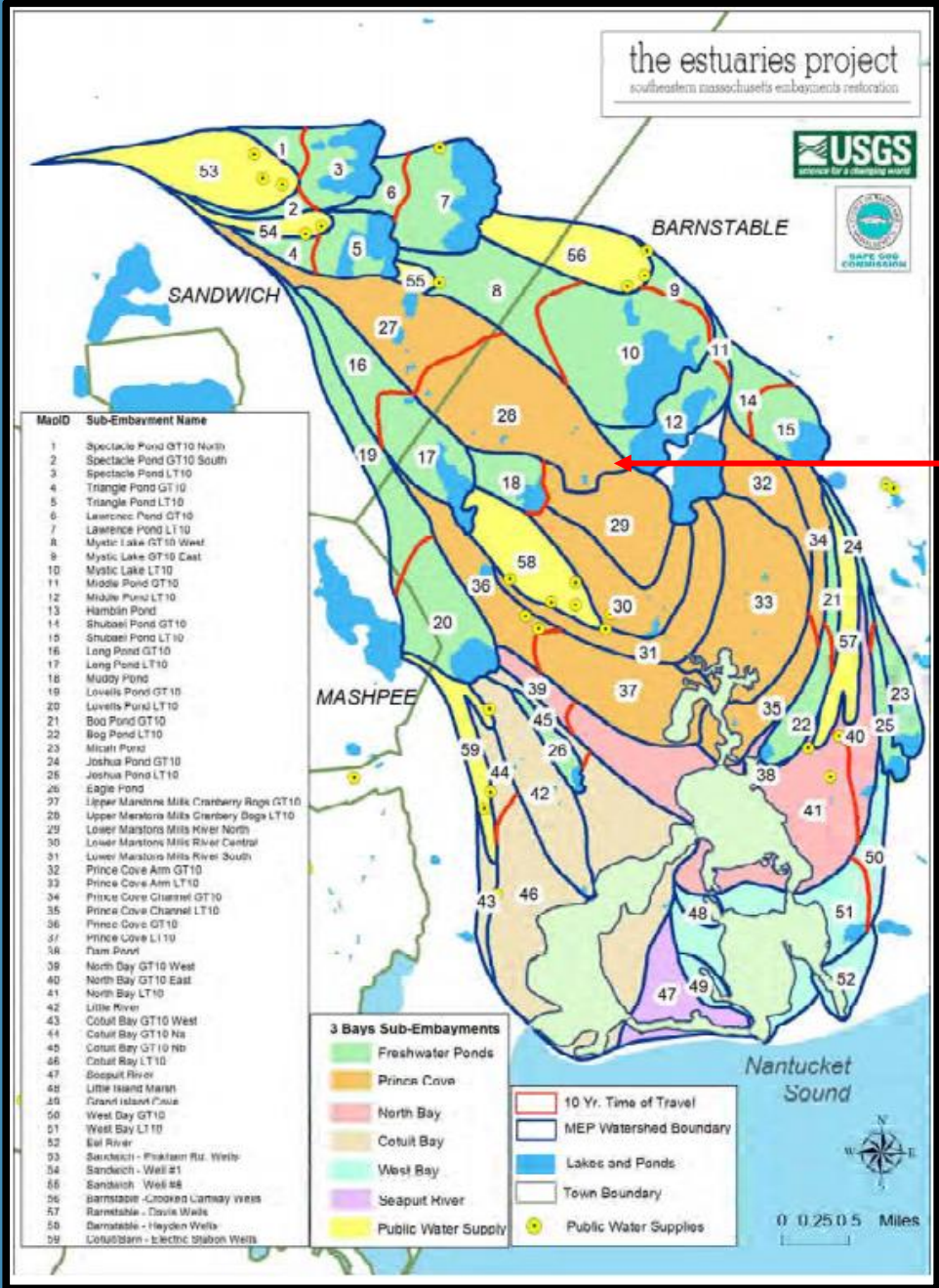


- \$1.46 Billion, 30 year plan
- 26,965 parcels in Barnstable
- 3,100 currently served by sewer; 100+ I/A septic systems with 85% reducing nitrogen
- 11,823 part of CWMP

