

INCORPORATED VILLAGE OF NORTH HAVEN

SHORT BEACH ROAD/POLLES CREEK STORMWATER RUNOFF
BIOSWALE PROJECT

SHORT BEACH ROAD, SAG HARBOR, NEW YORK

RG Project No. 3700.02

March 2024

TOWN OF SOUTHAMPTON

SUFFOLK COUNTY, NEW YORK

**TOWN OF SOUTHAMPTON
COMMUNITY PRESERVATION FUND
GRANT APPLICATION**



Prepared for:

Incorporated Village of North Haven
335 Ferry Road
Sag Harbor, New York 11963
Phone (631) 725-1378
Fax (631) 725-1120

Prepared By:

The Raynor Group, P.E. & L.S. PLLC
Civil Engineers & Land Surveyors
860 Montauk Highway
P.O. Box 720
Water Mill, New York 11976
Phone (631) 726-7600
Fax (631) 726-4378



TOWN OF SOUTHAMPTON

Department of Community Preservation
24 W Montauk Hwy, Hampton Bays, NY 11946
Ph: 631-287-5720 Fx: 631-728-1920

WQIPP@southamptontownny.gov

Entity: Inc Village of North Haven

Project Name: Short Beach Road

2024

COMMUNITY PRESERVATION FUND (CPF) WATER QUALITY IMPROVEMENT PROGRAM CHECKLIST/APPLICATION INSTRUCTIONS

The CPF Water Quality Improvement Project Plan (WQIPP) Fund follows the objectives in the adopted [Water Quality Improvement Project Plan](#) (see <http://www.southamptontownny.gov/WQIPP>)

To apply for funding, an application must be COMPLETED and submitted along with detailed narratives and supporting information as described below. The Water Quality Advisory Committee will rank and score projects based on the [Scoring Criteria contained in the application materials](#). Parcel acquisitions will be considered on an ongoing basis, independent of this application process.

Note: Electronic application submission required and 4 - full printed sets of application, site plan and narrative.

Upload application at www.southamptontownny.gov/WQIPPSUBMISSION

A Public Hearing and Town Board Resolution will be required for individual or multiple projects.

WATER QUALITY IMPROVEMENT PROJECT MEANS:

[1] DEFINITIONS:

1. **Wastewater Treatment Improvement Project** means the planning, design, construction, acquisition, enlargement, extension, or alteration of a wastewater treatment facility, including alternative systems to a sewage treatment plant or traditional septic system, to treat, neutralize, stabilize, eliminate or partially eliminate sewage or reduce pollutants in treatment facility effluent, including permanent or pilot demonstration wastewater treatment projects, or equipment or furnishings thereof. Stormwater collecting systems and vessel pumpout stations shall also be included within the definition of a wastewater improvement project.
2. **Nonpoint Source Abatement and Control Program Projects** developed pursuant to section eleven-b of the soil and water conservation districts law, title 14 of article 17 of the environmental conservation law, section 1455b of the federal coastal zone management act, or article forty-two of the executive law;
3. **Aquatic Habitat Restoration Project** means the planning, design, construction, management, maintenance, reconstruction, revitalization, or rejuvenation activities intended to improve waters of the state of ecological significance or any part thereof, including, but not limited to ponds, bogs, wetlands, bays, sounds, streams, rivers, or lakes and shorelines thereof, to support a spawning, nursery, wintering, migratory, nesting, breeding, feeding, or foraging environment for fish and wildlife and other biota.
4. **Pollution Prevention Project** means the planning, design, construction, improvement, maintenance or acquisition of facilities, production processes, equipment or buildings owned or operated by municipalities for the reduction, avoidance, or elimination of the use of toxic or hazardous substances or the generation of such substances or pollutants so as to reduce risks to public health or the environment, including changes in production processes or raw materials; such projects shall not include incineration, transfer from one medium of release or discharge to another medium, off-site or out-of-production recycling, end-of-pipe treatment or pollution control.
5. **The Operation of the Peconic Bay National Estuary Program**, as designated by the United States Environmental Protection Agency. Such projects shall have as their purpose the improvement of existing water quality to meet existing specific water quality standards. Projects which have as a purpose to permit or accommodate new growth shall not be included within this definition



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COMMUNITY PRESERVATION FUND (CPF)
WATER QUALITY IMPROVEMENT PROGRAM
 PROPOSAL SUMMARY

Project Applicant: _____
 Project Title: Short Beach Road/Polles Creek Stormwater Runoff Bioswale Project
 Project Manager Name: Terie Diat, Village Trustee
 Entity Anticipating Grant and Funding: Incorporated Village of North Haven

Name	Beth Kamper
Title	Village Clerk - Treasurer
Organization	Incorporated Village of North Haven
Address	335 Ferry Road, Sag Harbor, NY 11963
Phone	(631) 725-1378
Email	bkamper@northhavenvillage.org, tdiat@northhavenvillage.org

Property owner (if different from Project manager organization):

Name	
Affiliation	
Organization	
Address	
Phone	
Email	

Project Address: Short Beach Road, North Haven SCTM #(S) 901-6-1-37

Type of Project (Check all that apply):

- Reduction Remediation Restoration

Project Summary: (Provide a brief narrative description of proposed WQIPP project)

This project proposes to install a bioswale retention area on Village property on the road shoulder on Short Beach Road in the Village of North Haven to address storm water runoff into Polles Creek. Contaminants that enter into this waterbody may include, but not limited to, antifreeze, grease, oil, and heavy metals from cars; fertilizers, pesticides and other chemicals from gardens and homes; bacteria from pet waste and failing septic systems; and sediment from poor construction site practices. Dr. Gobler's lab conducted water quality testing in Polles Creek in 2023 and noted elevated levels of pollutants in Polles Creek. Short Beach Road is a heavily travelled roadway. The Village of North Haven has placed an electronic radar speed sign just north of the proposed bioswale. Over the period of 12 months, 1.2 million vehicles traverse this roadway both inbound and outbound to and from the Village of North Haven. The proposed bio-retention area will contain erosion control matting, native plantings and specialized soil mixes to treat, absorb, and convey stormwater runoff before entering Polles Creek.



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If additional information is needed to describe the project; a project narrative can accompany the application. Please limit the narrative to approximately 3 pages of project description, provide a summary of water quality benefits/objectives of approximately 2 pages and provide a cost estimate of approximately 2 to 4 pages with supporting estimates. Any additional materials should be focused specifically on the proposed project with references to other studies that are pertinent

1. PROJECT TYPE (check all that apply)

Must meet at least one of the definitions of “Water Quality Improvement Project” per State Law Chapter 551 cited above. Check all that apply. **Note: Monitoring costs are only potentially eligible for CPF funding within Aquatic habitat restoration projects.**

- Wastewater Treatment Improvement Project
- Non-point source abatement and control
- Aquatic habitat restoration
- Pollution prevention
- Operation of Peconic Bay National Estuary Program (Grant Match)

2. PRIORITY AREA(S) (check all that apply)

Priority areas are defined in the [Water Quality Improvement Project Plan \(WQIPP\)](#).

- 303(d) Impaired
- Peconic Estuary Program - [PEP map](#)
- High
- Medium
- Outside High and Medium priority areas*

*If Outside High and Medium priority areas, explain how the project is relevant to WQIPP goals.

3. PROJECT DESCRIPTION

3a. Existing conditions of applicable groundwater/sub-watershed/waterbody and most recent and relevant data available (provide sources).

Please see the attached Water Quality Testing Data from 2023 in Appendix D. Additionally, a supplement has been provided that summarizes the data pertaining to Polles Creek. Polles Creek drains to Sag Harbor Cove, a 303(d) impaired waterbody. An assessment of water quality in Sag Harbor Village was performed by Dr. Christopher J. Gobler in 2023. Results are attached in Appendix I.

3b. How the proposed solution addresses the issue in the context of Reduction, Remediation and/or Restoration as per the CPF Water Quality Project Plan. Note all remediation and restoration projects must assure that reduction measures are also addressed.

The proposed project seeks to reduce non-point source contaminants found in stormwater from entering the nearby Polles Creek. Remediation of contaminants will occur on-site and landward of the waterway, prolonging contaminant absorption, increasing toxin removal, and improving water infiltration. The project will make use of the natural topography of the road right of way to direct stormwater to the bioswale area. The bioswales provide infiltration and storage to capture and treat the stormwater.

3a Project Description:

Polles Creek, bordered by Short Beach Road is known to have high levels of organic nitrogen, fecal coliform, *Alexandrium* and poor flushing. Water quality testing was conducted by Dr. Christopher Gobler from Stony Brook University from May - September, 2023 in Polles Creek. The results showed that Total nitrogen levels exceeded the threshold in July, August and September.

To quote Dr. Goblers report "*A. catenella* is a toxic dinoflagellate that synthesizes saxitoxin, which leads to the syndrome of PSP, and causes illness or death in individual consuming shellfish containing these toxins (Anderson 1997). PSP has been occurring annually in New York waters since it first appeared in 2006. Although concentrations of *Alexandrium*, remained well below 1000 cells L-1 at most (NH) sites, Polles Creek came near the bloom threshold at 910 cell/L on 5/16/23."

From June to September Polles Creek exceeded the fecal coliform standard for shellfishing followed by the NYSDEC.



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3c. Describe the proposed technology and its demonstrated efficacy in similar settings. May include published data.

Bioretention systems, also known as bioinfiltration areas, rain gardens, bioswales, recharge gardens are recognized by the NYSDEC as practices that are effective at removing pollutants from stormwater and reducing stormwater runoff. Natural plants and vegetation are designed to mimic natural ecosystems. This makes the system resistant to pollution, disease, insects and extreme climatic events.

3d. How the project supports Town of Southampton, Suffolk County, NYSDEC, Long Island Nitrogen Action Plan (LINAP) or other adopted goals/policies (provide references with page numbers).

The TOS WQIPP indicates that stormwater collection initiatives meet the definition of a 'water quality improvement project.' The Stormwater BMP is within the category of mitigation initiatives for nitrogen pollution (p. 21). The project is situated in a High Priority area. The project aligns with the LINAP Action Plan scope, which discusses the benefits of bioretention on page 31, Section 6.13.

3e. Review the following statements and indicate whether they are applicable to your project. For all "Yes" responses, please indicate how your project addresses the requirements indicated.

YES N/A

If stormwater system or drainage is proposed: The project must indicate compliance with the New York State Stormwater Design Manual (2015 and as updated).

If project is related to farmland: Describe any Agricultural Stewardship Plan or other long term strategy for Nitrogen abatement.

If the project is for habitat restoration: The narrative must address how underlying causes are being ameliorated and expected outcomes for local species populations or other ecological considerations are given.

If project is a Sewage Treatment Plant (STP) or cluster treatment system: Fund allocation request is based on cost for reduction of pre-existing conditions and not for purpose of accommodating new density (describe pre-existing density and associated flow (gallons per day) and total projected nitrogen reduction in narrative). Include detailed information on how many homes the system would treat as well as potential for formation of Sewer District, if required by Suffolk County Health Department or Town Law.

If the project is requesting grant match: Include information related to funding program source and purpose of application and any relevant items on this checklist. Note: A Town Board resolution will be required in order to encumber matching funds for grant applications.

4. WATER QUALITY BENEFIT

4a. Identify Nitrogen, Pathogen or Pollutant of Concern (POC) including Existing Condition and Target Reduction.

POC reduction estimates were prepared using the EPA Spreadsheet Tool for Reducing Pollutant Load. The 2,000 cubic feet of bioswales are designed to capture the water quality volume of water from 8,200 square feet of roadway. The water quality volume is the 1.2" - 24 hour storm event. Please see the PLET spreadsheet in Appendix D for reductions in POCs.

4b. Describe plans for collecting and reporting on water quality over time.

The Village will continue to work with it's consulting engineers and Dr. Gobler of Stony Brook University for ongoing water quality monitoring.



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4c. Indicate useful life of proposed technology (must meet or exceed five years).

The expected useful life of the proposed technology is 50–200 years.

5. COST FACTORS

5a. Explain how you have confirmed that the proposed budget is reasonable, appropriate and necessary. If available, provide third party estimates or other documentation of how costs were determined.

The proposed budget was developed by The Raynor Group, P.E. & L.S. PLLC. The Raynor Group has extensive knowledge in preparing construction estimates for various projects. The project cost is estimated using knowledge of current market conditions.

5b. Describe any matching funds to be provided.

No matching funds are proposed. The Village currently has an annual budget of \$30,000 for water quality improvement initiatives, the majority of which are spent on testing with Dr. Gobler's lab. The remainder of the budget is spent on community outreach. No further funds are available.

5c. Explain: i. Why project cannot proceed and intended benefits cannot be achieved without external funding.
ii. if funds are awarded at a lower level than requested, or if there are cost overruns, explain how the project will proceed.

The project cannot proceed without the requested funding as there are presently no public or private funds available to undertake the critically needed remediation to improve the water quality of Polles Creek. Cost overruns are not anticipated. The Village Engineer will monitor the construction to address any changes or budget variances.

6. MANAGEMENT, EXPERIENCE, ABILITY

6a. Describe applicant's experience in completing similar projects.

The Village of North Haven retains The Raynor Group, P.E. & L.S. PLLC as the Village Engineer. They have prepared the proposed project design and will assist with the required permitting work as well as assisted with preparing the subject Grant Application. The Raynor Group has over 30 years experience in the design of municipal projects.

6b. Describe community support or opposition to project. If there is opposition, explain how this is to be addressed.

The community is wholly supportive of these types of environmental projects as they understand and value clean water. The public will be informed of the project via our monthly North Haven Newsletter and be given an opportunity to comment at monthly Board of Trustee meetings.

6c. Describe any permits needed and time frame/status of approvals. If permits are approved, indicate same.

NYSDEC Tidal Wetlands approval is required. NYSDEC approval will be secured during the spring of 2025. A SCDPW Work Permit is required. This will be obtained during the spring of 2025.



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7. MAINTENANCE, MONITORING, EVALUATION

Estimate ongoing maintenance costs and explain how these will be supported. Explain stewardship and monitoring activities planned for ensuring sustainability of the project.

Maintenance is required for all green infrastructure practices to maintain the functionality of the bioswale. Maintenance shall be monthly in the first year after installation, bi-monthly in years two and three, and annually from year three and beyond. The Village has existing staff and a maintenance budget that will be used for maintenance activities and will be incorporated into the routine maintenance schedule. The bioswale is considered to be functioning if no water is present one to two days after a rainfall event. Maintenance activities include mulching, edging, watering, weeding and plant replacement.

8. DURATION OF PROJECT

8a. Provide a projected project timeline. Note: The Committee will only make recommendations for shovel-ready projects that can commence this fiscal year.

The Village engineer will conduct a survey and have test borings performed in the March 2025 to provide technical information. The technical information will be used to create concept plans in the April 2025. Once concept plans are prepared, the Village Engineer will prepare construction documents and a bid package in July 2025. Construction of the project would commence November 2025 and be completed before December 2025.

8b. If project is multi-year or phased, provide a breakdown of budget and milestones for each year and phase.

N/A

9. ATTESTATION

Allocation of CPF funds will not be for the purpose of accommodating new growth, as this is prohibited by State law.

Check all boxes & sign.

- We certify that funds will not be directed for projects for the purpose of accommodating new growth.
- We understand that progress reports will need to be generated as specified in our Water Quality Improvement Contract AND a final report showing qualitative and/or quantitative data will be generated upon project completion. .
- I authorize the subject property to be inspected by Town Personnel.

Signature: _____

Jessie L. Deat

Date _____

3-11-2024

10. REQUIRED ATTACHMENTS Confirm that the following required documents are attached to this application:

11. REQUIRED ATTACHMENTS Confirm that the following required documents are attached to this application:

- Photos of existing conditions
- Location Map
- State Environmental Quality Review Act (SEQRA) Long or Short Environmental Assessment Form (EAF)
<https://www.dec.ny.gov/permits/6191.html>
- Completed EPA Spreadsheet Tool for Evaluating Pollutant Load (STEPL)
<https://www.epa.gov/nps/spreadsheet-tool-estimating-pollutant-loads-step1> or similar standardized methodology (describe)
- Project budget (see attached template)
- Ownership commitment is provided via letter of intent (LOI) for non-municipal owners or municipal resolution for municipal owners
- Public agencies must complete SEQRA on the project and submit determination of significance and associated documentation.

12. OTHER ATTACHMENTS

List other attachments provided, including cost estimates, bids, plans, documentation of matching funds, and other as appropriate to demonstrate project readiness, quality, feasibility, and cost effectiveness.



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BUDGET PROPOSAL

Is the applicant incorporated or organized as a Not-for-Profit corporation or Not-for Profit limited liability company?
 Yes No (If Yes, please submit a copy of the Certificate of Incorporation/Organization with this application)

Is the applicant a municipality? Yes No

If yes, please enter the request date or anticipated request date of RFP (Request for Proposals) July 2025.