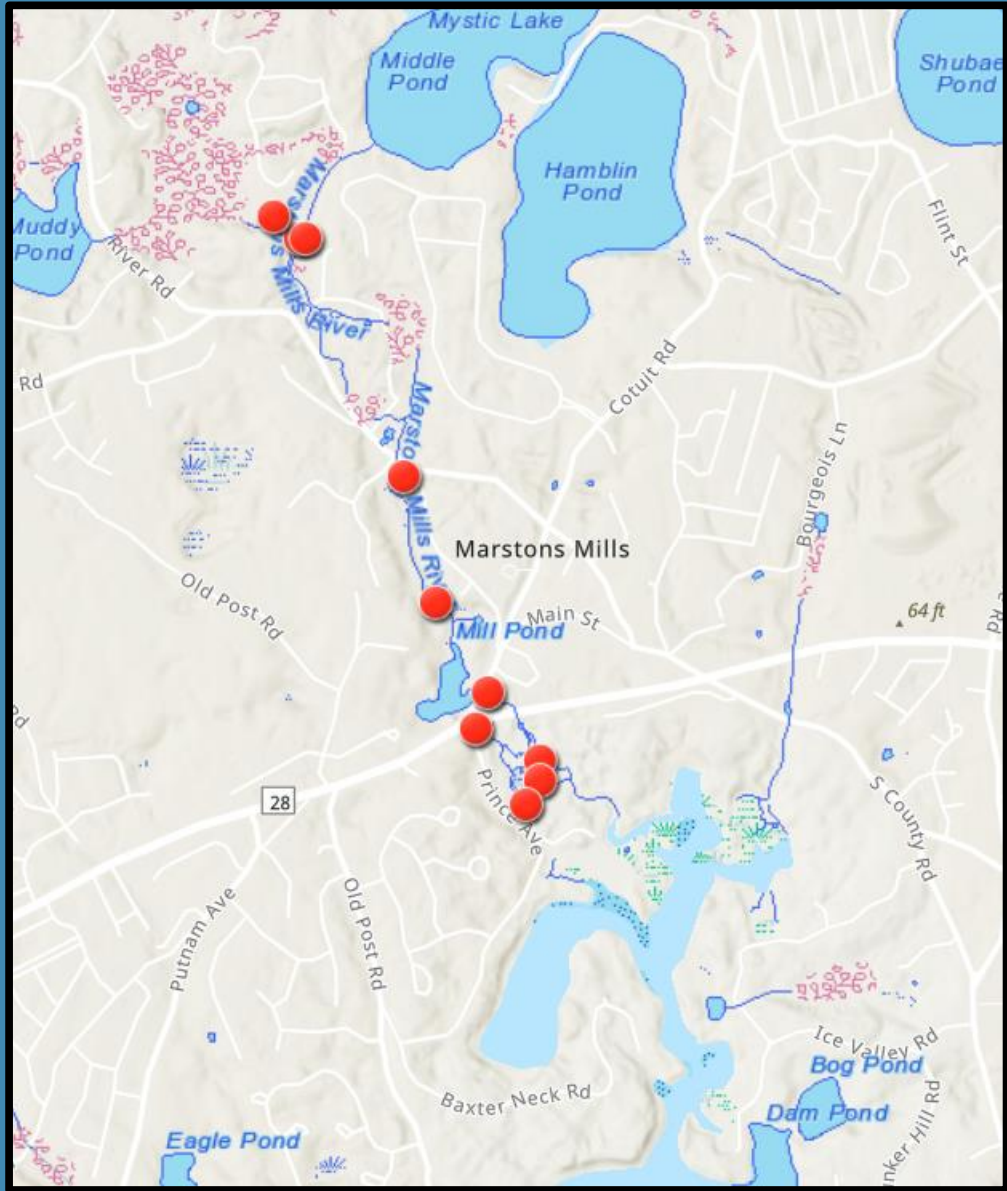
**ONLY 55%
OF THE TOWN
WILL BE SERVED**



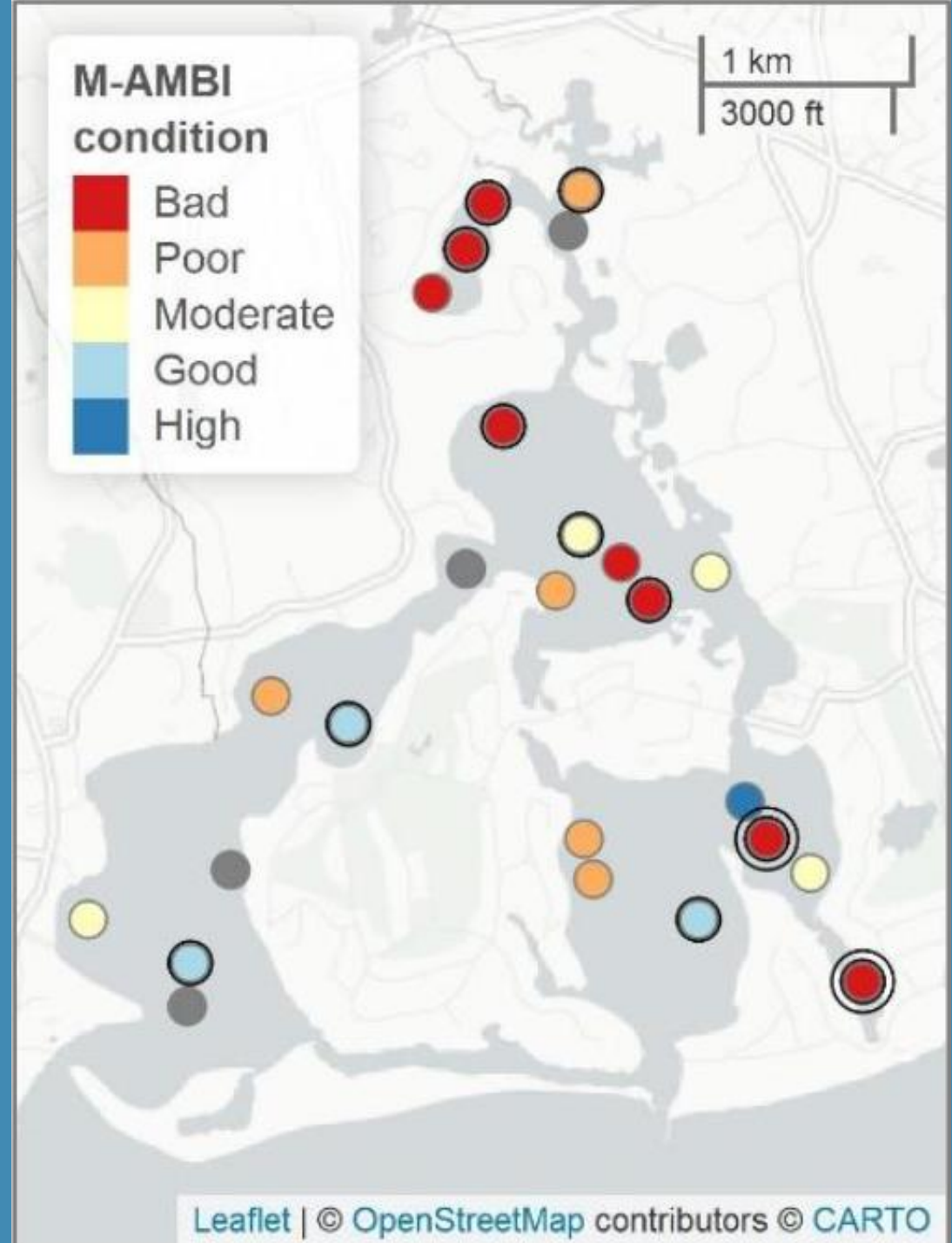
the estuaries project
southeastern massachusetts embayments restoration



Howes B., S. W. Kelley, J. S. Ramsey, R. Samimy, D. Schlezinger, E. Eichner (2005). Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for Three Bays, Barnstable, Massachusetts. Massachusetts Estuaries Project, Massachusetts Department of Environmental Protection. Boston, MA.



EPA SAMPLING 2019



**Restore and preserve clean water
throughout Barnstable**
Educate, Monitor, Mitigate and Advocate

I/A Septic System Project

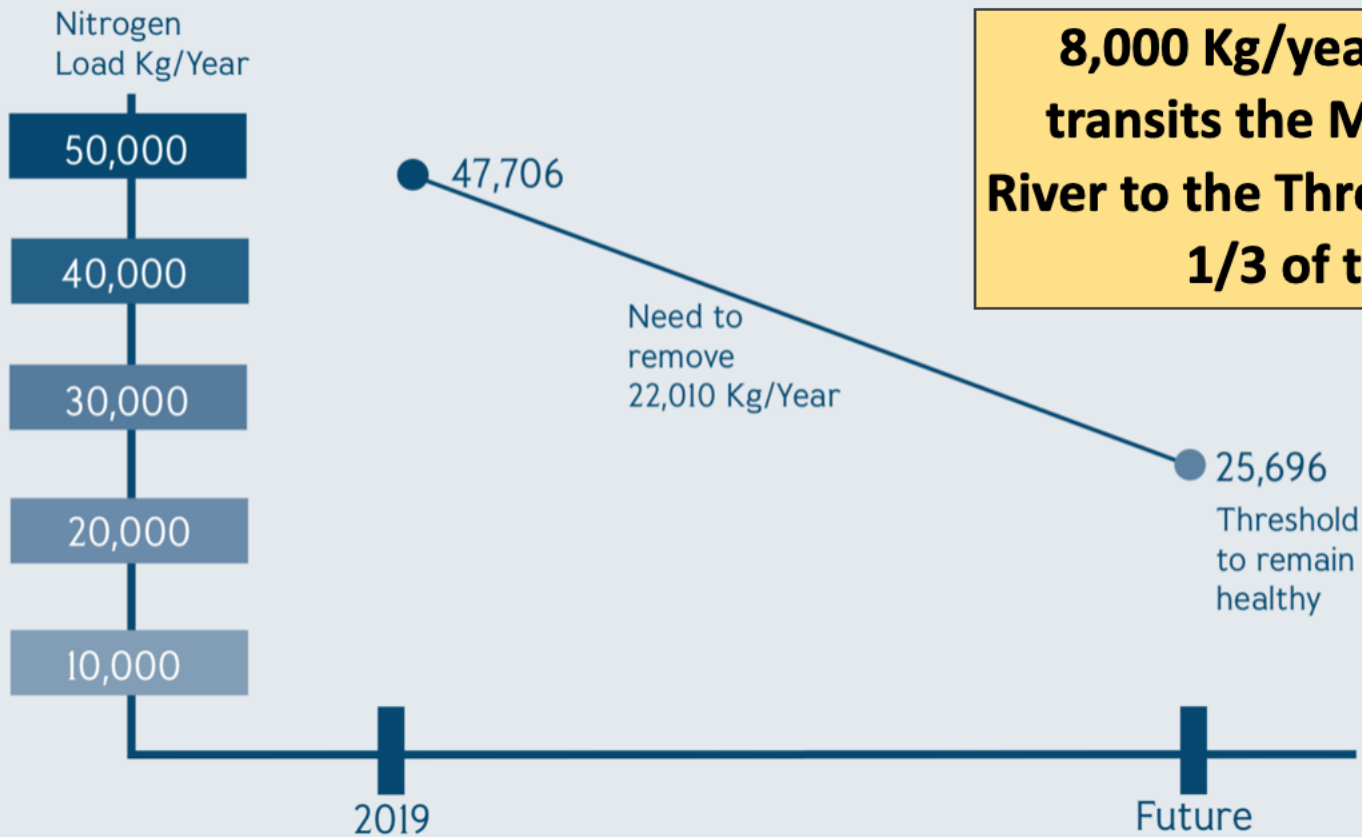


Cranberry Bog Restoration Project

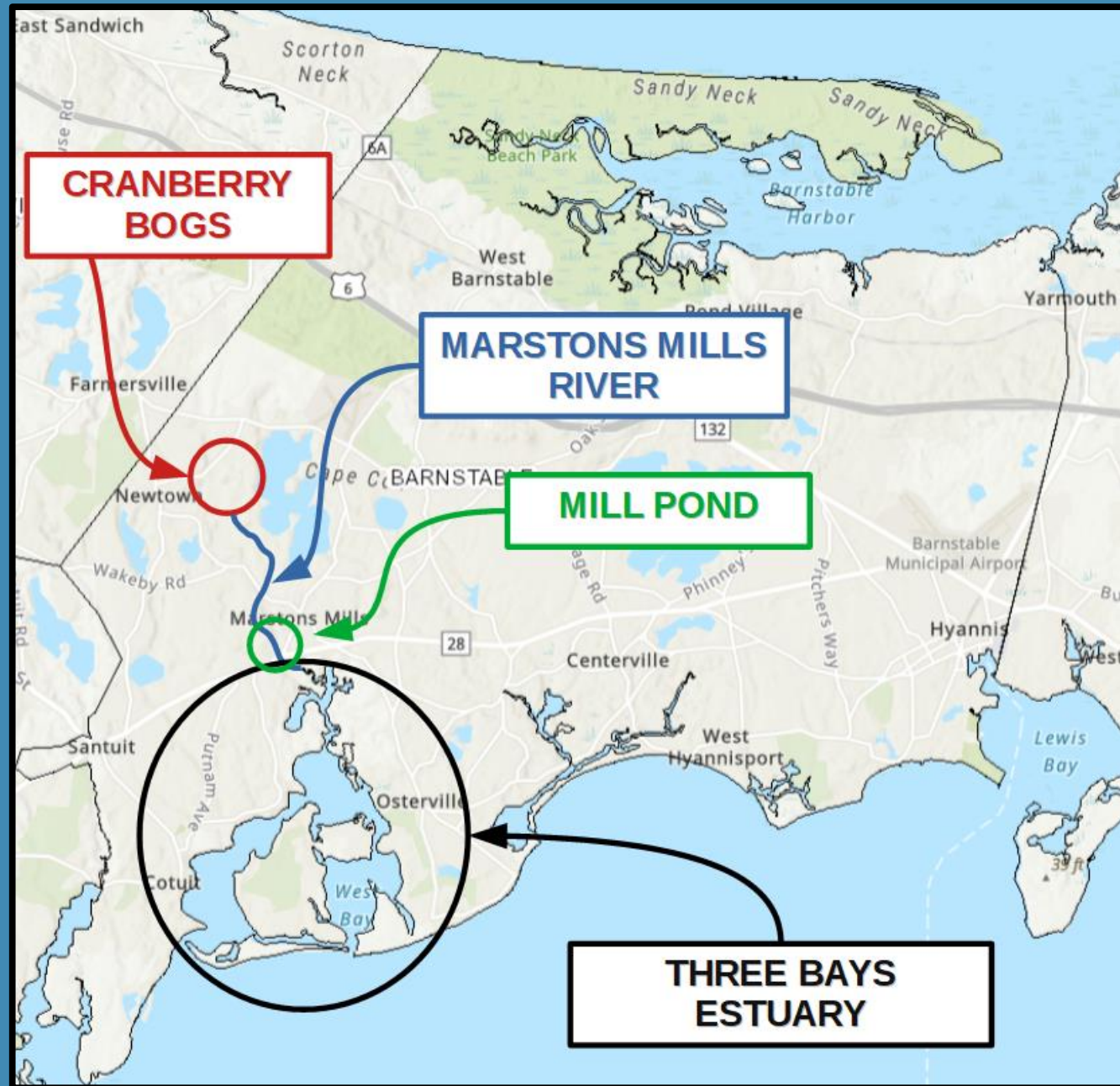


MASSACHUSETTS ESTUARY PROJECT (MEP) DATA/STATISTICS

THE CHALLENGE: Increasing the Health Status of the Three Bays Estuary



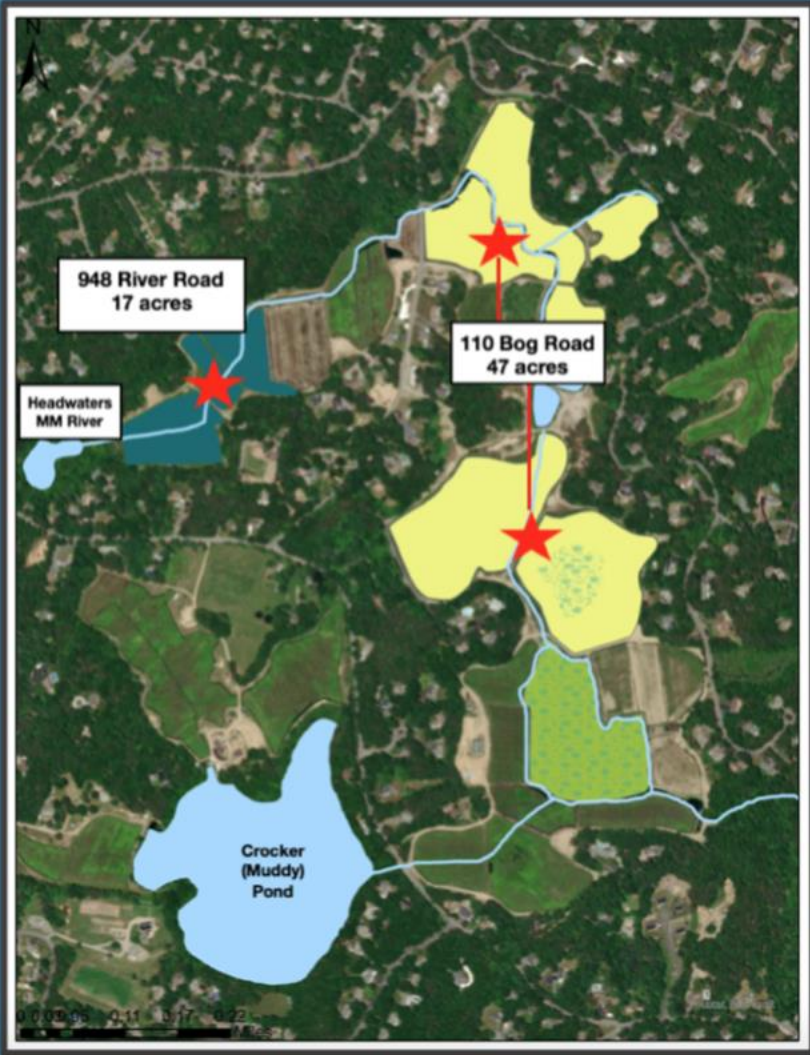
**8,000 Kg/year of nitrogen
transits the Marstons Mills
River to the Three Bays Estuary;
1/3 of the load**



MARSTONS MILLS CRANBERRY BOG RESTORATION PROJECT



Goal - 100+ Acres





1850s — Helped Save the Cape's Economy
2050s — Help Save the Cape's Environment

THE WALL STREET JOURNAL.

DOW JONES | News Corp *****

FRIDAY, MARCH 22, 2024 - VOL. CCLXXXIII NO. 68

WSJ.com

★★★★ \$5.00

DJIA 39781.37 ▲ 269.24 0.7%

NASDAQ 16401.84 ▲ 0.2%

STOXX 600 509.77 ▲ 0.9%

10-YR.TREAS. yield 4.270%

OIL \$81.07 ▼ \$0.20

GOLD \$2,182.40 ▲ \$24.50

EURO \$1.0862

YEN 151.63

HOMEOWNEROUS | KRIS FRIESWICK

Why Your Septic System Will Not Be Ignored

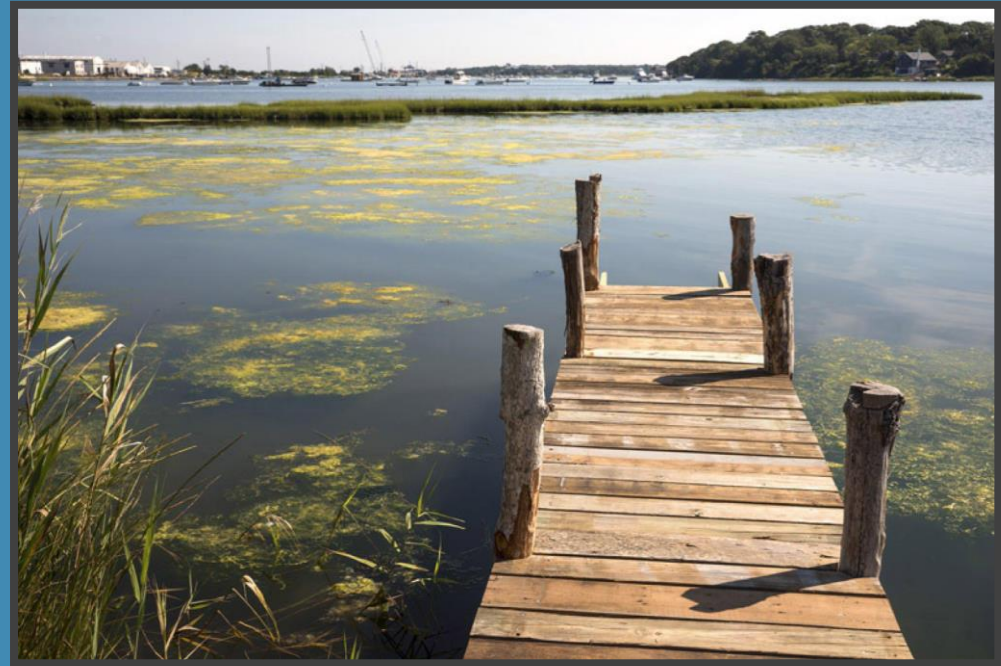


“Bet you didn’t know you had a big old hunk of Moses-approved engineering history buried next to your rhododendron.”