PLANNING/ENGINEERING/DESIGN	Town CPF Request	Matching Funds Committed	Matching Funds Pending	Estimated Total Project Costs
Task 1-Survey and Mapping	\$-3,500.00	\$-	\$-	\$-3,500.00
Task 2-Construction Drawings, Details & Specifications	\$-4,000.00	\$-	\$-	\$-4,000.00
Task 3-Prepare Bid Document and Public Letting	\$-3,000.00	\$-	\$-	\$-3,000.00
Task 4-	\$-	\$-	\$-	\$-0.00
Task 5-	\$-	\$-	\$-	\$-0.00
Task 6-	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
Planning/Engineering/Design Cost Total	\$-10,500.00	\$-0.00	\$-0.00	\$-10,500.00

Contractual Services				
Maintenance of Bioretention Facility (Semi-Annually)	\$-4,500.00	\$-	\$-	\$-4,500.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
Contractual Services Cost Total	\$-4,500.00	\$-0.00	\$-0.00	\$-4,500.00

Construction & Site Improvements				
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
Construction & Site Improvements Cost Total	\$-0.00	\$-0.00	\$-0.00	\$-0.00



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Equipment/Materials/Supplies	Town CPF Request	Matching Funds Committed	Matching Funds Pending	Estimated Total Project Costs
See Attached Construction Estimate	\$-61,050.00	\$-	\$-	\$-61,050.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
	\$-	\$-	\$-	\$-0.00
				\$ 0.00
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				\$ 0.00
				\$ 0.00
				\$ 0.00
				\$ 0.00
				\$ 0.00
				\$ 0.00
				\$ 0.00
Equipment/Materials/Supplies Total	\$-61,050.00	\$0.00	\$-0.00	\$-61,050.00

Additional Cost				
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
	\$-	\$-	\$-	\$- 0.00
Additional Cost Total	\$- 0.00	\$- 0.00	\$- 0.00	\$- 0.00

Planning/Engineering/Design Cost Total (from page 7)	\$- 10,500.00	\$- 0.00	\$- 0.00	\$- 10,500.00
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Total Project Cost	\$-76,050.00
Applicant matching funds committed	\$-0.00
Applicant matching funds pending approval (e.g. grant request submitted pending determination)	\$-0.00
Total CPF Funds Requested	\$-76,050.00

Source of matching funds	Amount



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COMMUNITY PRESERVATION FUND (CPF) WATER QUALITY IMPROVEMENT PROGRAM LETTER OF INTENT

APPLICANT'S INFORMATION

Owner: Incorporated Village of North Haven
Contact First and Last Name: Beth Kamper
Contact Address: 335 Ferry Road, Sag Harbor, NY 11963
Contact Phone: (631) 725-1378
Contact Email: bkamper@northhavenvillage.org, tdiat@northhavenvillage.org

CONTRACT RECIPIANT INFORMATION

Name/Organization: Incorporated Village of North Haven
Contact Person/Officer: Terie Diat, Village Trustee
Contact Address: 335 Ferry Road, Sag Harbor, NY 11963
Contact Phone: (631) 725-1378, (516) 606-2600 (cell)
Contact Email: tdiat@northhavenvillage.org

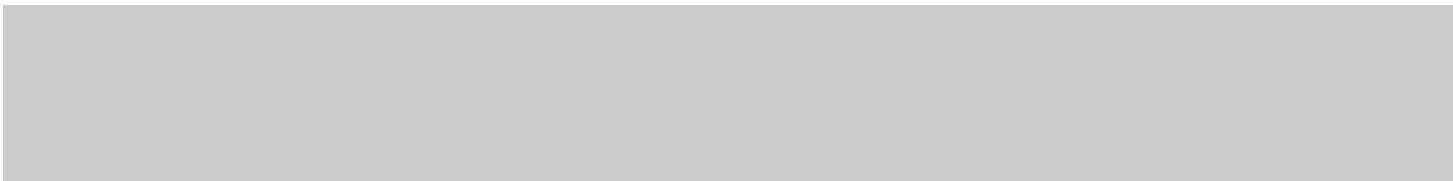
PROJECT INFORMATION

Project Title: Short Beach Road/Polles Creek Stormwater Runoff Bioswale Project
Project Location: Short Beach Road, North Haven
Project Description (1-3 sentences):

The Village of North Haven will install a bioswale and rain garden on Village property adjacent to Short Beach Road, a county right-of-way adjacent to Polles Creek. The project will improve water quality by removing nutrients, oils, sediments, and pesticides from road runoff prior to stormwater discharge in Polles Creek.

ANTICIPATED PROJECT TIMELINE

Begin: March 2025
Complete: December 2025
Notes: _____



Appendix A

Proposed Project Plan



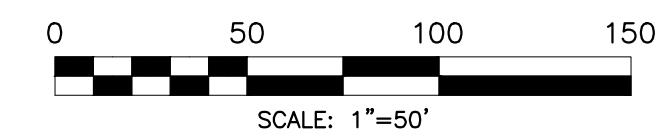
	IMPERVIOUS AREA AREA = 8,200 SF		BIOSWALE AREA AREA = 2,000 SF
--	------------------------------------	--	----------------------------------

STORAGE VOLUME CALCULATIONS

IMPERVIOUS AREA	= 8,200 SF
RUNOFF COEFFICIENT	= 0.98 (ASPHALT)
WATER QUALITY VOLUME	= 1.2 INCHES
REQUIRED STORAGE VOLUME	= 8200 SF X 0.1 FEET X 0.98
	= 803.6 CF REQUIRED

PROPOSED BIOSWALE AREA

AREA	= 2,000 SF
PONDING DEPTH	= 12 INCHES
BIOSWALE VOLUME	= 2,000 CF
DRAINAGE STORAGE	= 338 CF
TOTAL STORAGE	= 2,338 CF



REVISIONS			
DATE	BY	DESCRIPTION	APPRVD
INCORPORATED VILLAGE OF NORTH HAVEN 335 FERRY ROAD SAG HARBOR, N.Y. 11963 WATER QUALITY IMPROVEMENT PROJECT SHORT BEACH ROAD, VILLAGE OF NORTH HAVEN SHORT BEACH ROAD THE RAYNOR GROUP, P.E. & L.S., PLLC SURVEYORS CIVIL ENGINEERS SITE PLANNERS DEERFIELD GREEN P.O. BOX 720 WATERMILL, NY 11976 (631)726-7600 DESIGNED BY: VAG SCALE: 1" = 50' DWG. NO. DRAWN BY: RCW DATE: 03/08/2024 SK-1 APPROVED BY: VAG FILE NO.: 3700.02 <small>VINCENT A. GALDIELLO PROFESSIONAL ENGINEER NO. 072544</small>			

Appendix B

Existing Conditions Photos

Feb 29, 2024 at 8:29:56 AM
Short Beach Rd, Suffolk County



Feb 29, 2024 at 8:30:03 AM
Short Beach Rd. Suffolk County



Feb 29, 2024 at 8:30:17 AM
Short Beach Rd, Suffolk County



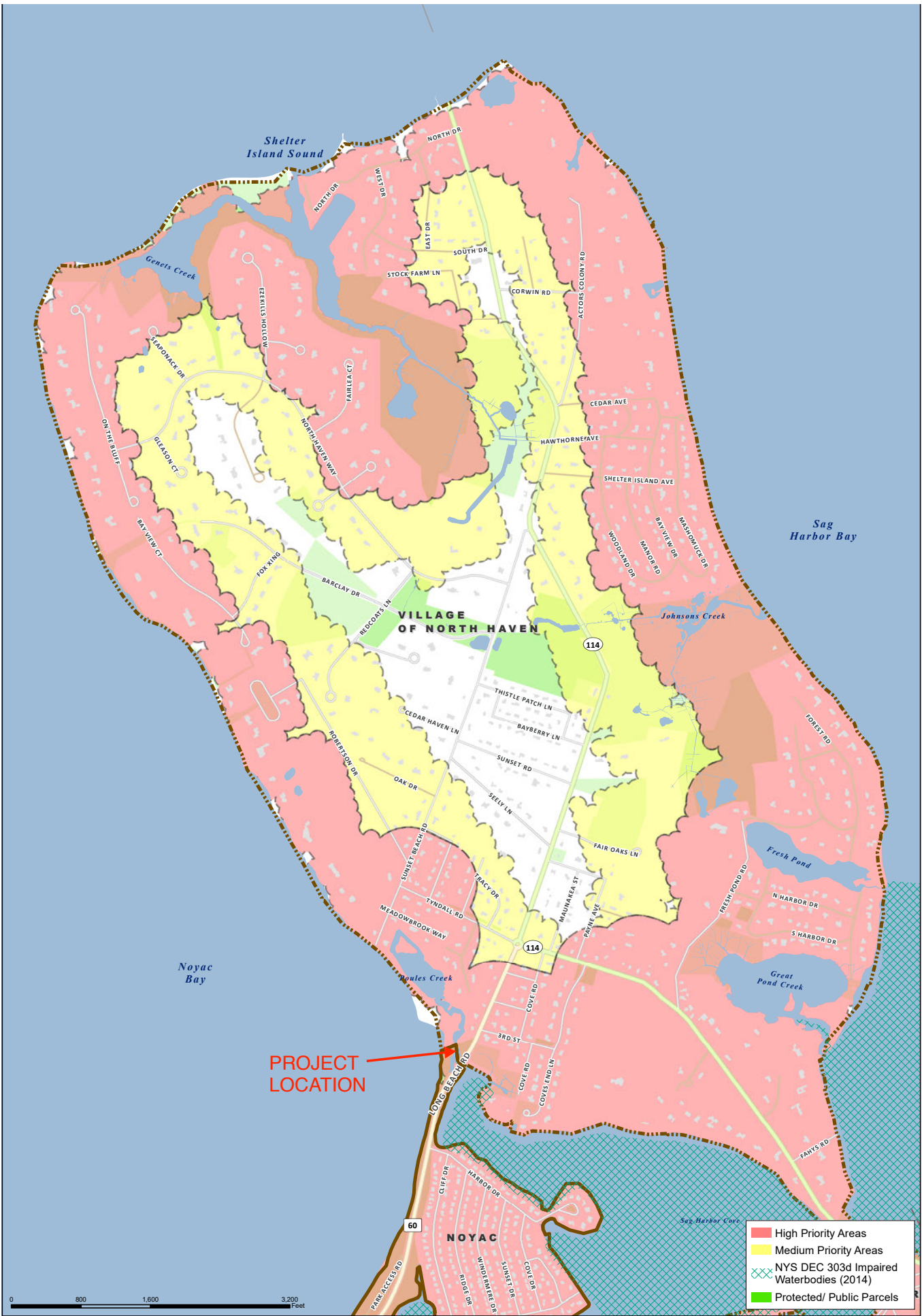
Feb 09, 2024 at 8:30:27 AM
Short Beach Rd, Suffolk County



Feb 29, 2024 at 8:31:54 AM
Short Beach Rd, Suffolk County



Appendix C
Location Map



PROJECT LOCATION

- High Priority Areas
- Medium Priority Areas
- NYS DEC 303d Impaired Waterbodies (2014)
- Protected/ Public Parcels

0 800 1,600 3,200 Feet

Town of Southampton CPF Water Quality Improvement Project Plan

VILLAGE OF NORTH HAVEN

Suffolk County Real Property Tax Service
 COPYRIGHT 2016, COUNTY OF SUFFOLK, N.Y.
 Real Property Taxmap parcel line work used with permission of
 Suffolk County Real Property Tax Service Agency (R.P.T.S.A.)



Appendix D

EPA Spreadsheet Tool for Evaluating Pollutant Load

Total load by subwatershed(s)																				
Watershed	N Load (no BMP)	P Load (no BMP)	BOD Load (no BMP)	Sediment Load (no BMP)	E. coli Load (no BMP)	N Reduction	P Reduction	BOD Reduction	Sediment Reduction	E. coli Reduction	N Load (with BMP)	P Load (with BMP)	BOD (with BMP)	Sediment Load (with BMP)	E. coli Load (with BMP)	%N Reduction	%P Reduction	%BOD Reduction	%Sed Reduction	%E. coli Reduction
	lb/year	lb/year	lb/year	t/year	Billion MPN/yr	lb/year	lb/year	lb/year	t/year	Billion MPN/yr	lb/year	lb/year	lb/year	t/year	Billion MPN/yr	%	%	%	%	%
W1	4.42	0.77	13.84	0.11	0.00	1.84	0.58	0.00	0.00	0.00	2.58	0.19	13.84	0.11	0.00	41.58	74.99	0.00	0.00	0.00
Total	4.42	0.77	13.84	0.11	0.00	1.84	0.58	0.00	0.00	0.00	2.58	0.19	13.84	0.11	0.00	41.58	74.99	0.00	0.00	0.00

Appendix E

State Environmental Quality Review Act (SEQRA)
Short Environmental Assessment Form (EAF)

Short Environmental Assessment Form

Part 1 - Project Information

Instructions for Completing

Part 1 – Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 – Project and Sponsor Information			
Name of Action or Project: Village of North Haven Stormwater Treatment Improvement Project			
Project Location (describe, and attach a location map): Short Beach Road, Village of North Haven			
Brief Description of Proposed Action: This project proposes to install a bioswale retention area on Village property on the road shoulder on Short Beach Road in the Village of North Haven to address storm water runoff into Polles Creek. Contaminants that enter into this waterbody may include, but not limited to, antifreeze, grease, oil, and heavy metals from cars; fertilizers, pesticides and other chemicals from gardens and homes; bacteria from pet waste and failing septic systems; and sediment from poor construction site practices. The proposed bio-retention area will contain erosion control matting, native plantings and specialized soil mixes to treat, absorb, and convey stormwater runoff before entering Polles Creek.			
Name of Applicant or Sponsor: Incorporated Village of North Haven Terie Diat, Village Trustee - Project Manager		Telephone: 631-725-1378	
		E-Mail: tdiat@northhavenvillage.org	
Address: 335 Ferry Road			
City/PO: Sag Harbor		State: New York	Zip Code: 11963
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.		NO <input type="checkbox"/>	YES <input type="checkbox"/>
2. Does the proposed action require a permit, approval or funding from any other government Agency? If Yes, list agency(s) name and permit or approval: Town of Southampton CPF Water Quality Improvement Program		NO <input type="checkbox"/>	YES <input checked="" type="checkbox"/>
3. a. Total acreage of the site of the proposed action?		<u>0.05</u> acres	
b. Total acreage to be physically disturbed?		<u>0.05</u> acres	
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor?		<u>0.19</u> acres	
4. Check all land uses that occur on, are adjoining or near the proposed action:			
<input type="checkbox"/> Urban <input type="checkbox"/> Rural (non-agriculture) <input type="checkbox"/> Industrial <input type="checkbox"/> Commercial <input checked="" type="checkbox"/> Residential (suburban)			
<input type="checkbox"/> Forest <input type="checkbox"/> Agriculture <input checked="" type="checkbox"/> Aquatic <input type="checkbox"/> Other(Specify):			
<input type="checkbox"/> Parkland			

5. Is the proposed action, a. A permitted use under the zoning regulations? b. Consistent with the adopted comprehensive plan?	NO	YES	N/A
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	NO	YES	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: The proposed action will treat stormwater runoff that flows from Short Beach Road into Polles Creek, which is a tributary to the Peconic Bay Estuary, a designated Critical Environmental Area	NO	YES	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8. a. Will the proposed action result in a substantial increase in traffic above present levels? b. Are public transportation services available at or near the site of the proposed action? c. Are any pedestrian accommodations or bicycle routes available on or near the site of the proposed action?	NO	YES	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9. Does the proposed action meet or exceed the state energy code requirements? N/A If the proposed action will exceed requirements, describe design features and technologies: _____ _____	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	
10. Will the proposed action connect to an existing public/private water supply? N/A If No, describe method for providing potable water: _____ _____	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	
11. Will the proposed action connect to existing wastewater utilities? N/A If No, describe method for providing wastewater treatment: _____ _____	NO	YES	
	<input type="checkbox"/>	<input type="checkbox"/>	
12. a. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? b. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory?	NO	YES	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency? b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____ _____ _____	NO	YES	
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

<p>14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply:</p> <p><input checked="" type="checkbox"/> Shoreline <input type="checkbox"/> Forest <input type="checkbox"/> Agricultural/grasslands <input type="checkbox"/> Early mid-successional</p> <p><input checked="" type="checkbox"/> Wetland <input type="checkbox"/> Urban <input type="checkbox"/> Suburban</p>		
<p>15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?</p>	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>16. Is the project site located in the 100-year flood plan?</p>	NO	YES
	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<p>17. Will the proposed action create storm water discharge, either from point or non-point sources?</p> <p>If Yes,</p> <p> a. Will storm water discharges flow to adjacent properties?</p> <p> b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)?</p> <p>If Yes, briefly describe:</p> <p>_____</p> <p>_____</p>	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
<p>18. Does the proposed action include construction or other activities that would result in the impoundment of water or other liquids (e.g., retention pond, waste lagoon, dam)?</p> <p>If Yes, explain the purpose and size of the impoundment:</p> <p>_____</p> <p>_____</p>	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility?</p> <p>If Yes, describe:</p> <p>_____</p> <p>_____</p>	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste?</p> <p>If Yes, describe:</p> <p>_____</p> <p>_____</p>	NO	YES
	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>I CERTIFY THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE</p> <p>Applicant/sponsor/name: <u>Terie Diat</u> Date: <u>3/11/24</u></p> <p>Signature: <u><i>Terie Diat</i></u> Title: <u>Village Trustee - Project Manager</u></p>		

Project: Stormwater Treatment Improvement
Project - Short Beach Road

Date: March 8, 2024

Short Environmental Assessment Form

Part 2 - Impact Assessment

Part 2 is to be completed by the Lead Agency.