Proper waste management is so crucial that instructions on it can be found as far back as the

Old Testament: Book of Deuteronomy Chapter 23: Verses 12-13

“Designate a place outside the camp where you can go to relieve yourself,” it commands. “As part of your equipment have something to dig with, and when you relieve yourself, dig a hole and cover up your excrement.”



Tisbury Tightens Septic Regulations

Louisa Hufstader *Tuesday, October 3, 2023 - 10:06am*

The Washington Post

Democracy Dies in Darkness

THE DROWNING SOUTH

A HIDDEN THREAT

Fast-rising seas could swamp septic systems in parts of the South



New Wastewater Rules Arrive in Tisbury as Part of Islandwide Plan

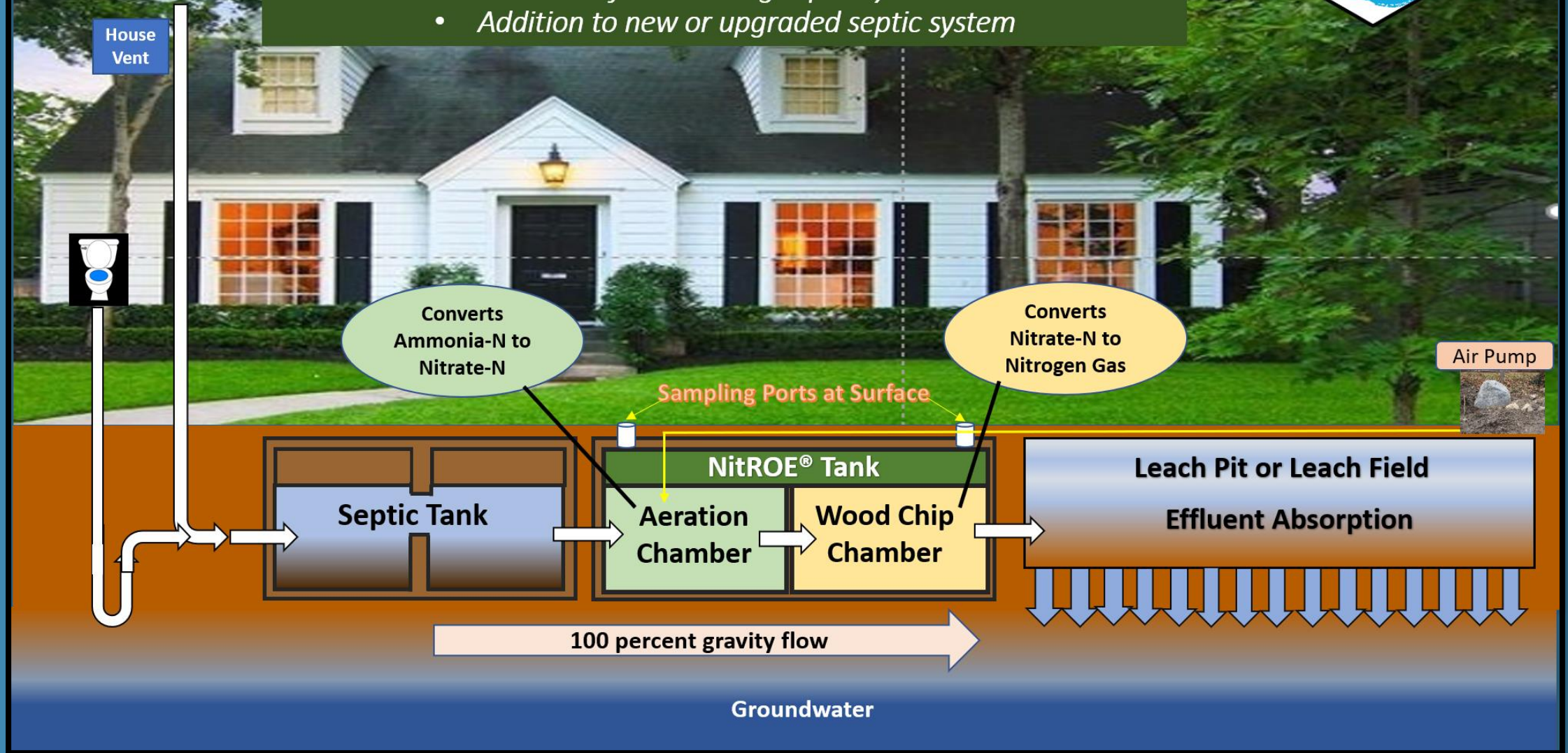
Thomas Humphrey *Thursday, January 4, 2024 - 4:45pm*

- **Installation of enhanced, nitrogen removing septic system that removes at least 95% of nitrogen**
 - **House sales/real estate transfers**
 - **Upgrades, repairs, replacements — whether or not system has failed**
 - **New construction**
 - **Expansions/Additions (e.g., bedrooms)**
- **Considering another amendment to require upgrades for systems too close to the water (within 1,000 feet)**

NitROE® WWTS Tank Supplement



- *Retrofit to existing septic system*
- *Addition to new or upgraded septic system*

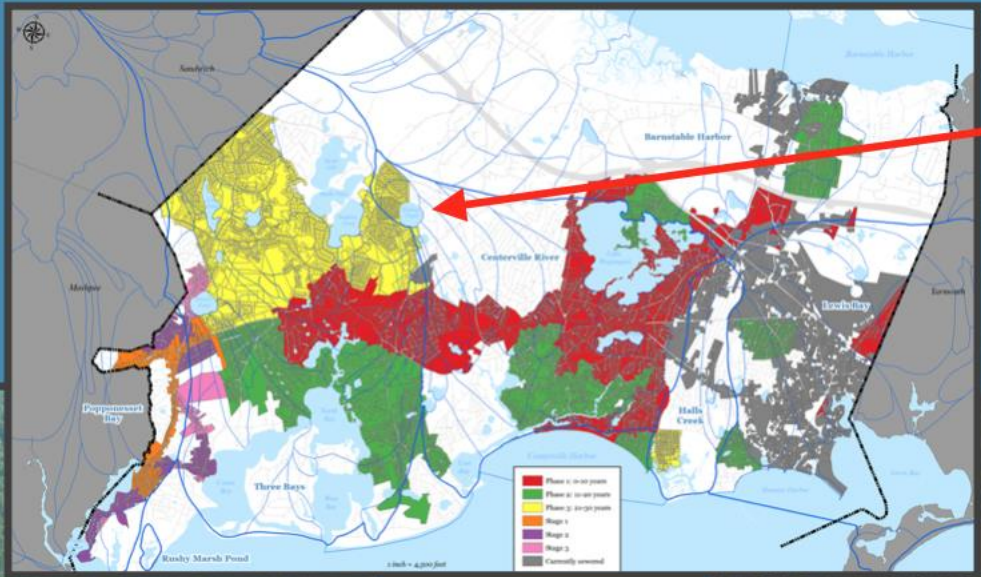


KleanTu NitROE I/A Septic System

Desirable Characteristics

- Best in Class Performance
- Low cost/cost competitive to municipal sewer
- Modular structure allowing integration into existing Title 5 system
- Low maintenance
- Real time monitoring
- Ability to operate in absence of power





**Shubael Pond
Marstons Mills**

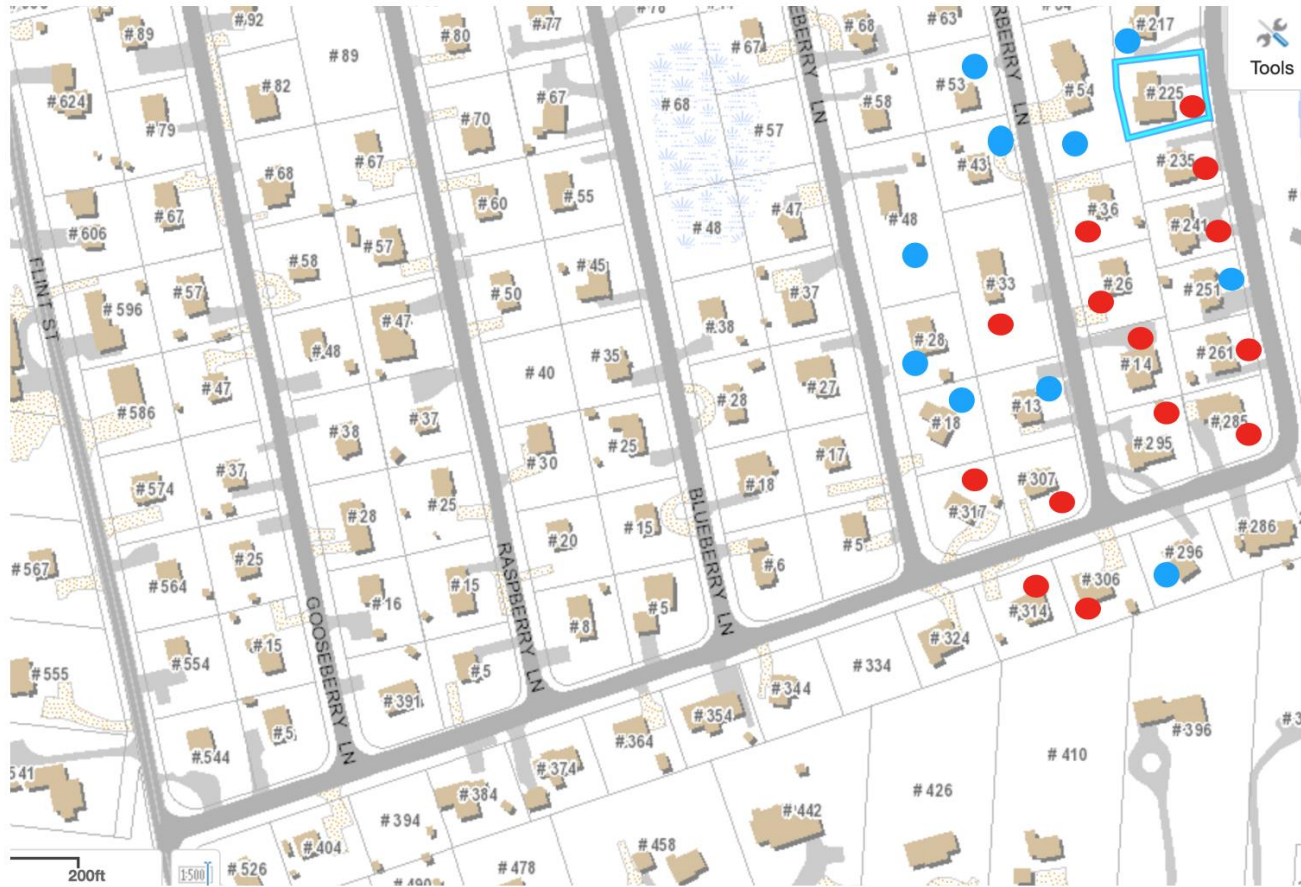


July 2020



350 homes around the pond

Sand Shores Neighborhood - Shubael Pond



- Southwest corner of the neighborhood
- Red = 14 Target Homes
- Blue = Alternate Homes
- Horsely Witten Group has completed all survey work and septic system inspections
- April Board of Health meeting