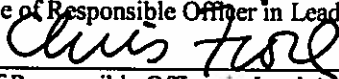
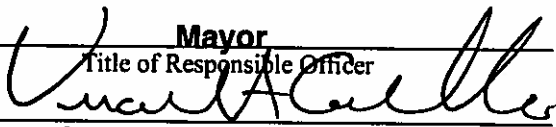
Answer all of the following questions in Part 2 using the information contained in Part 1 and other materials submitted by the project sponsor or otherwise available to the reviewer. When answering the questions the reviewer should be guided by the concept “Have my responses been reasonable considering the scale and context of the proposed action?”

	No, or small impact may occur	Moderate to large impact may occur
1. Will the proposed action create a material conflict with an adopted land use plan or zoning regulations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Will the proposed action result in a change in the use or intensity of use of land?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Will the proposed action impair the character or quality of the existing community?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Will the proposed action have an impact on the environmental characteristics that caused the establishment of a Critical Environmental Area (CEA)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Will the proposed action result in an adverse change in the existing level of traffic or affect existing infrastructure for mass transit, biking or walkway?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Will the proposed action cause an increase in the use of energy and it fails to incorporate reasonably available energy conservation or renewable energy opportunities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Will the proposed action impact existing:		
a. public / private water supplies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. public / private wastewater treatment utilities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Will the proposed action impair the character or quality of important historic, archaeological, architectural or aesthetic resources?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Will the proposed action result in an adverse change to natural resources (e.g., wetlands, waterbodies, groundwater, air quality, flora and fauna)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Will the proposed action create a hazard to environmental resources or human health?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Short Environmental Assessment Form
Part 3 Determination of Significance

For every question in Part 2 that was answered "moderate to large impact may occur", or if there is a need to explain why a particular element of the proposed action may or will not result in a significant adverse environmental impact, please complete Part 3. Part 3 should, in sufficient detail, identify the impact, including any measures or design elements that have been included by the project sponsor to avoid or reduce impacts. Part 3 should also explain how the lead agency determined that the impact may or will not be significant. Each potential impact should be assessed considering its setting, probability of occurring, duration, irreversibility, geographic scope and magnitude. Also consider the potential for short-term, long-term and cumulative impacts.

The Board of Trustees of the Village of North Haven has determined that the installation of a bioswale retention area on the road shoulder of Short Beach Road to treat absorb and convey stormwater runoff before it enters Polles Creek will not have an adverse impact on the environment and that installing a bioswale retention area will, in fact, result in a beneficial impact on the environment by removing contaminants typically found in stormwater runoff. Therefore, a Negative Declaration pursuant to SEQRA has been adopted.

<input type="checkbox"/> Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action may result in one or more potentially large or significant adverse impacts and an environmental impact statement is required.	
<input type="checkbox"/> Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action will not result in any significant adverse environmental impacts.	
Village of North Haven Board of Trustees Name of Lead Agency	March 8, 2024 Date
Chris Fiore Print or Type Name of Responsible Officer in Lead Agency	Mayor Title of Responsible Officer
 Signature of Responsible Officer in Lead Agency	 Signature of Preparer (if different from Responsible Officer)

Appendix F

Village of North Haven Resolution

Village of North Haven

335 FERRY ROAD
SAG HARBOR, NEW YORK 11963

PHONE: 631-725-1378

FAX: 631-725-1120

RESOLUTION 2 – MARCH 2024

**INCORPORATED VILLAGE OF NORT HAVEN RESOLUTION SUPPORTING WATER
QUALITY IMPROVEMENT PROJECTS TO REDUCE POLLUTANTS IN LOCAL
PONDS AND CREEKS**

Whereas, the Board of Trustees of the Incorporated Village of North Haven support of any actions that reduces the amount of pollutants that infiltrate any and all local ponds, creeks, bays, and aquifer systems; and


Therefore, Be it Resolved that the Board of Trustees of the Village of North Haven, at its meeting held on March 11, 2024, hereby approves the installation of three (3) water quality improvement projects. The project locations are Short Beach Road/Polles Creek, Fresh Pond Road and Ryders Pond; and

Be it further Resolved, that the Board of Trustees authorizes the submission of three (3) separate grant applications under the 2024 Town of Southampton Community Preservation Fund Water Quality Improvement Program to support the construction and maintenance costs associated with each project.

Motion Made By: Trustee Diat

Motion Seconded By: Mayor Fiore

All in favor motion so carried.


Beth M. Kamper, Clerk-Treasurer

March 11, 2024



Village of North Haven

335 FERRY ROAD
SAG HARBOR, NEW YORK 11963

PHONE: 631-725-1378

FAX: 631-725-1120

RESOLUTION 3 – MARCH 2024

**INCORPORATED VILLAGE OF NORTH HAVEN AUTHORIZING A NEGATIVE
DECLARATION FOR THE APPLICATION TO TOWN OF SOUTHAMPTON
COMMUNITY PRESERVATION FUND (CPF) WATER QUALITY IMPROVEMENT
PROGRAM**

Whereas, the Village of North Haven is applying for funding to the Town of Southampton 2024 Community Preservation Fund under the Water Quality Improvement Program for a water quality initiative project at Short Beach Road/Polles Creek; and

Whereas, the Village Board has reviewed the provisions of the New York State Environmental Quality Review Act (SEQRA), as related to the proposed action: and

Whereas, the proposed action is classified as an Unlisted Action; and

Whereas, the Village Board has conducted a review of the information contained in the SEQRA documentation consisting of a Short Environmental Assessment Form (SEAF) prepared by The Raynor Group, P.E. & L.S. PLLC; and

Whereas, the potential impacts and the magnitude and importance of potential impacts and benefits have been considered and a Negative Determination was recommended; and

Now, Therefore, Be It Resolved, the Village Trustees hereby adopts a Negative Declaration pursuant to the State Environmental Quality Review Act for the application to the Town of Southampton Community Preservation Fund (CPF) Water Quality Improvement Program.

Motion Made By: Trustee Skilbred

Motion Seconded By: Mayor Fiore

All in favor motion so carried.


Beth M. Kamper, Clerk-Treasurer

March 11, 2024



Appendix G

Recommended Native Plants

Village of North Haven

Recommended Native Plants

NATIVE TREES

- American Beech (*Fagus grandifolia*)
- American Holly (*Ilex opaca*)
- American Hornbeam (*Carpinus caroliniana*)
- American Linden (*Tilia Americana*)
- Atlantic White Cedar (*Chamaecyparis thyoides*)
- Black Cherry (*Prunus serotina*)
- Black Oak (*Quercus velutina*)
- Black Birch (*Betula lenta*)
- Black Gum (*Nyssa sylvatica*)
- Chestnut Oak (*Quercus prinus*)
- Common Alder (*Alnus serrulata*)
- Eastern Red Cedar (*Juniperus virginiana*)
- Flowering Dogwood (*Cornus florida*)
- Gray Birch (*Betula populifolia*)
- Hackberry (*Celtis occidentalis*)
- Hawthorne (*Crataegus crusgalli*)
- Ironwood (*Carpinus caroliniana*)
- Persimmon (*Diospyros virginiana*)
- Pignut Hickory (*Carya glabra*)
- Pitch Pine (*Pinus rigida*)
- Post Oak (*Quercus stellata*)
- Quaking Aspen (*Populus tremuloides*)
- Red Oak (*Quercus rubra*)
- Red Maple (*Acer rubrum*)
- Sassafras (*Sassafras albidum*)
- Scarlet Oak (*Quercus coccinea*)
- Shadbush (*Amelanchier canadensis*)
- Speckled Alder (*Alnus rugosa*)
- Swamp Magnolia (*Magnolia virginiana*)
- Swamp White Oak (*Quercus bicolor*)
- Sweet Bay Magnolia (*Magnolia virginiana*)
- Sweet Gum (*Liquidambar styraciflua*)
- Tulip Tree (*Liriodendron tulipifera*)
- White Oak (*Quercus alba*)
- White Ash (*Fraxinus americana*)
- Witch Hazel (*Hamamelis virginiana*)

NATIVE SHRUBS

- American Elder (*Sambucus canadensis*)
- Arrowwood (*Viburnum dentatum*)
- Bayberry (*Myrica pensylvanica*)
- Black Chokeberry (*Aronia melanocarpa*)
- Black Haw (*Viburnum prunifolium*)
- Black Huckleberry (*Gaylussacia baccata*)
- Fetterbush (*Leucothoe racemosa*)
- Highbush Blueberry (*Vaccinium corymbosum*)
- Inkberry (*Ilex glabra*)
- Maleberry (*Lyonia ligustrina*)
- Maple-leaved Viburnum (*Viburnum acerifolium*)
- Mountain Laurel (*Kalmia latifolia*)
- Nannyberry (*Viburnum lentago*)
- Northern Arrowwood (*Viburnum recognitum*)
- Pasture Rose (*Rosa virginiana*)
- Pussy Willow (*Salix discolor*)
- Red Chokeberry (*Aronia arbutifolia*)
- Scrub Oak (*Quercus ilicifolia*)
- Shadbush (*Amelanchier canadensis*)
- Shining Sumac (*Rhus copallina*)
- Sheep Laurel (*Kalmia angustifolia*)
- Steeplebush (*Spirea latifolia*)
- Staggerbush (*Lyonia mariana*)
- Swamp Rose (*Rosa palustris*)

NATIVE SHRUBS (Continued)

- Swamp Azalea (*Rhododendron viscosum*)
- Sweetfern (*Comptonia peregrina*)
- Sweet Pepperbush (*Clethra alnifolia*)
- Spicebush (*Lindera benzoin*)
- Virginia Rose (*Rosa virginiana*)
- Winterberry (*Ilex verticillata*)
- Witherod (*Viburnum nudum*)

NATIVE GRASSES, WILDFLOWERS, GROUNDCOVERS, ETC.

- Blue-eyed Grass (*Sisyrinchium angustifolium*)
- Bluestem Grass (*Andropogon scoparium*)
- Broom Sedge (*Andropogon virginicus*)
- Bearberry (*Arctostaphylos uva-ursi*)
- Beebalm (*Monarda didyma*)
- Bergamot (*Monarda fistulosa*)
- Butterfly Weed (*Asclepias tuberosa*)
- Blazing Star (*Liatris spicata*)
- Blue Lupine (*Lupinus perennis*)
- Birds Foot Violet (*Viola pendata*)
- Bracken Fern (*Pteridium aquilinum*)
- Canada Mayflower (*Maianthemum canadense*)
- Cardinal Flower (*Lobelia cardinalis*)
- Common Hairgrass (*Deschampsia flexuosa*)
- Cinnamon Fern (*Osmunda cinnamomea*)
- Golder Heather (*Hudsonia ericoides*)
- Horsemint (*Monarda punctata*)
- Hay-scented Fern (*Dennstaedtia punctilobula*)
- Lowbush Blueberry (*Vaccinium angustifolium*)
- New England Aster (*Aster novae-angliae*)
- New York Aster (*Aster novi-belgii*)
- New York Fern (*Dryopteris cristata*)
- NY Ironweed (*Vernonia noveboracensis*)
- Pennsylvania Sedge (*Carex pensylvanica*)
- Royal Fern (*Osmunda regalis*)
- Sensitive Fern (*Onoclea sensibilis*)
- Stiff Aster (*Aster linariifolius*)
- Sweet Goldenrod (*Solidago odora*)
- Trailing Arbutus (*Epigaea repens*)
- Wild Indigo (*Baptista tinctorial*)
- Wintergreen (*Gaultheria procumbens*)
- Wild Columbine (*Aquilegia canadensis*)
- Wild Geranium (*Geranium maculatum*)

Appendix H

Short Beach Road Traffic Statistics

Incoming	7/22/22	7/7/23		1,273,297
Outgoing	7/22/22	7/7/23		1,182,047

Appendix I

Water Quality Studies

**North Haven Village 2023 water quality study
Final Report**



by

**Christopher J. Gobler, PhD, Jennifer Goleski,
Lakshita Kundal, and Lauren Taveira**



**Stony Brook University
School of Marine and
Atmospheric Sciences**

February 2024

Executive Summary

This study was undertaken from May through October of 2023 for the North Haven Village Trustees to assess water quality, harmful algal blooms, and pathogenic bacteria in the marine bodies of Fresh Pond, Mashomuck Creek, Ganet Creek, Great Salt Pond, as well as at the Ferry dock on the north shore. While measurements of dissolved oxygen were generally at concentrations supportive of fisheries, Mashomuck Creek was below for most of sampling season. Great Salt Pond fell below this value for dissolved oxygen 3 times from July to September, as well as Fresh Pond which was low in September. Chlorophyll *a* levels exceeded recommended concentrations at Great Salt Pond and Mashomuck Creek from July to October, and Fresh Creek and Polles Creek in July and August, respectively. Measurements of total nitrogen across all marine sites demonstrated that all sample locations except for the ferry site exceeded the USPEA recommended value of 0.4 mg/L, which can lead to harmful algal blooms. Additionally, there was one instance of a harmful algal bloom (HAB) in Fresh Pond of *Cochlodinium polykrikoides* on September 19th, although *Alexandrium* concentration neared bloom threshold of 1000 cells L⁻¹ in Polles Creek on May 16th. All sites experienced fecal coliform levels above the NYSDEC recommended level of 14 CFU/100 mL multiple times during the sampling period for long stretches of time. Half of the sites remained below the NYSDOH recommended level of Enterococci at 104 CFU/100 mL with Mashomuck Creek and Great Salt Pond being above on multiple dates and the Ferry site only on July 27th.

In 2022, a preliminary study was conducted for all sites except for the ferry in September and October. Comparatively, the water quality of North Haven Village has gotten worse since then. There were more instances of low dissolved oxygen at more sites in 2023. Additionally, the levels of fecal coliform, enterococci, and Chlorophyll *a* were higher in 2023. Overall, this study revealed

regions of North Haven waters that of good or fair quality while other regions require further study, monitoring, and possible remediation.

1. Background

Coastal marine ecosystems are amongst the most ecologically and economically productive areas on the planet. They provide an estimated US \$20 trillion in annual resources or about 43% of the global ecosystem goods and services (Costanza et al., 1997). Approximately 40% of the world's population lives within 100 km (about 62.14 mi) of a coastline, making these regions subject to anthropogenic stressors such as intense nutrient loading (Nixon, 1995; Valiela, 2006). These nutrients, including nitrogen and phosphorus, are essential in the growth of algal blooms. Therefore, excessive nitrogen loading into coastal ecosystems promotes algal productivity. These nutrients are often being introduced into water through runoff, so when it rains the levels of nutrients can increase. The microbial consumption of the organic matter caused by algal blooms reduces oxygen levels, promoting hypoxia (Cloern, 2001). The rapid acceleration of nutrient loading to coastal zones in recent decades has contributed to a significant expansion of algal blooms. Additionally, certain types of algal blooms can be especially dangerous to coastal ecosystems and humans who live there.

Globally, the phytoplankton communities of many coastal ecosystems have become increasingly dominated by harmful algal blooms (HABs) and New York is a prime example of this trend. Prior to 2006, algal blooms in NY were well-known for their ability to disrupt coastal ecosystem and fisheries but were never considered a human health threat. Since 2006, blooms of a toxic dinoflagellate, *Alexandrium catenella*, have led to paralytic shellfish poisoning (PSP) due to the production of saxitoxin. This induced the closure of thousands of acres of shellfish beds in Suffolk County. In 2008, a second toxic dinoflagellate *Dinophysis acuminata* began forming large annual blooms, generating the toxins okadaic acid and DTX-1. Both toxins are the causative agents of diarrhetic shellfish poisoning (DSP). During the past decade, moderate levels of *A. catenella*

and *D. acuminata* have been detected in waters surrounding North Haven. The lack of sampling in North Haven has prohibited the understanding of risk.

In Suffolk County, blooms of the ichthyotoxic dinoflagellate *Cochlodinium polykrikoides* have occurred every year since 2004 in the Peconic Estuary and Shinnecock Bay. The algal blooms from these regions have been shown to cause rapid mortality in fish, shellfish, and shellfish larvae (Gobler et al., 2008; Tang & Gobler, 2009a; 2009b). *C. polykrikoides* form blooms around the world and the highly lethal effects of these blooms on fish, shellfish, shellfish larvae, zooplankton, and subsequent impacts on fisheries have been well established (Kudela & Gobler, 2012). Studies to date suggest short-lived, labile toxins, similar to reactive oxygen species (ROS), play a central role in the toxicity of *C. polykrikoides* to fish and shellfish (adult, juvenile, and larvae) (Tang & Gobler, 2009a; 2009b). In 2012, these blooms spread into East Hampton Town marine waters. Large populations of bay scallops, that were otherwise abundant prior to the blooms, died following these bloom events (Deborah Barnes, NYSDEC, pers. comm.). However, the precise distribution of *C. polykrikoides* blooms in North Haven waters is unknown.