Sand Shores Neighborhood - Shubael Pond



0 250 500 1,000 Feet

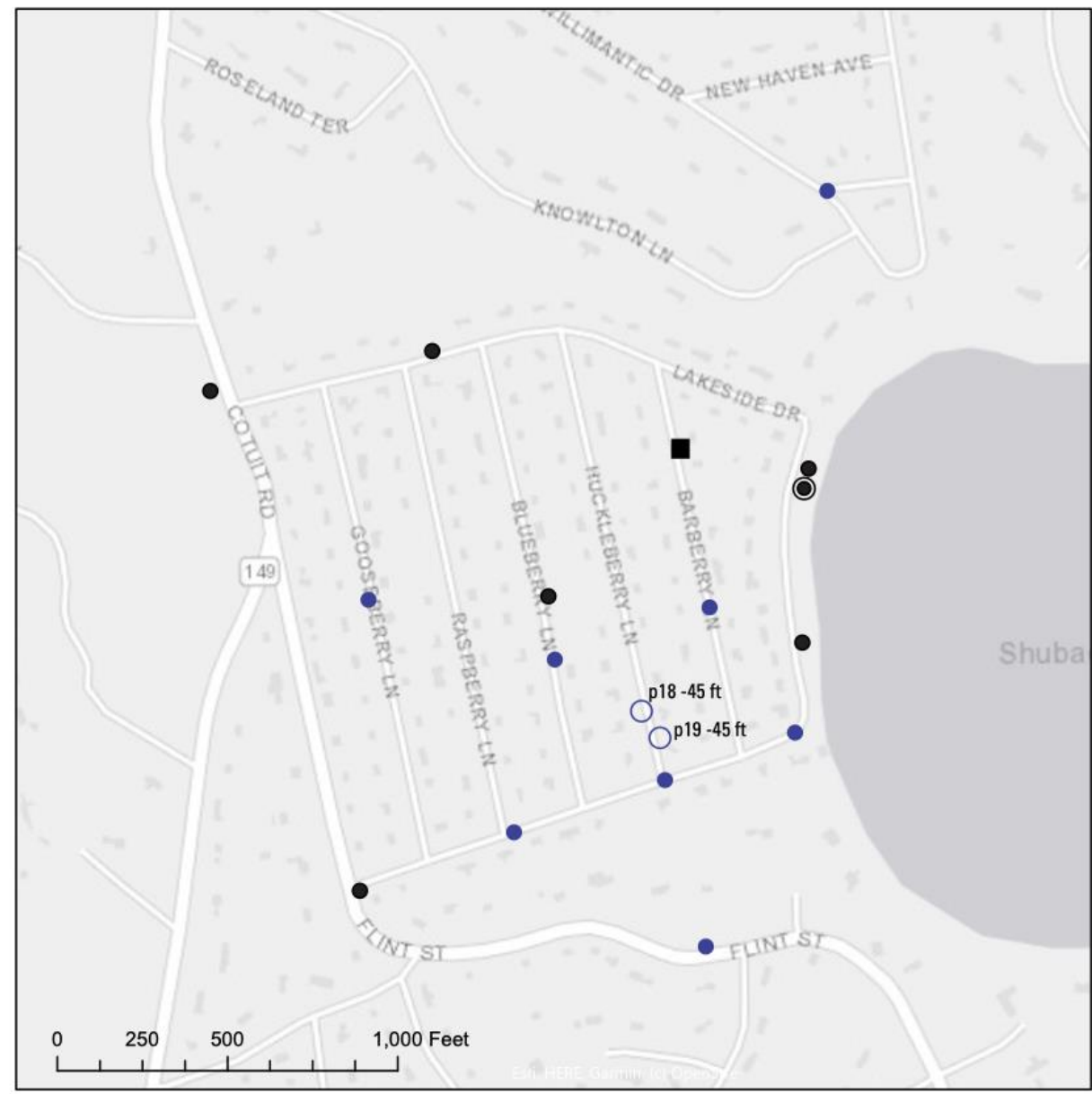
○ water table wells

Hydraulic Gradient Vectors

← 11/12/2020 ← 0.0015
← 12/16/2020 ← 0.002
← 2/23/2021

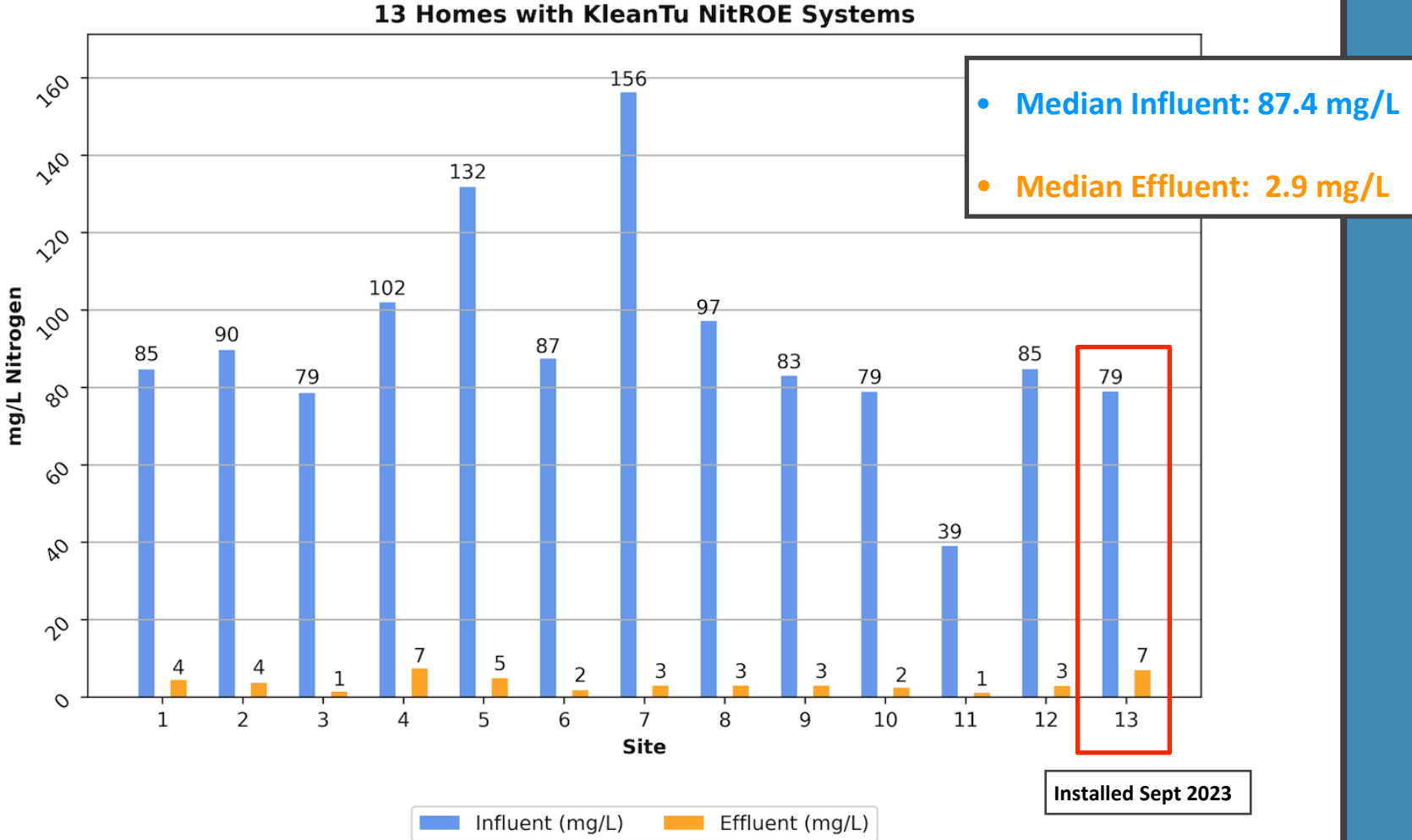
- 35+ water table wells drilled in the Sand Shores neighborhood
- Managed and funded by the USGS and U.S. EPA Region 1
- Groundwater samples collected quarterly

Sand Shores Neighborhood Latest Sampling Wells

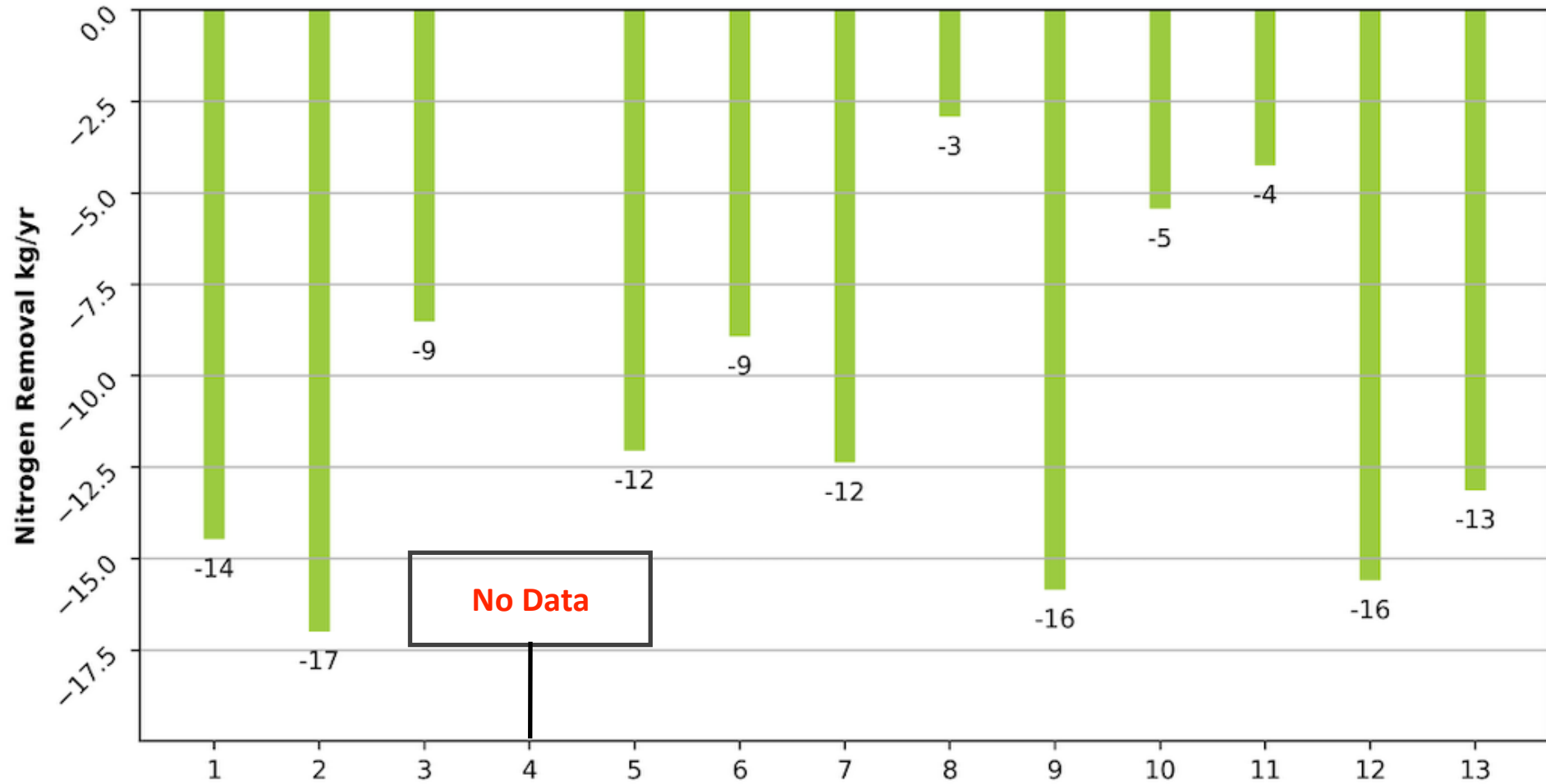


- Existing well cluster
- Phase 1 completed water-table well
- Phase 1 completed multilevel well
- Phase 2 completed water-table well
- Phase 3 proposed multilevel well
site name and proposed max depth in feet

SHUBAEL POND I/A SEPTIC SYSTEM PROJECT PERFORMANCE DATA 12/10/21 - 01/24/24 (MEDIAN)



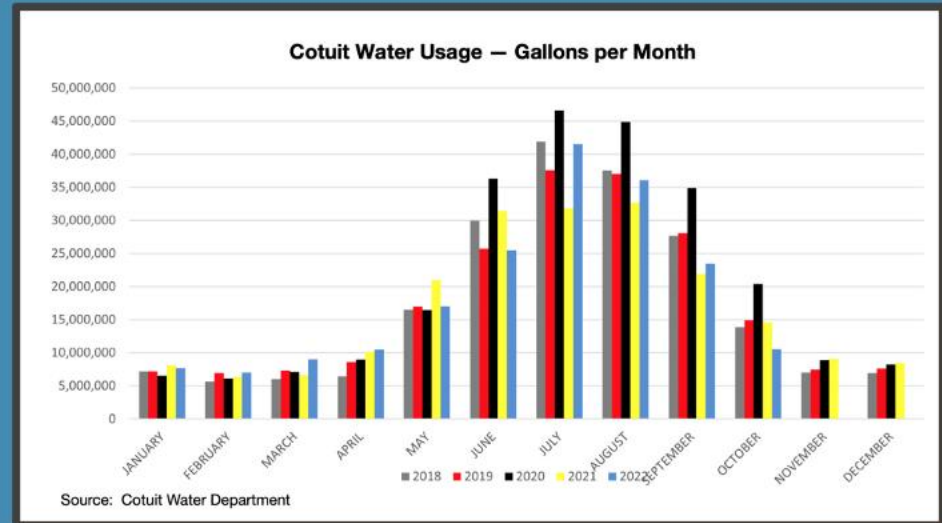
SHUBAEL POND I/A SEPTIC SYSTEM PROJECT NITROGEN REMOVAL KG/YEAR



Forecasted Nitrogen Removal Based on Household Water Usage (kg/yr)

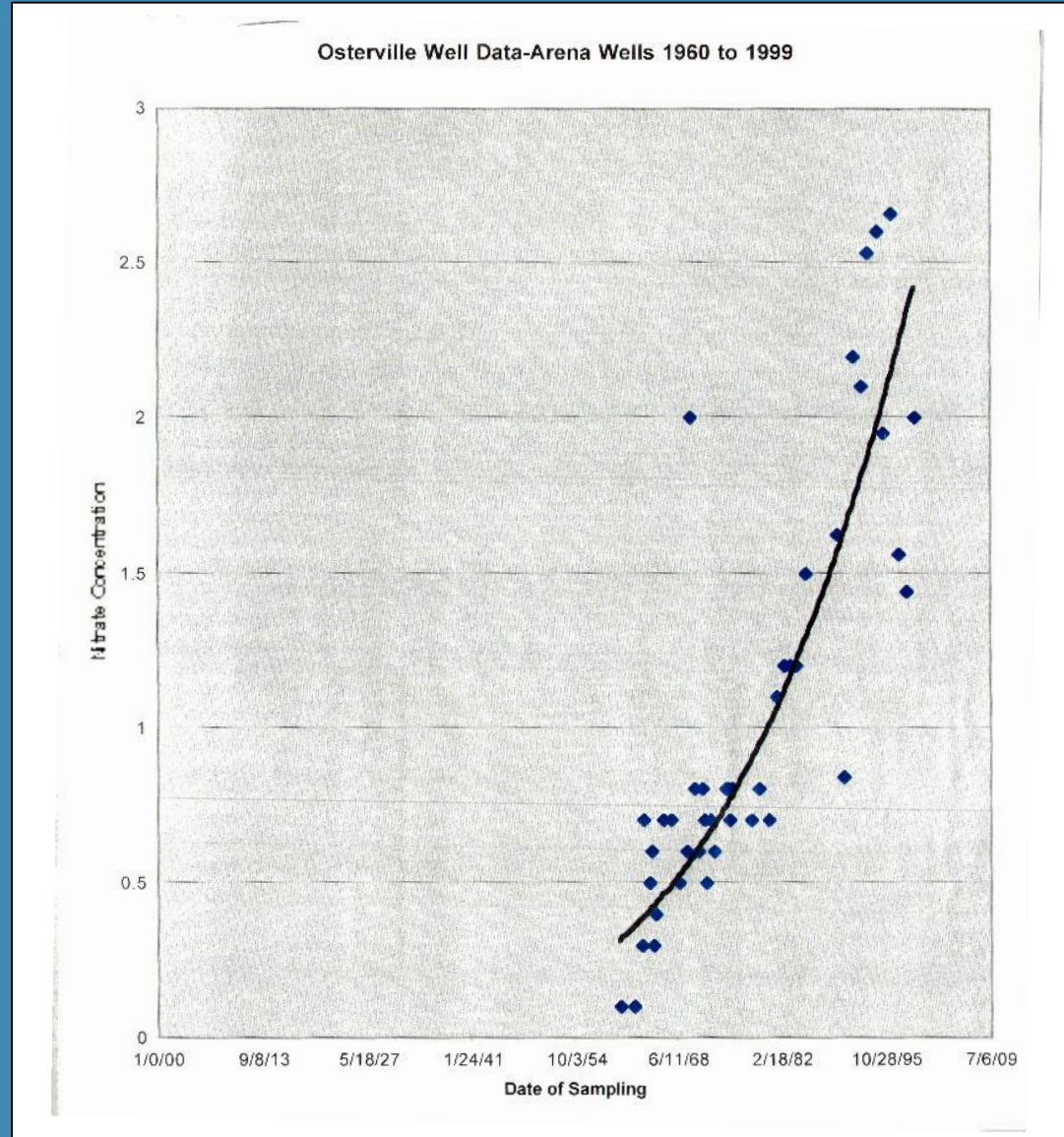


- 106 single family homes within 400 feet from the shores of Cotuit Bay
 - Discharge more than 47,000 gallons of wastewater per day; approximately 12 million gallons per year ⁽¹⁾
- 4,500 pounds (2.5 tons) of nitrogen going into Cotuit Bay annually**
- I/As performing at 4 mg/L **could eliminate 3,600 pounds**

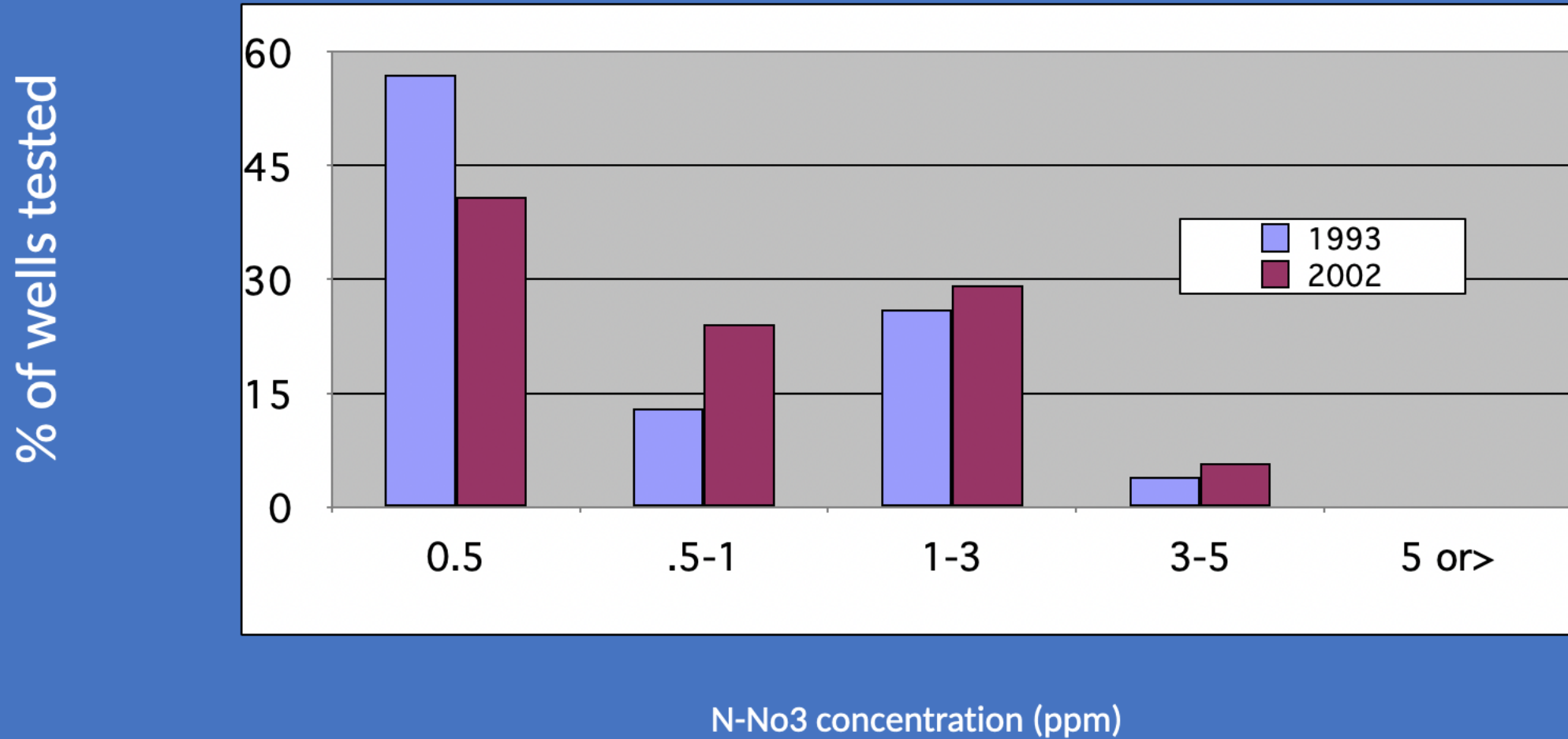


(1) Source: Cape Cod Commission's Watershed MVP software and Cotuit Water Department