A final group of microbes of concern in coastal ecosystems are pathogenic bacteria which can reside in water. Such pathogens can be a hazard to humans swimming by infecting the alimentary canal, ears, eyes, nasal cavity, skin, or upper respiratory tract (Thompson et al., 2005). Consumption of contaminated shellfish is one of the most common exposure routes for marine pathogens. Fecal coliform bacteria and *Enterococcus* are the recommended indicator for human pathogens in marine waters, and gastrointestinal symptoms are a frequent health outcome associated with exposure (Thompson et al., 2005). The presence of high levels of fecal coliform bacteria and/or *Enterococcus* may trigger action by a municipal agency to remediate such conditions. One key obstacle to generating a successful remediation plan for high levels of indicator bacteria is that the source of the potentially pathogenic bacteria is often unknown. Pathogenic fecal bacteria co-present with fecal coliform bacteria and/or *Enterococcus* may be derived from any animal. This includes humans and remedial plans for mitigating bacteria from human wastewater will differ radically from plans focused on the mitigation of animal feces. Moreover, mitigation of feces-derived bacteria from birds that live on the waterbody would differ radically from plans to minimize dog or deer feces that might emanate from road run-off.

OBJECTIVES:

- 1. Monitor water quality across North Haven waters including measurements of temperature, salinity, chlorophyll a, dissolved oxygen, Secchi disk, and harmful algae including A. catenella, D. acuminata, and C. polykrikoides.***

- 2. Quantify nitrogenous nutrients in surface waters. Total levels of nitrogen will be quantified within all marine waters. Concentrations of total nitrogen will be compared to the Peconic Estuary Program's goal of 0.4 mg/L for ecosystem health.***

- 3. Quantify levels of indicator bacteria in North Haven waters. Levels of fecal coliform bacteria and Enterococcus will be quantified in North Haven waters.***

- 4. Provide a final presentation that interprets all findings regarding scientific literature and local, state, and federal regulations.***

2. Approach

1. Methods and Approach

The 2023 sampling season ran from May through October. Sampling was performed twice per month with efforts made to sample during wet (within 24 hours of >1" of rainfall) and dry periods and during spring and neap tides. Sampling sites will include Fresh Pond (NHFP), Ganet Creek (NHGC), Polles Creek (NHPC), Great Salt Pond (NHGSP), and Mashomuck Creek (NHMC). In addition, samples were collected from the Shelter Island Sound along the north coast of North Haven (NHFY) as a control, end-member site.

2. Targeted Analyses

General water quality measurements obtained for each site include salinity, temperature, and dissolved oxygen levels measured with a handheld YSI 556 probe calibrated according to the manufacturer's recommendations. A Secchi disk was used to determine water clarity. Additionally, water was collected at each of these sites and analyzed for chlorophyll a. The pigment chlorophyll a, which serves as an analog for algal biomass, was measured by filtering whole water through

glass fiber filters. Chlorophyll a was extracted from the filter with acetone, and then the fluorescence was measured to obtain concentration levels (Parsons et al., 1984).

Levels of harmful algae were quantified by obtaining surface water and preserving it in Lugol's iodine (5% v/v). Samples were then quantified under an inverted microscope. Identification of harmful algae was seasonal with a focus on *A. catenella* in May and June, *D. acuminata* in May, June, and July, and *C. polykrikoides* from July through September. The sites were also sampled for quantification of fecal coliform bacteria and Enterococci bacteria. Enterococci and fecal coliform bacteria were quantified using the IDEXX Enterolert and Colilert, respectively, & Quanti-Tray/2000 sampling kits, giving MPN per 100mL.

3. Findings

3.1. General Water Quality: Temperature, Salinity & Dissolved Oxygen

Surface temperatures ranged from 16.9 to 32.6°C across North Haven's waters. The seasonal average for surface waters was $24.0 \pm 4.0^\circ\text{C}$, and the summertime mean (June 20th – September 22nd) was $26.3 \pm 3.0^\circ\text{C}$ (Fig. 2 A & B). Maximum temperatures ranged from 27.3 to 32.6°C and observations peaked between July 20th and August 5th. Surface salinities ranged from 20.0 to 30.8 PSU. The seasonal average was 28.0 ± 1.9 PSU, and summertime average 27.7 ± 2.2 PSU (Fig. 3 A & B). Dissolved oxygen measurements ranged from 1.2 to 11.3 mg L⁻¹, with a mean concentration of 6.5 ± 1.9 mg L⁻¹, and average summertime concentration of 5.8 ± 1.6 mg L⁻¹ (Fig. 4 A & B). The NYDEC level of dissolved oxygen supportive of fisheries and other wildlife is 4.8 mg L⁻¹. The only sites that were consistently above this level were in the ferry, Polles Creek, and Ganet Creek. The only site deep enough for use of the Secchi disk was Ganet Creek, which was consistently below the NOAA minimum of 2 meters (Fig. 5).

3.2. Nitrogen Concentrations

Nitrogen is one of the necessary nutrients for algae to grow, and if there is not enough nitrogen in the water it can limit the growth of algae. Therefore, the more nutrients we add to the water, the more the algae can grow. The Peconic Estuary total nitrogen threshold is 0.4 mg L⁻¹. For comparison, total nitrogen concentrations at Great Salt Pond exceeded this threshold value throughout the sampling period and was almost 10 times the threshold at its highest concentration

of 3.68 mg N/L on August 8th (Fig. 6 A). Similarly, total nitrogen levels were consistently above the threshold in Mashomuck Creek from May to September with the highest concentration being almost 5 times that of the threshold on May 16th. Total nitrogen concentrations were also elevated in Fresh Pond where concentrations were only below the threshold in June and October. In Polles Creek, total nitrogen levels exceeded the threshold in July, August, and September and in Ganet Creek, total nitrogen levels only exceeded the threshold in August and September. Summer averages of total nitrogen exceeded the threshold at all sites except at the ferry site never reached the threshold value throughout the sampling season (Fig. 6 A & B). Great Salt Pond also had the highest average for chlorophyll *a* levels and nitrogen, which is consistent with our expectations (Fig. 6 B; Fig. 7 B).

3.3 Algae and Harmful Algae; *A. catenella*, *D. acuminata*, & *Cochlodinium*

All algae contain the pigment chlorophyll *a* and is used as a proxy for total phytoplankton biomass. Moderate levels of algae support productive fisheries and ecosystems, but excessive algal growth can lead to a series of negative ecological consequences such as hypoxia and acidification. The USEPA considers 20 $\mu\text{g L}^{-1}$ of chlorophyll *a* in marine waters as eutrophic, and all sites except for Great Salt Pond were below this level on average, with mean concentrations ranging from 4.8 to 34.0 $\mu\text{g L}^{-1}$ (Fig. 7 A & B). Sites did surpass 20 $\mu\text{g chl } a \text{ L}^{-1}$ on individual dates in all sites except for at the ferry.

A. catenella is a toxic dinoflagellate that synthesizes saxitoxin, which leads to the syndrome of PSP, and can cause illness or death in individuals consuming shellfish containing these toxins (Anderson 1997). PSP has been occurring annually in New York waters since it first appeared in 2006. Although concentrations of *Alexandrium*, remained well below 1000 cells L^{-1} at most sites, Polles Creek came near the bloom threshold at 910 cells/L on 5/16/23 (Fig. 8 A).

Dinoflagellates of the genus *Dinophysis* can cause DSP, a globally significant human health syndrome (Reguera et al., 2012). *Dinophysis* spp. synthesizes okadaic acid (OA) and dinophysistoxins (DTXs), the causative toxins of DSP. *Dinophysis* spp. blooms exceeding 10,000 cells L^{-1} have the potential to contaminate shellfish, and although cells have been detected, concentrations remained well below this level in 2023 (Fig. 8 B).

C. polykrikoides is an ichthyotoxic dinoflagellate that has caused fish mortality across the globe including some sites on eastern Long Island (Kudela and Gobler, 2012). *C. polykrikoides* blooms in excess of 300 cells mL⁻¹ have been known to cause mortality in larval fish, which use these estuarine systems as nurseries, and in shellfish (Tang and Gobler 2009). Maximum *C. polykrikoides* cell densities surpassed 300 cells mL⁻¹ in Fresh Pond (315 cells mL⁻¹) on September 19th (Fig. 8 C).

3.4. Fecal Coliform

The average concentration of fecal coliform bacteria across all marine sites was 462 colony forming units (CFU) 100 mL⁻¹, ranging from 0 to 4839 CFU 100 mL⁻¹ (Fig. 9 & 10 A). The shell fishing standard for fecal coliform bacteria set by the US FDA National Shellfish Sanitation Program (NSSP) and followed by the NYSDEC are mean values below 14 CFU 100 mL⁻¹, with 90% of individual values below 49 CFU 100 mL⁻¹. All sites except for the ferry were above the mean value limit overall, but not for the summer mean. Fecal coliform concentrations that peaked on 6/29, 7/17, 8/8, 8/19, 9/19 all coincided with rainfall in the days leading to/of sampling (Weather Underground, 2023). The only days where all sites exceeded the NYSDEC limit were 7/13, 9/6, and 9/19. Mashomuck Creek was the first site to exceed the recommended levels on 5/16, while all the other sites began to exceed recommended levels 2 weeks later. Mashomuck Creek was also one of the few sites still over the recommended levels in October, as well as Ganet Creek and Great Salt Pond. From June to September, Mashomuck Creek, Ganet Creek, Great Salt Pond, Polles Creek, and Fresh Pond were all over the recommended levels with few exceptions. On 8/8, Fresh Pond dipped below the recommended levels. The site of the Ferry only exceeded the limit on 7/13, 9/6, and 9/19.

3.5. Enterococcus Bacteria

Mean concentration across all sites was 263 CFU 100 mL⁻¹, ranging from 21 to 1,630 CFU 100 mL⁻¹, far more than the NYSDOH bathing standard of <104 CFU 100 mL⁻¹ (Fig. 9 B). Averages were over this threshold in Mashomuck Creek and Great Salt Pond. Values were over the safe bathing standard from June through October for Mashomuck Creek, and a maximum in excess of 4,800 CFU 100 mL⁻¹, was reached on July 27th in Great Salt Pond (Fig. 9 B). The ferry

only exceeded the NYSDOH level on 7/27, while Great Salt Pond exceeded this level on 6/1, 7/27, 8/8, 9/6, and 9/19. Like the fecal coliform levels, many of these dates coincide with rainfall. Fresh Pond, Ganet Creek, and Polles Creek never surpassed the NYSDOH standard levels.

4. Conclusions

Management of pathogens in surface waters of North Haven is warranted. For most samples in and around North Haven, fecal coliform bacteria levels exceeded the NYSDEC standard for shellfishing (14 CFU per 100 mL), in 2023. Similarly, for most samples taken in North Haven, Enterococcus levels exceeded the NYSDOH swimming standard (104 CFU per 100 mL). Yet, North Haven's beaches remain open as a bathing beach locale. At the North Haven marine sites, fecal coliform levels were above the NYSDEC shellfishing standard for more than half of the samples, while Enterococcus levels exceeded the NYSDOH swimming standard in around half of samples.

In 2016, Suffolk County adopted Article 19 of the sanitary code which permitted the use of innovative and alternative septic systems. Such systems must reduce total nitrogen levels in septic effluent to less than 19 mg L⁻¹ and, to date, five such commercially available systems have been approved for use. Additional systems are in the piloting stage of approval, making the array of choices even larger in the future. For example, the NYS Center for Clean Water Technology at Stony Brook University is piloting Nitrogen Removing Biofilters as onsite septic systems which have been achieving septic effluent of < 10 mg L⁻¹ as well as >90% removal of drugs, pharmaceuticals, personal care products, and other organic contaminants. Presently, Suffolk County, the Town of East Hampton Town and the Town of Southampton all have grants available to homeowners to install any of the Article 19-approved low nitrogen septic systems. The cost of a simple installation of the low nitrogen systems is presently ~\$25,000, but much more for a complex site. The sum of grants available is often more than the cost of the full installation of the systems, meaning that, in many cases, they can be installed for free. In some cases, however, installation can become more expensive if, for example, major infrastructure or landscaping must be moved or replaced during the installation process.

Beyond the upgrading of septic systems, there are likely opportunities to connect parts of North Haven to the existing sewage treatment plant. The plant is currently discharging very low levels of N to surface waters, on average $< 5 \text{ mg L}^{-1}$, which is better than any approved onsite septic system. For regions near the sewage treatment plant, it may be cost effective to hook up homes and facilities to the existing plant. This must be fully investigated, however, as for some parts of Long Island such costs can exceed \$50,000 per home and the installation of sewage lines can be disruptive to neighborhoods. Once connected, the installation would create a maintenance-free solution for homeowners although the connection to the sewage treatment plant will represent an additional utility fee. For onsite systems, Suffolk County requires homeowners to purchase operation and maintenance contracts with certified companies who will inspect systems one-to-two times per year to assure systems are functioning properly.

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6. Figures & Tables

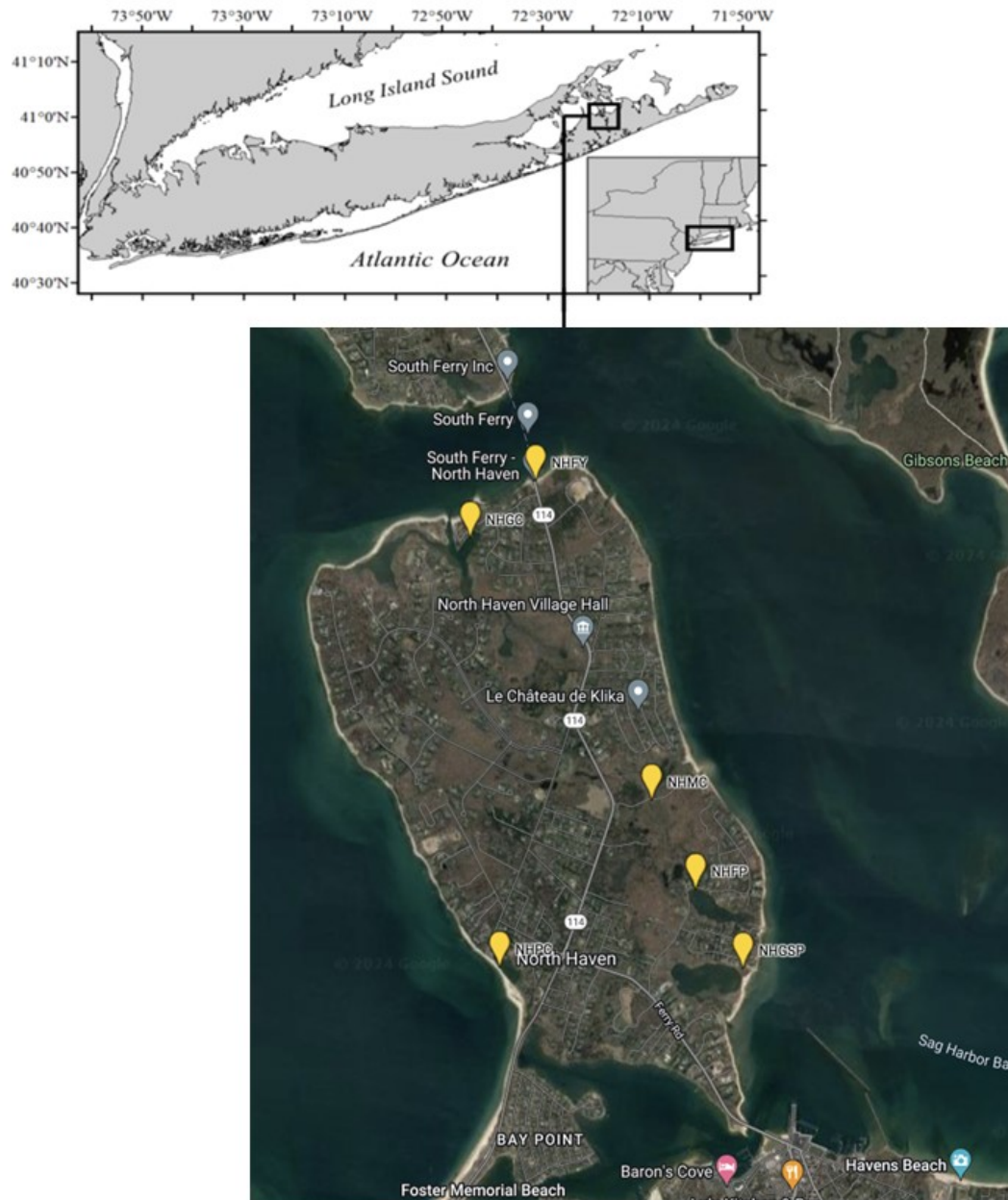


Figure 1. Map of North Haven sample sites during 2023 (indicated with yellow map pins). “NHPC” is Polles Creek, “NHGC” is Ganet Creek, “NHFY” is Ferry, “NHMC” is Mashomuck Creek, “NHFP” is Fresh Pond, and “NHGSP” is Great Salt Pond.

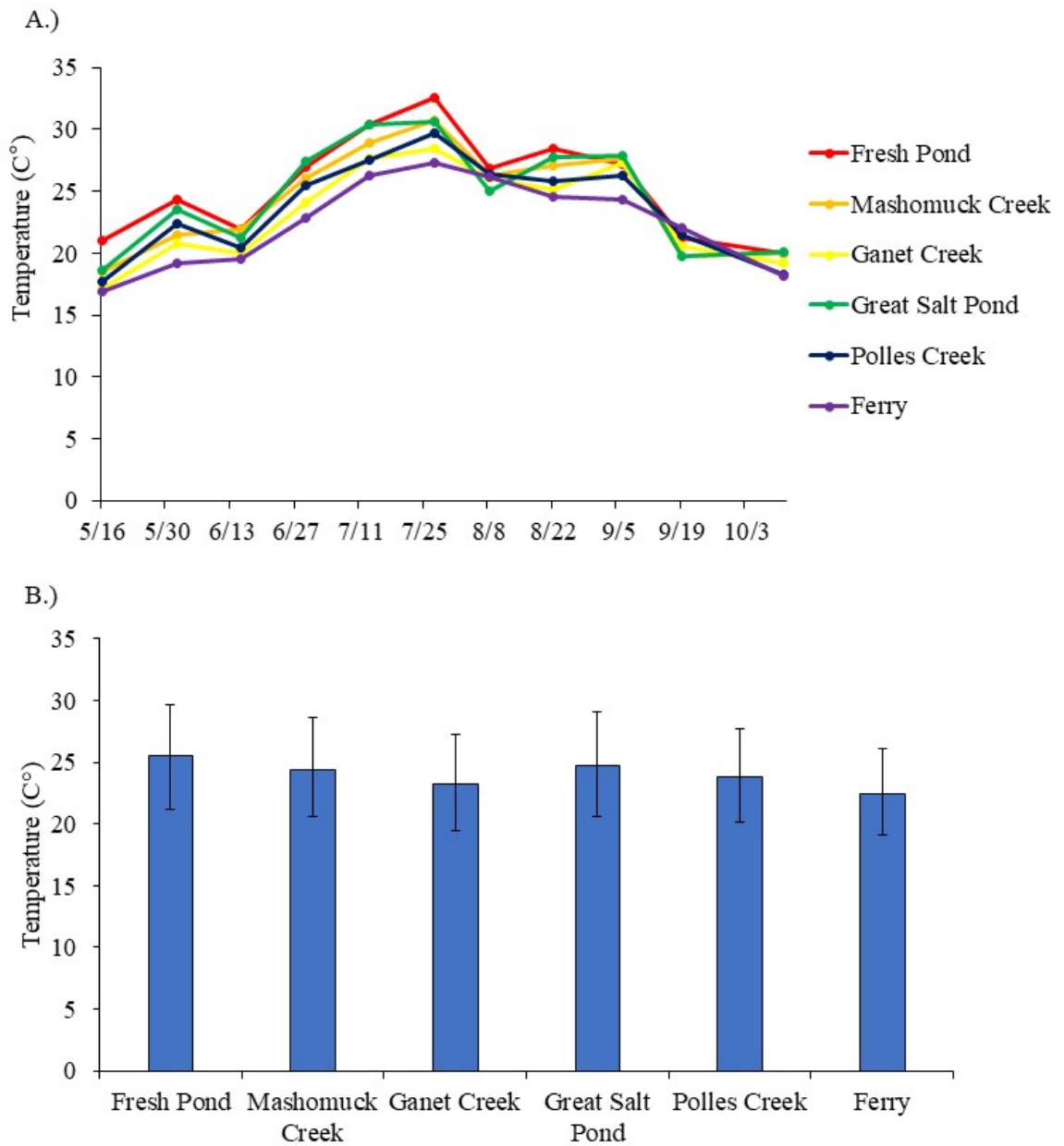


Figure 2. Temperature levels shown in a time series (A) and averages of sites in a bar graph (B) of North Haven in 2023. Standard deviation bars show 1 standard deviation specific to each site.

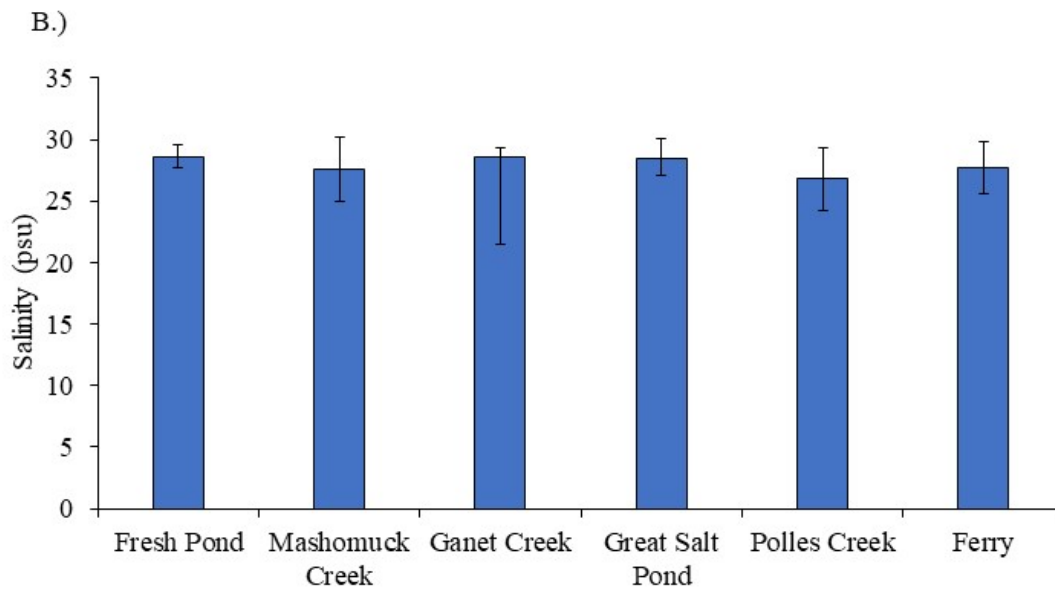
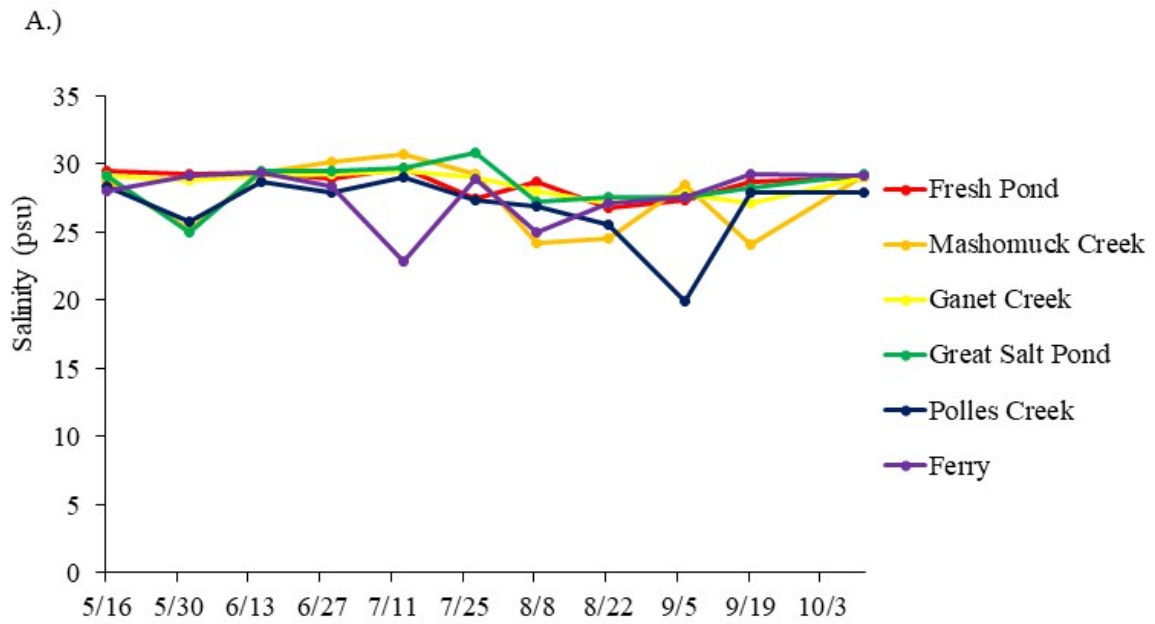


Figure 3. Salinity levels shown in a time series (A) and averages of sites in a bar graph (B) of North Haven in 2023. Standard deviation bars show 1 standard deviation specific to each site.

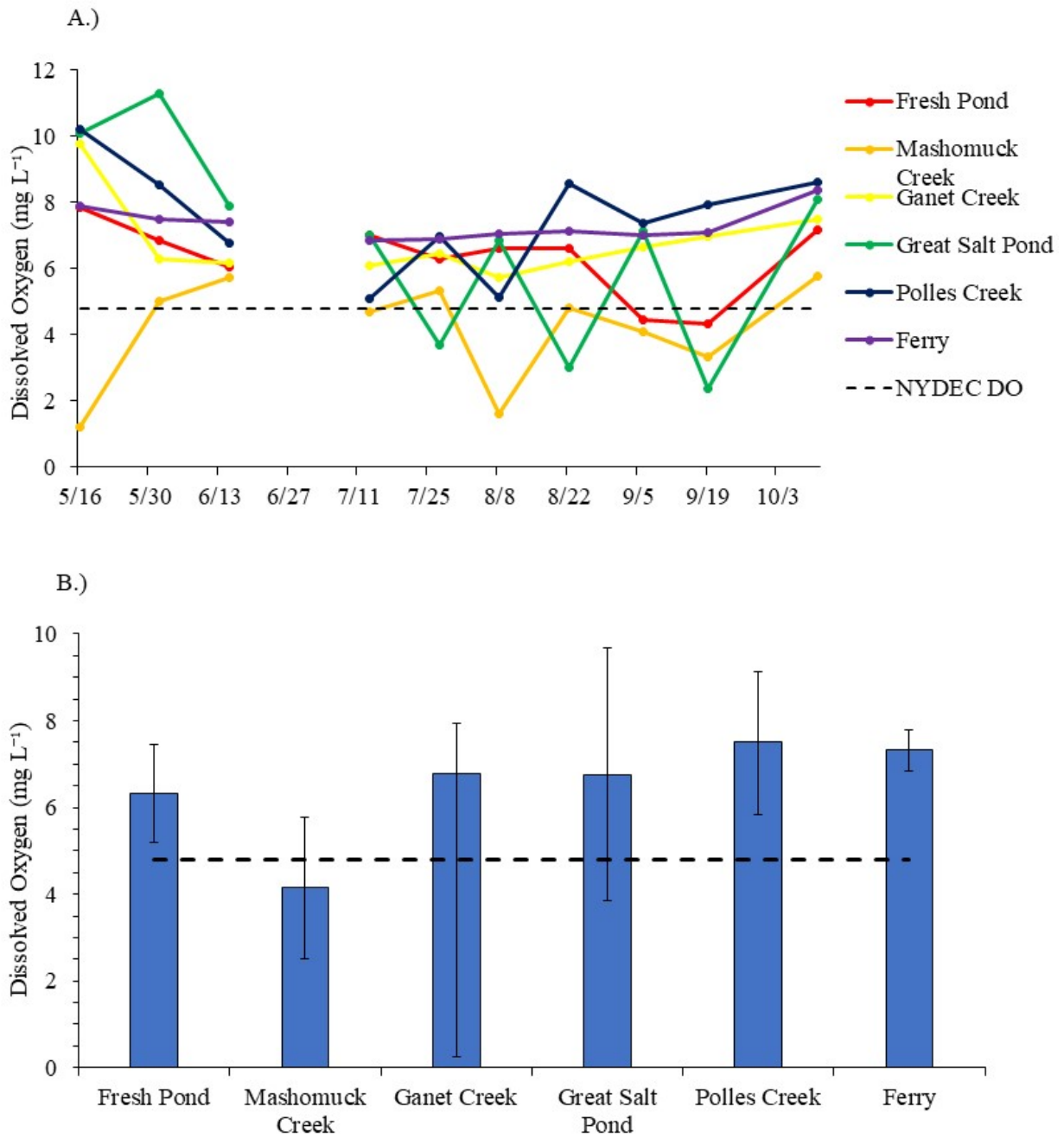


Figure 4. Dissolved Oxygen measurements in a time series (A) and averages taken across sites (B) in North Haven 2023. (Data was unable to be collected for dates between June 13th and July 11th). The NYDEC dissolved oxygen recommendation of 4.8 mg L⁻¹ indicated by the dotted line. Standard deviation bars show 1 standard deviation specific to each site.

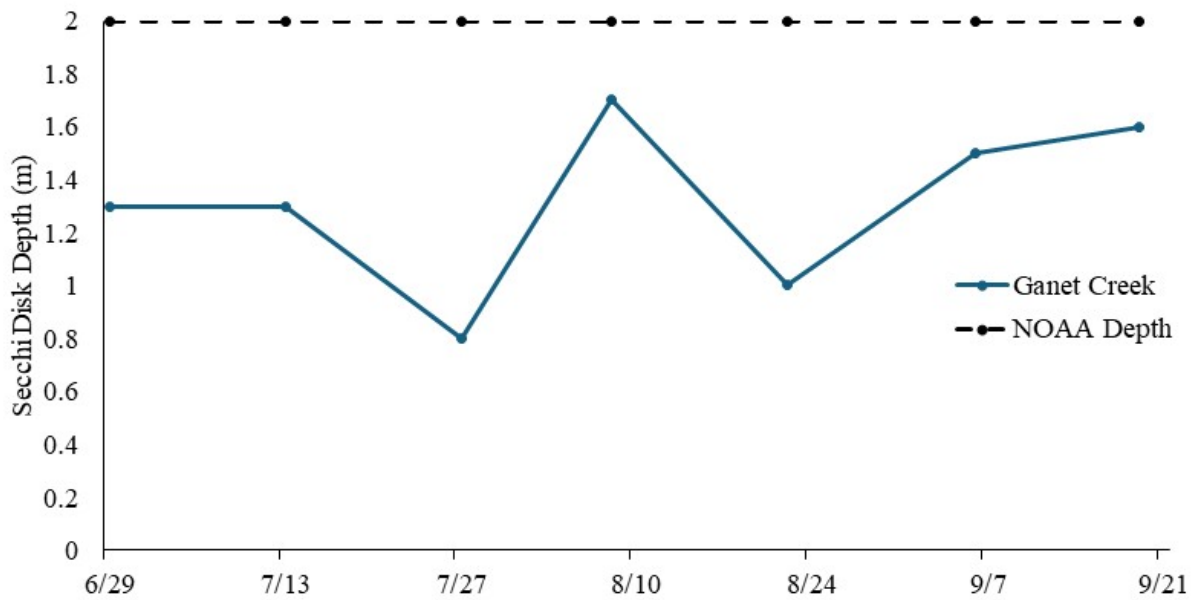


Figure 5. Secchi disk depths (m) across Ganet Creek in North Haven during 2023. Dotted line represents the Secchi disk depth standard of 2.0 meters; Secchi disk depth standard set by NOAA. *All other sampling locations (i.e. Fresh Pond, Mashomuck Creek, Polles Creek, Great Salt Pond, Ferry) had Secchi disk depths consistent at level of the 0.5 meters (not shown in this figure).*

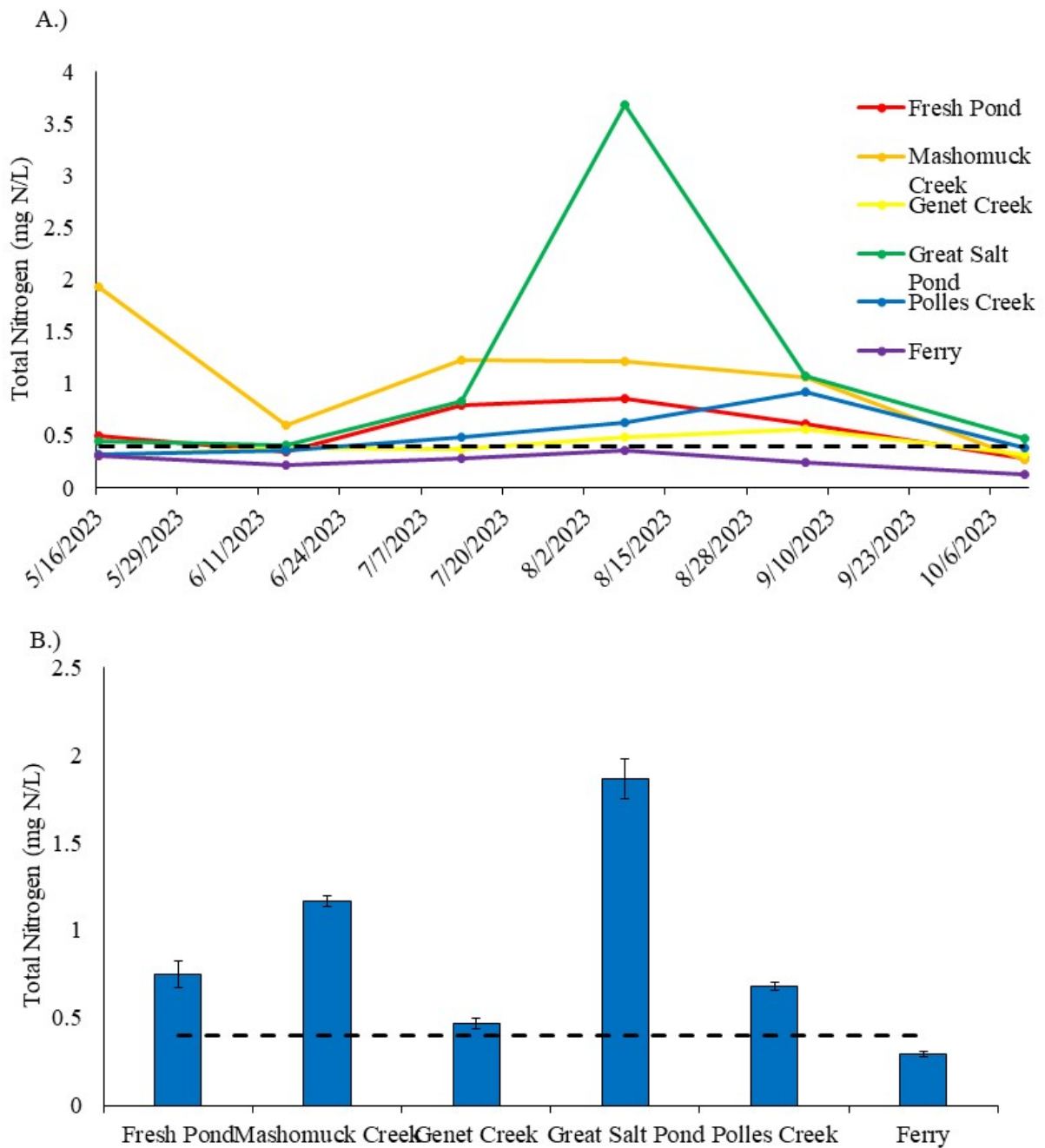


Figure 6. A.) Time-series, and B.) Summer average of total nitrogen levels (mg N/L) at North Haven marine sites during 2023. Columns represent averages \pm standard deviation. The USEPA recommends levels of total nitrogen be under 0.4 mg L^{-1} , indicated by the dotted line.