1960 TO 1999

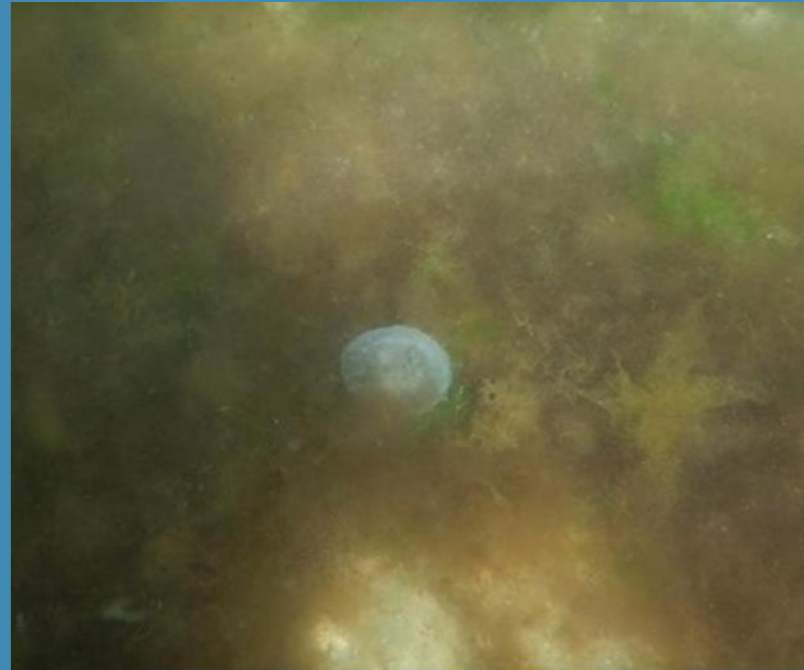
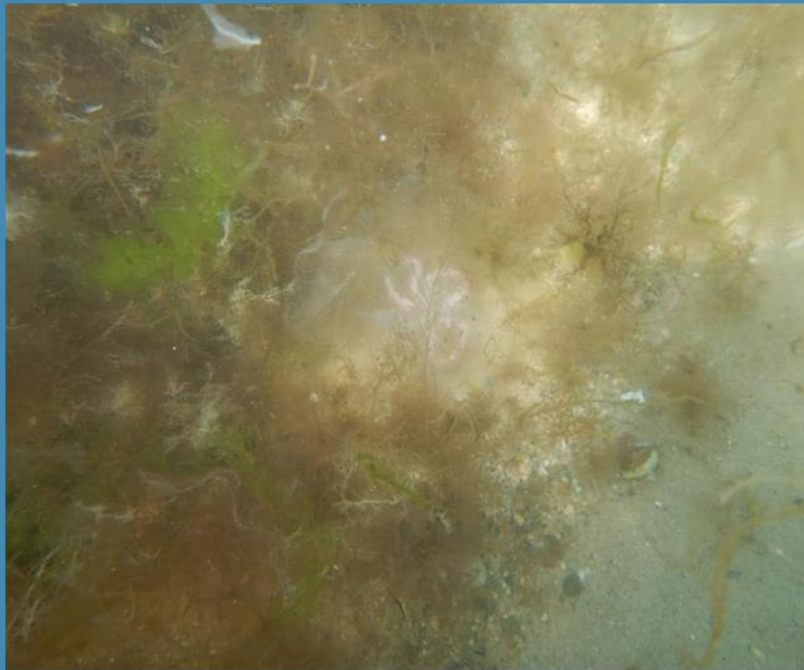


Nitrate-Nitrogen in Cape Cod Public Supply Wells



WARMING WATERS + NUTRIENTS=





COOLPIX W300, 4.3mm, f/4.1, 1/800s





DESIGNING FOR THE FUTURE

*All models are wrong
but some are useful*



George E.P. Box
British Statistician

*Taking a model literally is not
taking a model seriously*



Peter Diamond
Economist

THANK YOU

BCLEANWATER.ORG



Issue 25, Fall 2023

COALITION Quarterly DOUBLE ISSUE

Rules, Regulations, and Resources

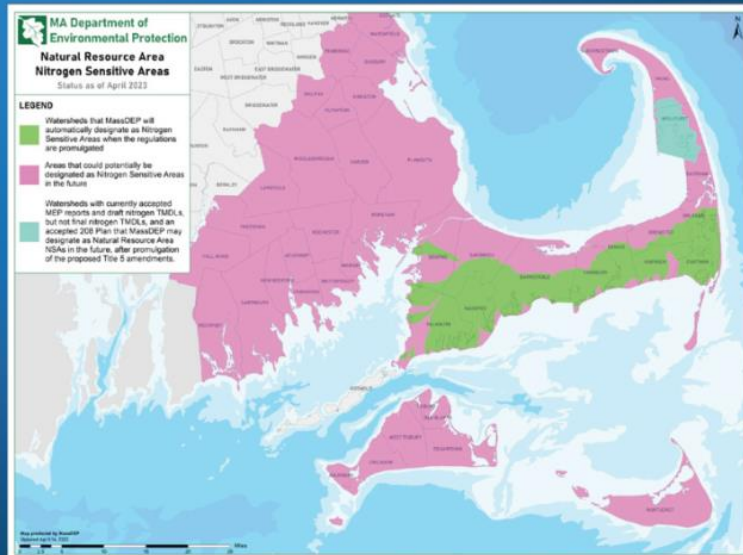
The Enterprise

FALMOUTH • BOURNE • MASHPEE • SANDWICH

Health Board Passes New Septic Regulations

VINEYARD  GAZETTE

New Wastewater Rules Arrive in Tisbury



BCleanWater.org

Step-by-Step Instructions for Installing An I/A System

- 1. Find out if you live in a Nitrogen Sensitive Area (NSA) and if your town is applying for a Watershed Permit (WP).** Please refer to the NSA map on this issue's cover page.
 - If you live in an NSA and your town is not applying for a WP, you will most likely need to install an I/A system.
 - If you live in an NSA and your town is applying for a WP, you should discuss with your town's Board of Health if you should install an I/A system.
 - If you live in Barnstable, visit the town's website (Administrative Dept->Assessing Division>Property Look Up) to determine if your property is scheduled to be connected to the town's sewer system.
- 2. Explore your financing options.** The state, Barnstable County and a few Cape Cod towns have several options to help you. See page 6 for specific programs.
- 3. Select a local engineer.** Choose a firm that specializes in civil engineering, land surveying, environmental permitting and understands the soil conditions of Cape Cod. They will design a system plan specific to your site and will secure approvals and construction permits with your local Board of Health and Conservation Commission (if you live near wetlands).
- 4. Working with your engineering firm, select an I/A system manufacturer and installer** that offers an I/A system technology (BACT) that meets your goals and budget.
- 5. Once permits have been secured by your engineer, hire an excavator** that will install your system and notify your town of the installation. It is important that the excavator is trained to install the I/A system you have selected.
- 6. Set up a system maintenance contract with a service provider.**
- 7. Follow the US EPA's Septic Smart tips** to ensure the proper function and longevity of your septic system.

Check out the Resources page on the BCWC website for more information.