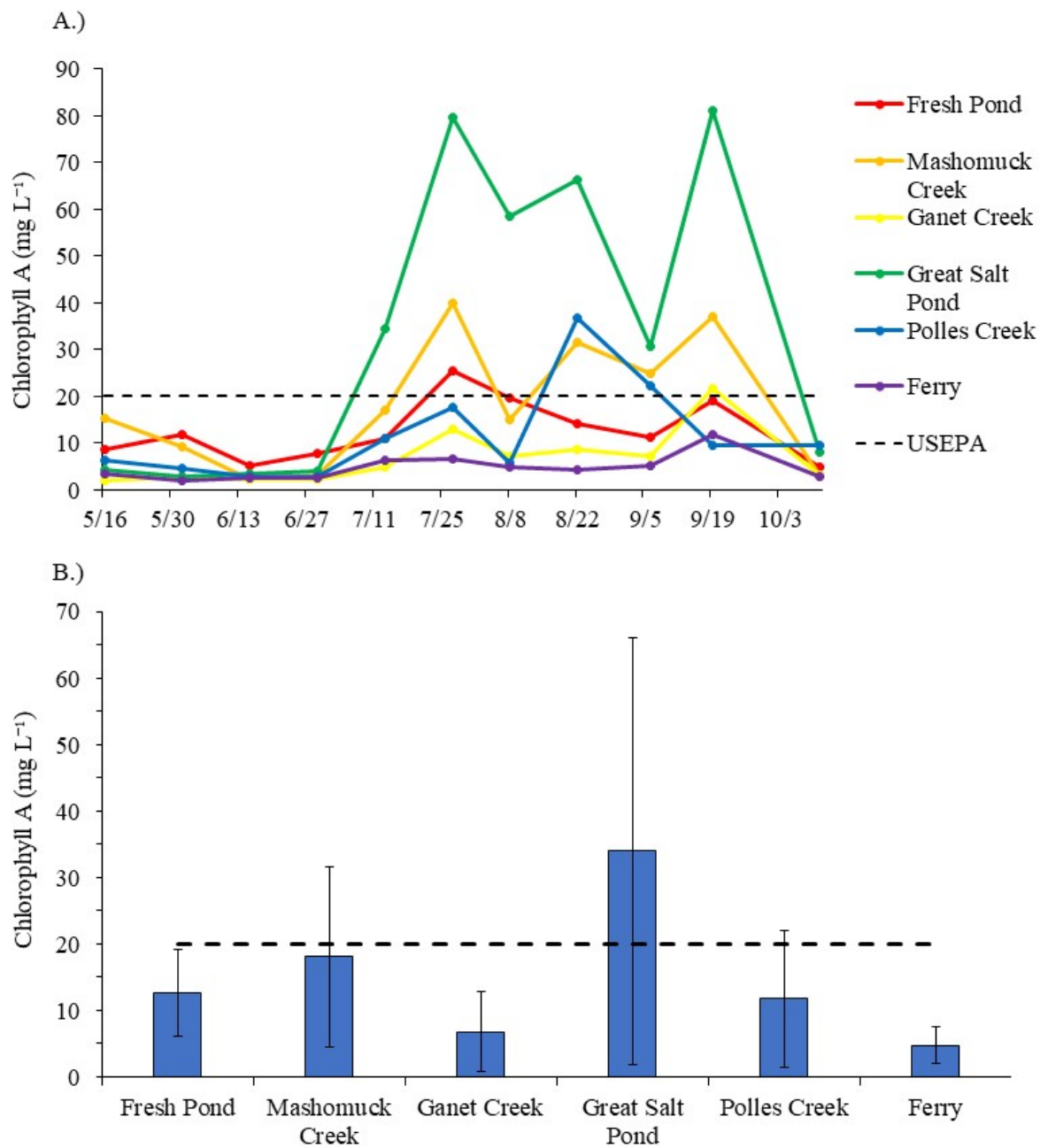


Figure 7. Chlorophyll-a levels measured in a time series (A) and averaged by site in a bar graph (B) in North Haven 2023. The USEPA recommends levels of chlorophyll a be under 20 mg L⁻¹, indicated by the dotted line.

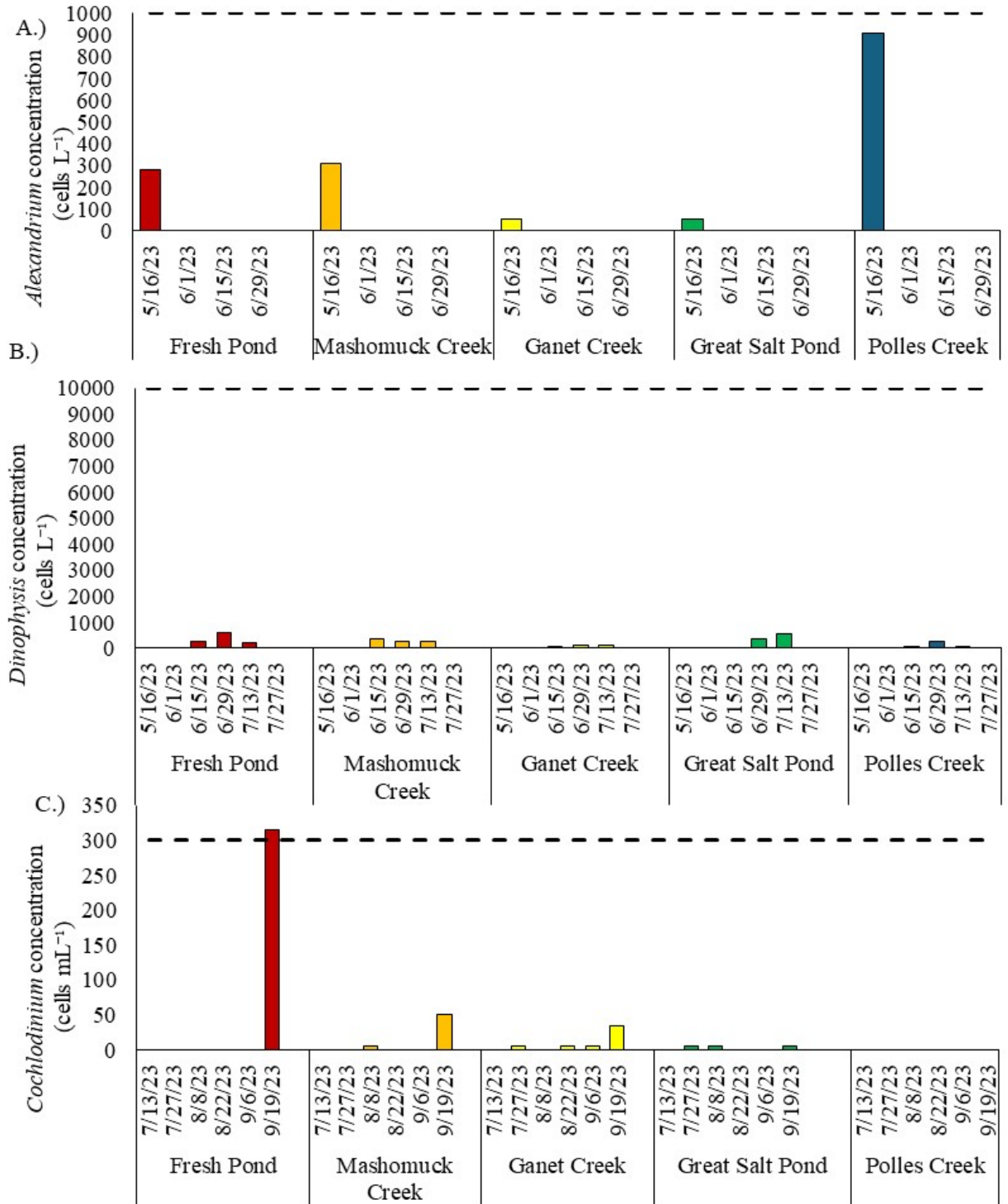


Figure 8. Concentrations of A.) *Alexandrium* (cells L⁻¹) B.) *Dinophysis* (cells L⁻¹) and C.) *Cochlodinium* (cells mL⁻¹) across marine sites in North Haven during 2023. The dashed lines represent respective bloom thresholds: 1000 cells mL⁻¹ for *Alexandrium*, 10,000 cells cells L⁻¹ for *Dinophysis*, and 300 cells mL⁻¹ for *Cochlodinium*.

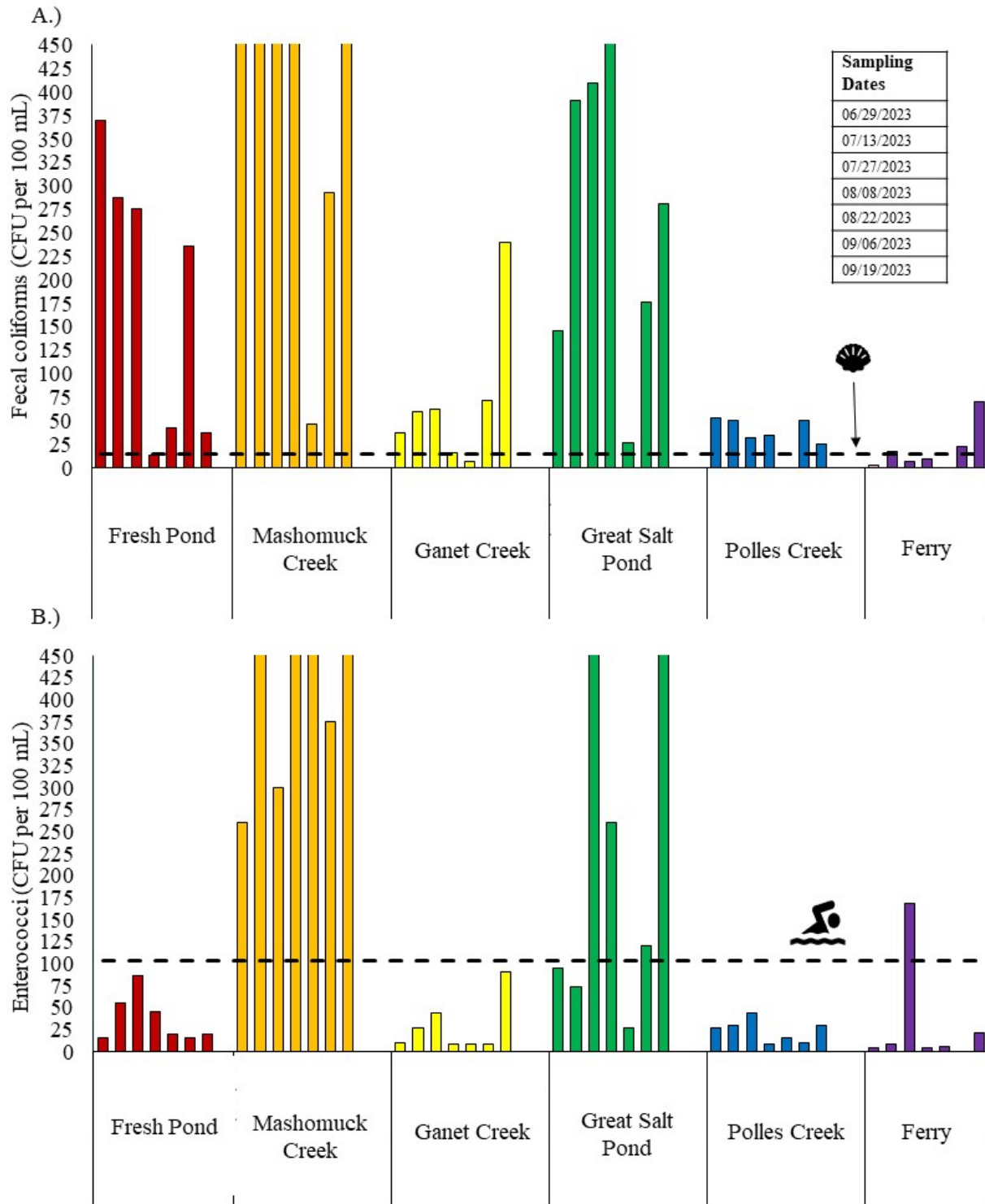


Figure 9. Time-series of A.) fecal coliform and B.) enterococci concentrations (CFU per 100 mL) across marine sites in North Haven in Summer 2023.

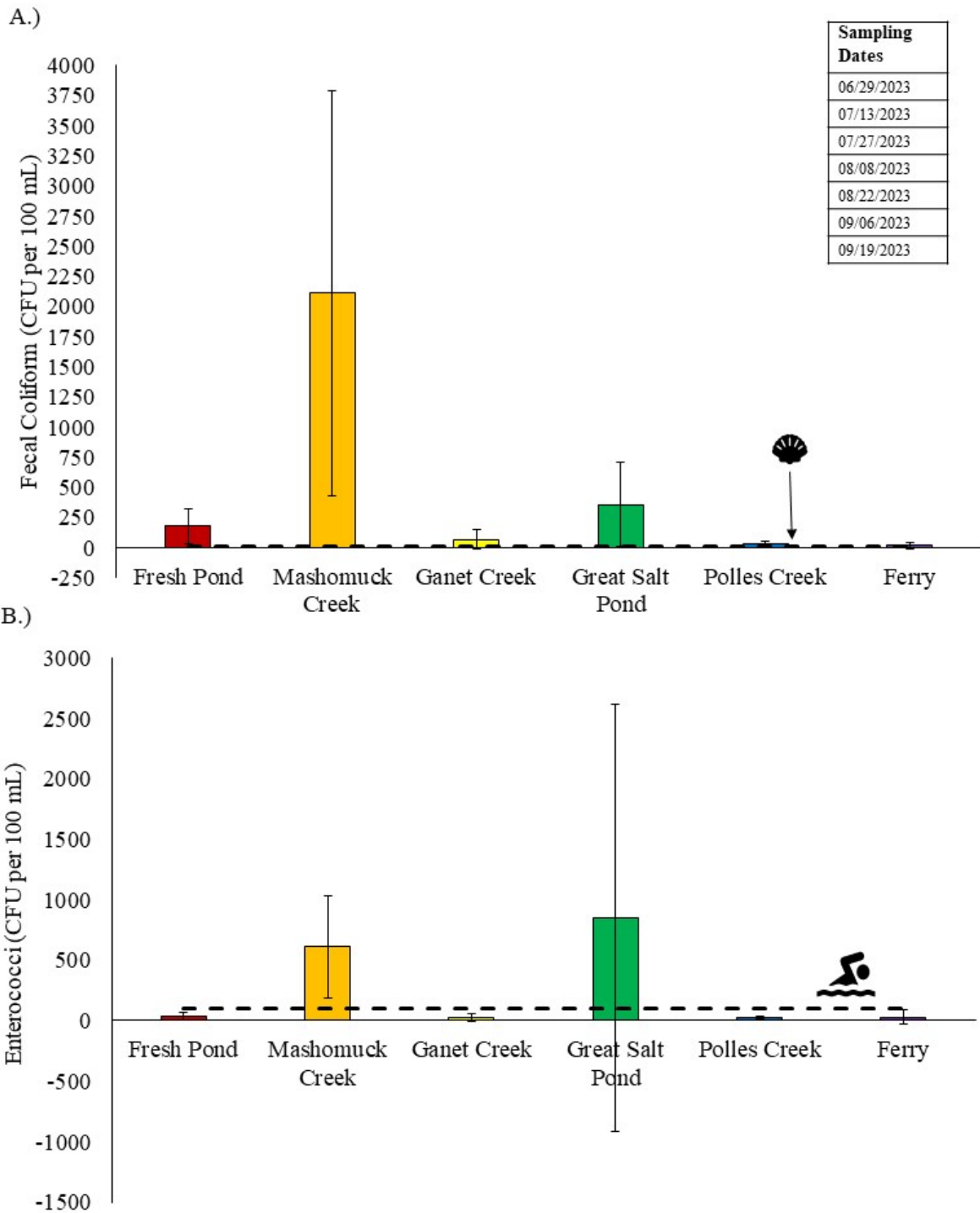


Figure 10. Total averages of A.) fecal coliform and B.) enterococci concentrations (CFU per 100 mL) across marine sites in North Haven, from June to September 2023. Columns represent averages \pm standard deviation.

ASSESSMENT OF WATER QUALITY IN MARINE WATERS SURROUNDING SAG HARBOR VILLAGE



Christopher J. Gobler, PhD

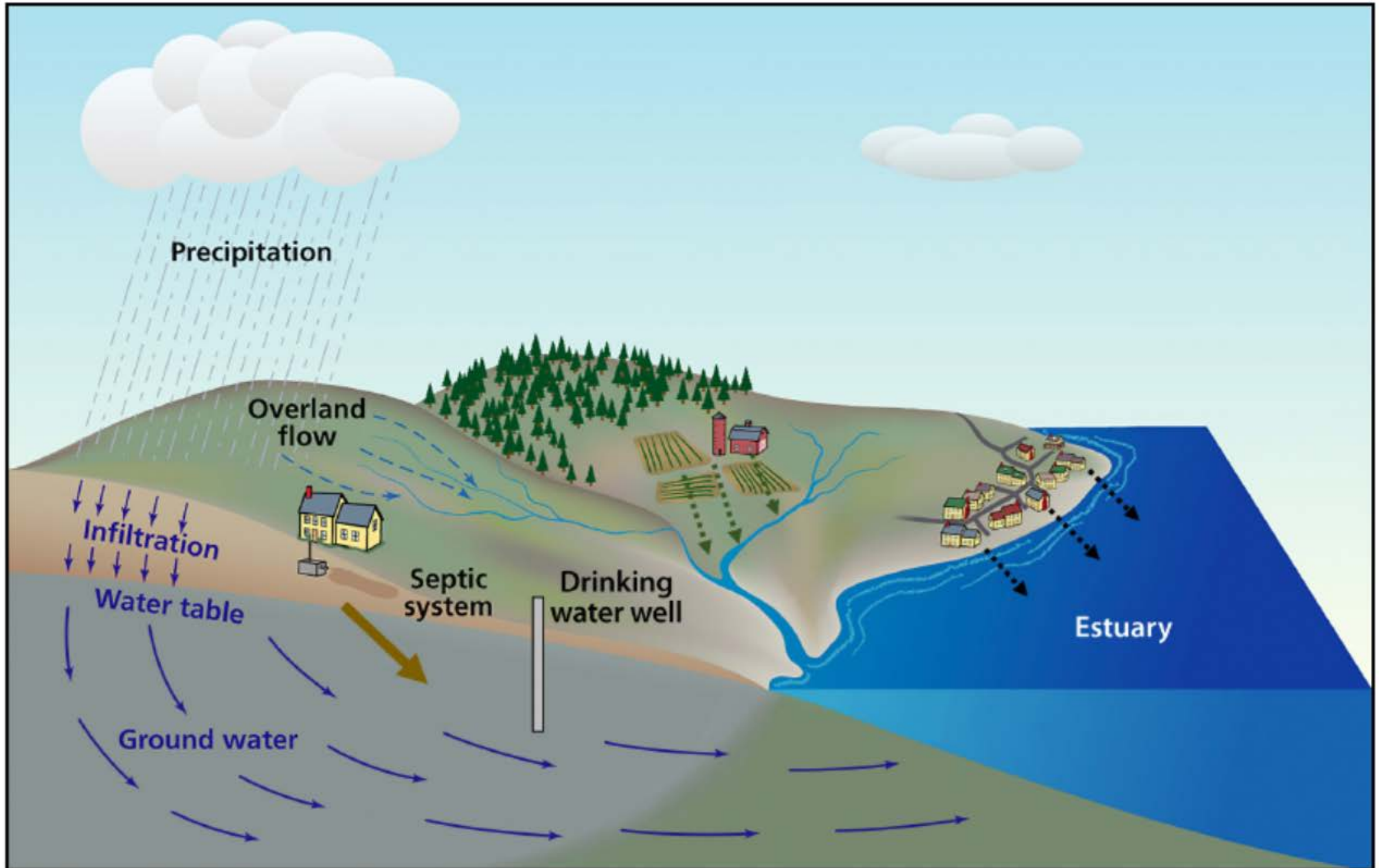
March 2024



Stony Brook University
School of Marine and
Atmospheric Sciences

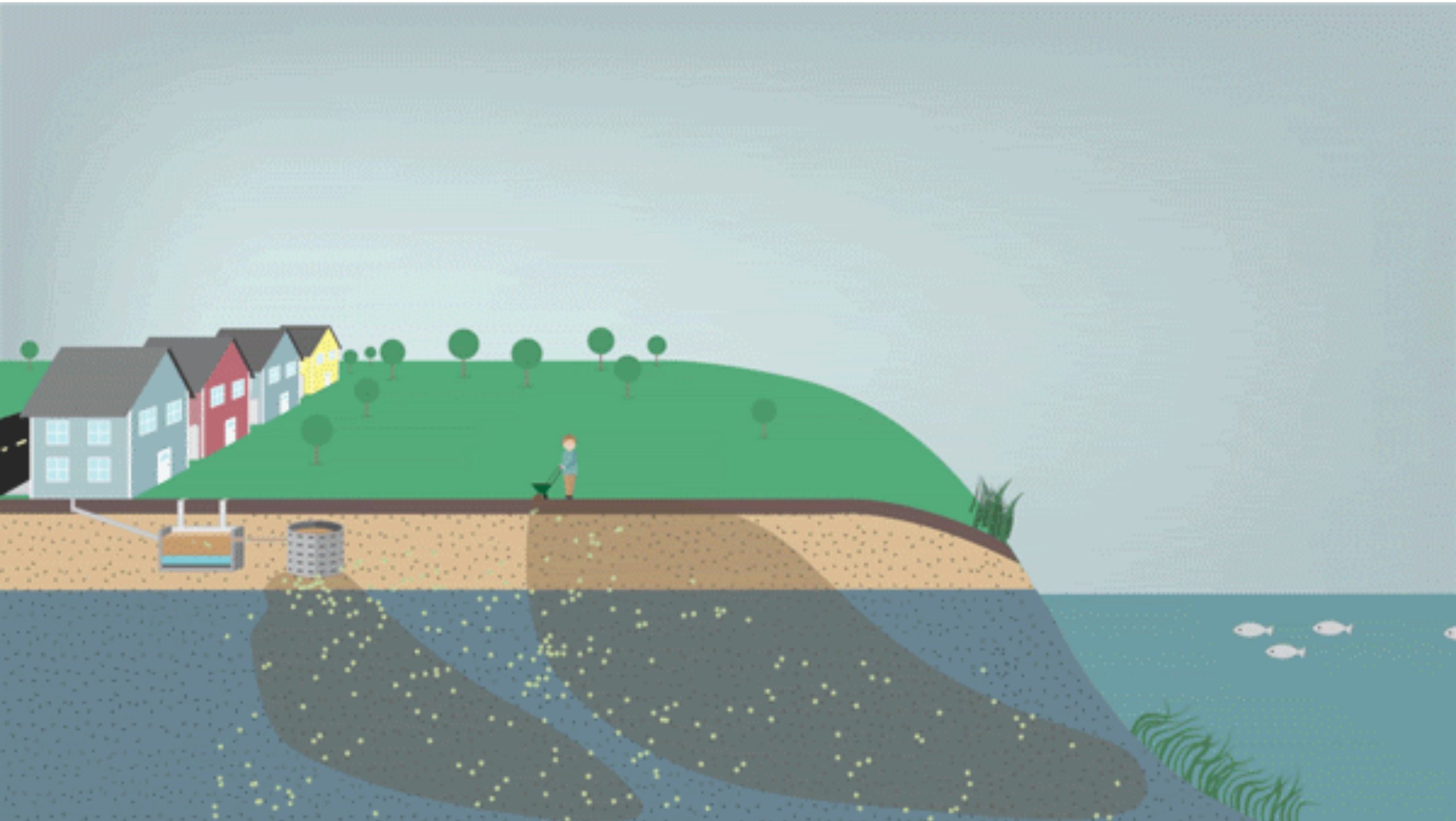
All of Long Island is a watershed -

Materials from land enter our groundwater, become our drinking water, and enter our surface waters



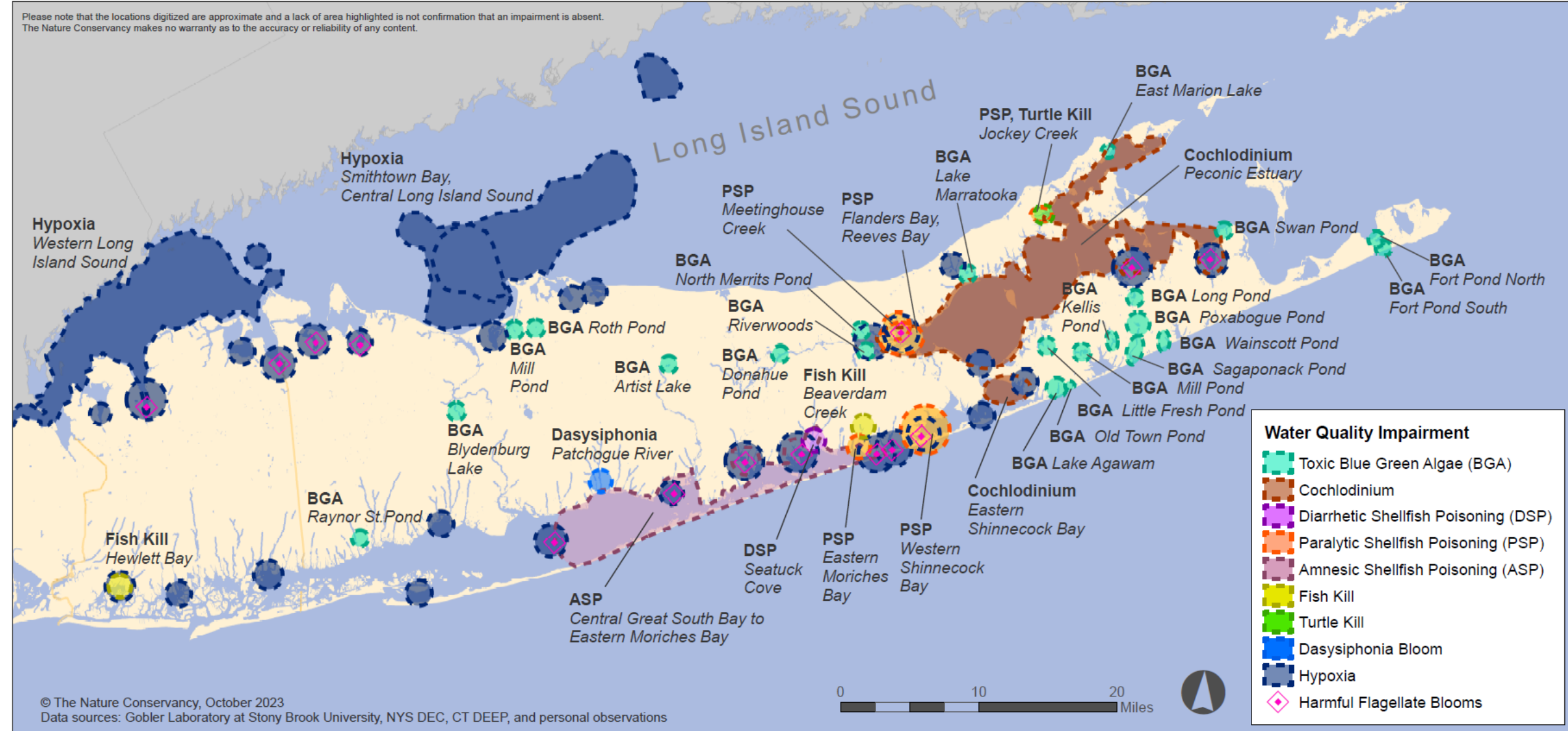
Most nitrogen loading from wastewater

((Kinney and Valiela, 2011; Lloyd 2014, 2016; Gobler and Stinette, 2016; SCSWP, 2020; NCSWP, 2020, 2022))



Long Island Water Quality Impairments Summer 2023

Please note that the locations digitized are approximate and a lack of area highlighted is not confirmation that an impairment is absent. The Nature Conservancy makes no warranty as to the accuracy or reliability of any content.

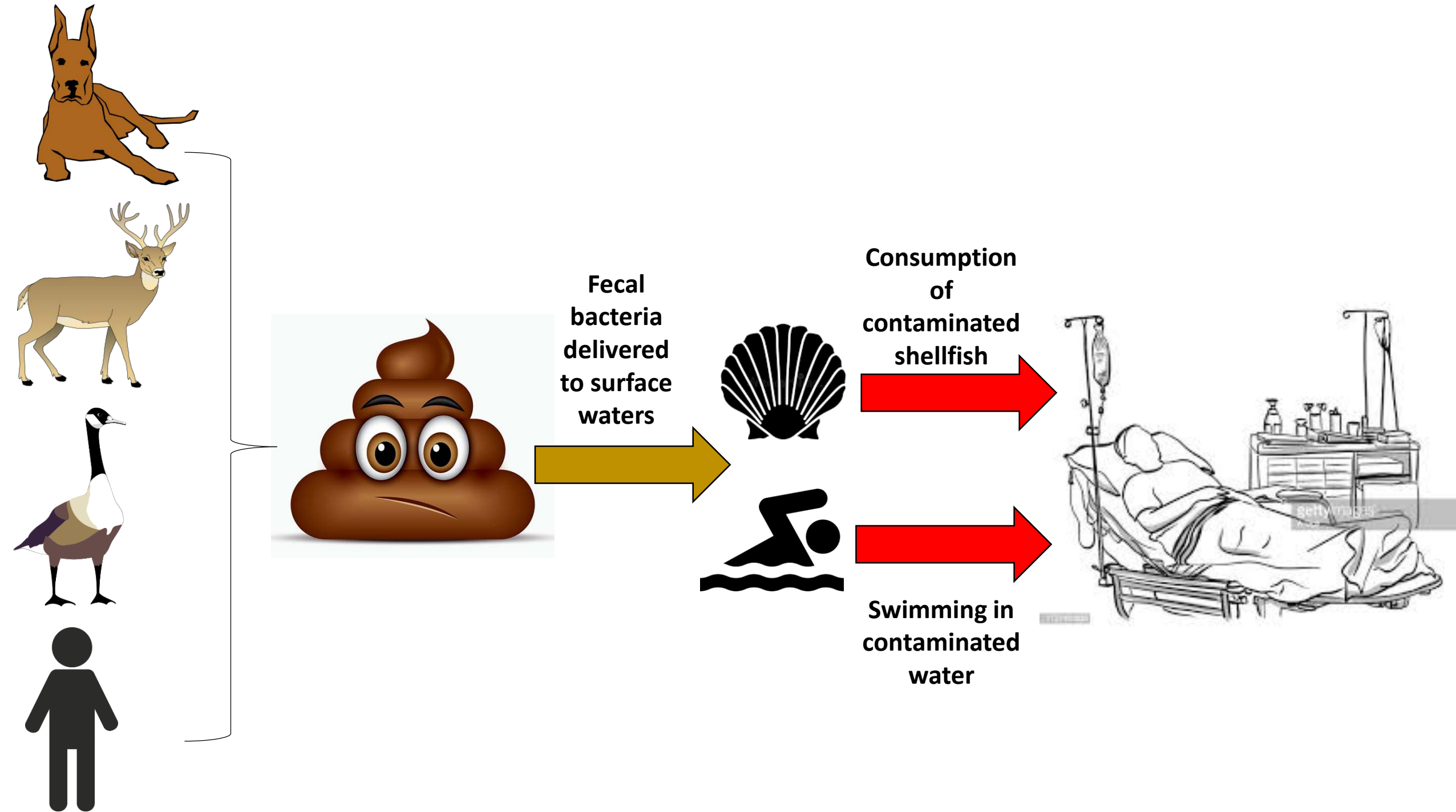


Harmful Algal Blooms (HABs)

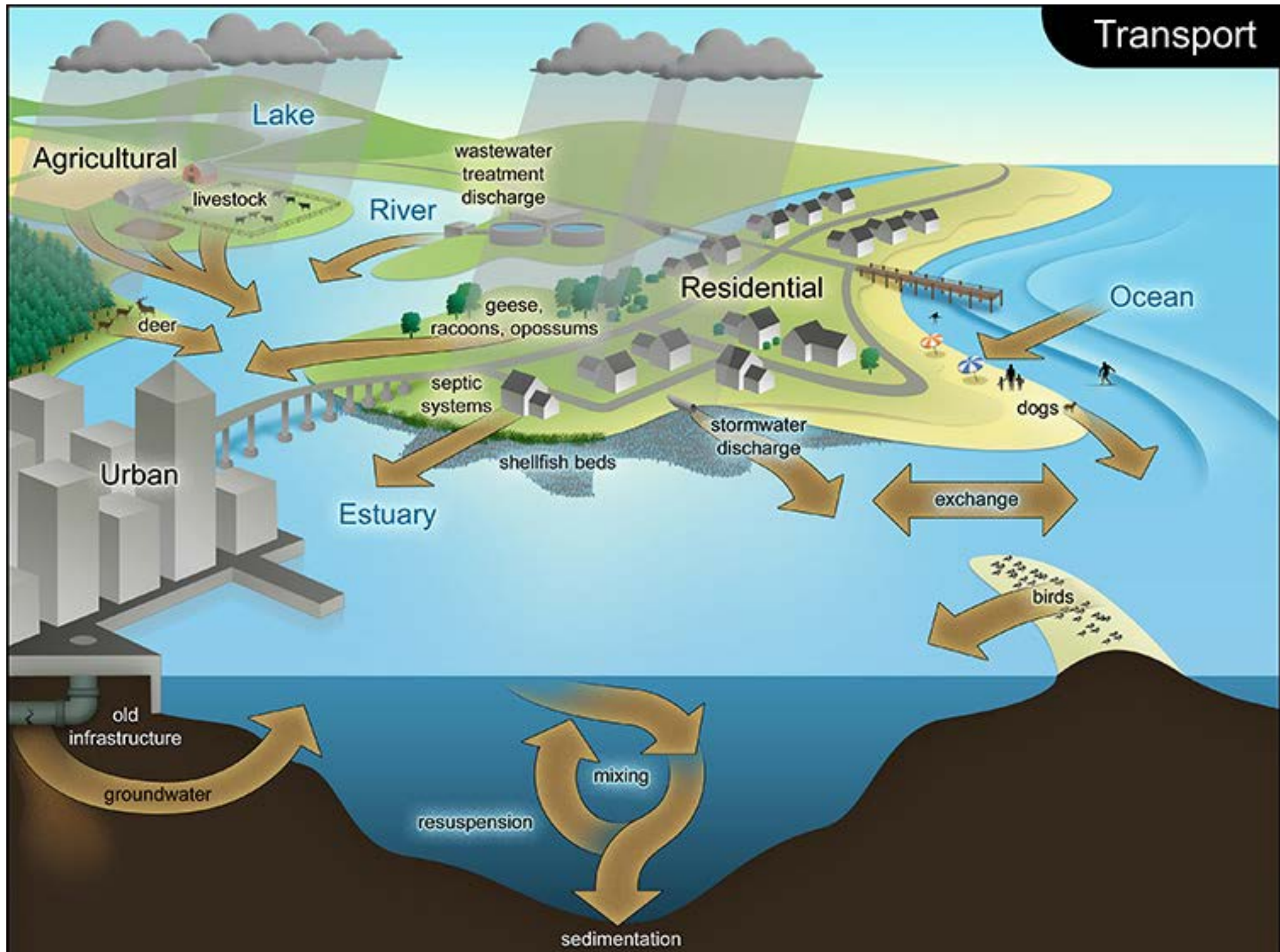
Growth of an algal species to densities which negatively impact human health or an ecosystem.



Public health threat of fecal bacteria



Sources of pathogenic bacteria



NYS standards for indicator bacteria

Indicator bacteria	What is it?	NYS standard
Fecal coliform bacteria	Any coliform bacteria that lives in animal intestines	NYSDEC, shellfish beds: Geometric mean below 14 colony forming units per 100 mL
<i>Enterococcus</i>	Single genus of fecal streptococcus bacteria found in intestines of warm-blooded animals	NYSDOH, bathing beaches: No samples >10 ⁴ colony forming units per 100 mL

Sag Harbor & Little Northwest Creek Shellfish Closures

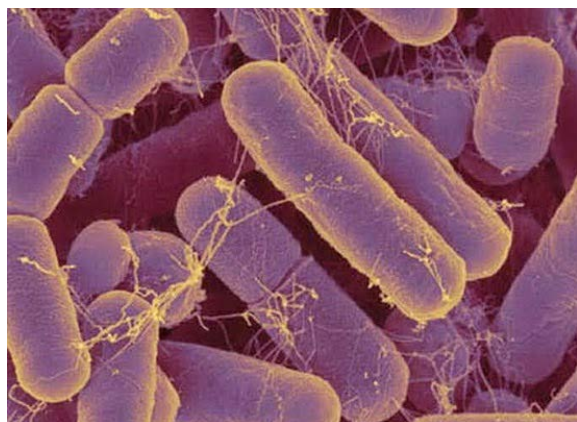
6 NYCRR Part 41.3 (b)
Paragraph 5 (i)



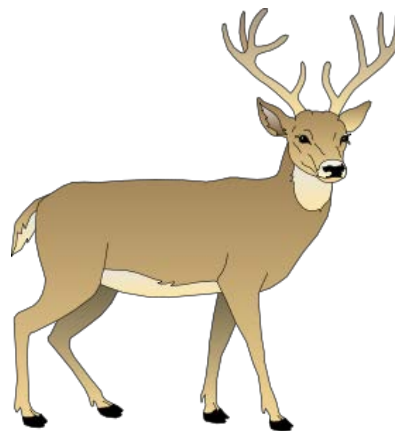
Microbial Source Tracking

- Identify the biological source of fecal bacteria in a watershed
- Provides basis for management strategies and efficient resource allocation

Fecal Bacteria:
Bacteroides



Target Host Organisms:



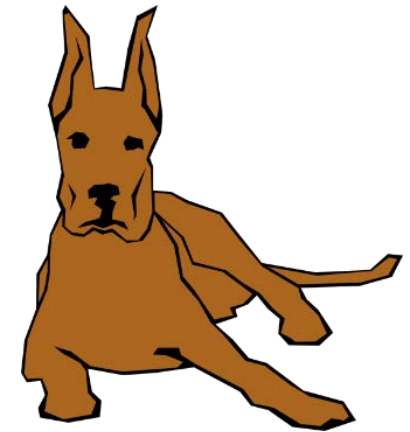
Ruminant



Birds



Human



Dog

Genetic Markers:

Bacterial DNA



AGCACTCTAGGGAGACTGCCTTCGTAAGGAGGAGGAAGGTGAGGACGACGTCAAGTCATCA

Fluorescent Probe



Dye

TTCCTCCTCCTTCCACTCCTGCT

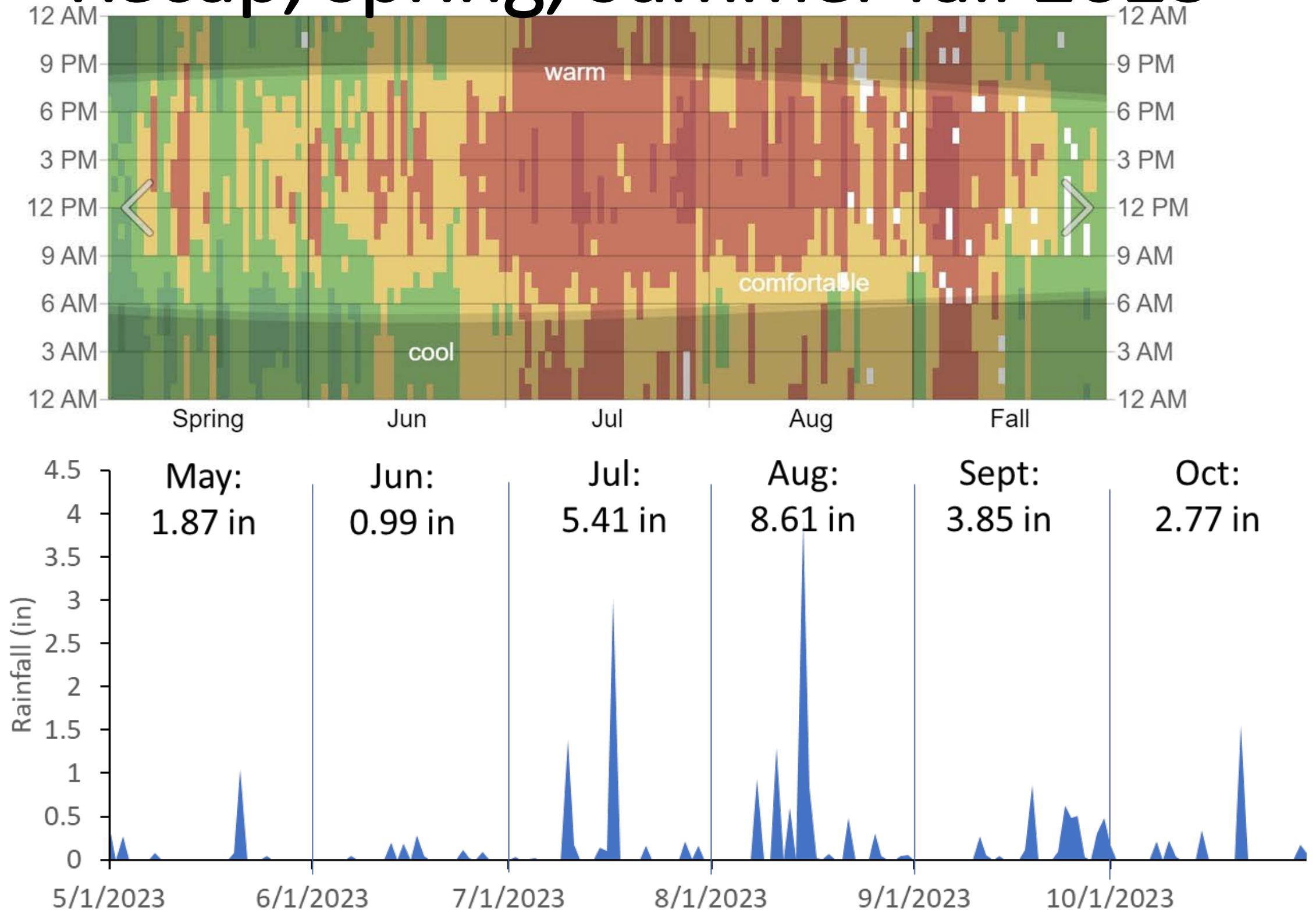
Water quality impairments 2018-2022

- Multiple marine water quality impairments were observed (nitrogen, dissolved oxygen, water clarity, algal blooms, fecal bacteria).
- Nitrogen was the nutrient promoting algal growth and, in turn, rust tides, low water clarity, and low oxygen.
- Wastewater from on-site septic systems was the primary source of nitrogen to Sag Harbor and Sag Harbor Cove.
- Human waste was the primary source of fecal bacteria to the inner Harbor, whereas dogs, small mammals, and birds contributed to fecal bacteria near Haven's Beach.

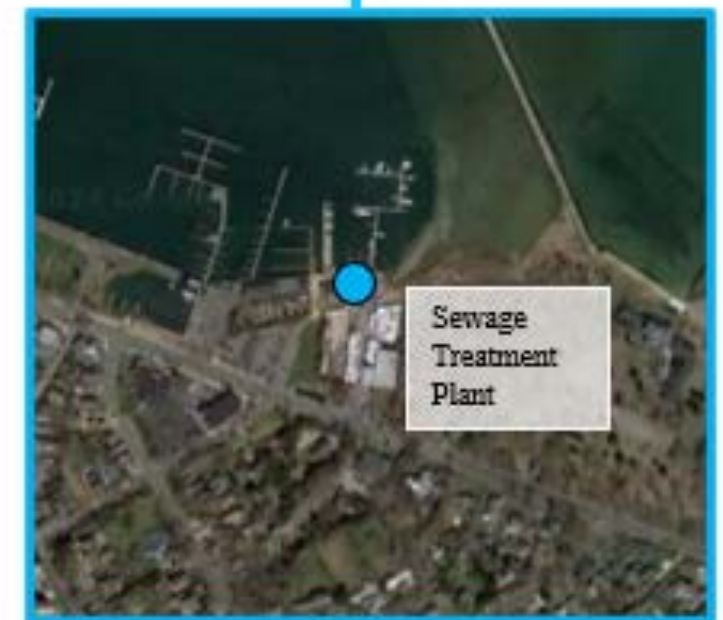
2023 study of Sag Harbor

- Focus on Haven's Beach: is the beach being contaminated by the sump? Is the bathing beach meeting state health standards?
- Focus on Windmill Beach: Is the bathing beach meeting state health standards? What is contributing to contamination?
- General marine water quality in Sag Harbor and Sag Harbor Cove
- Mapping of marine water quality

Recap, spring, summer fall 2023



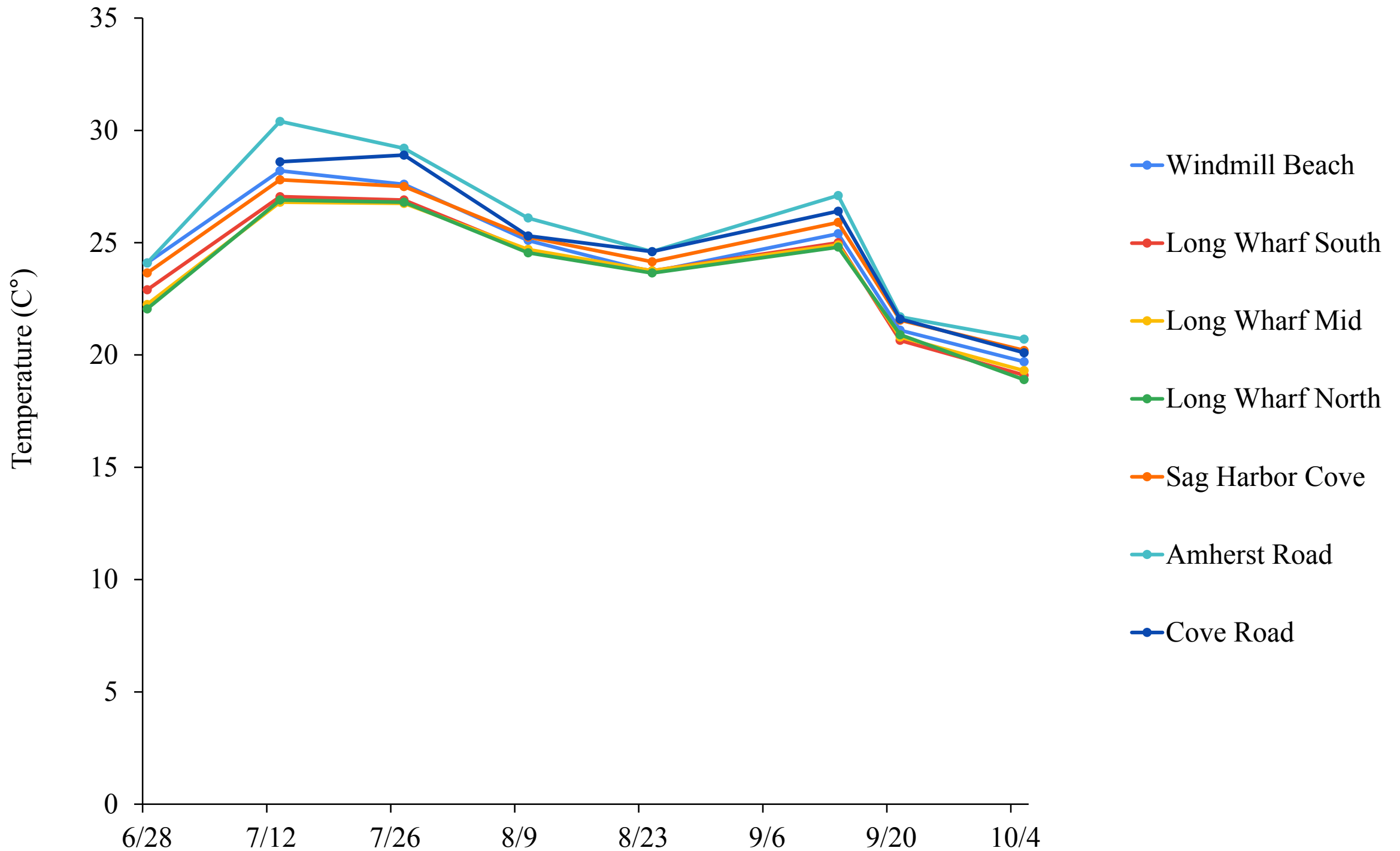
Study sites



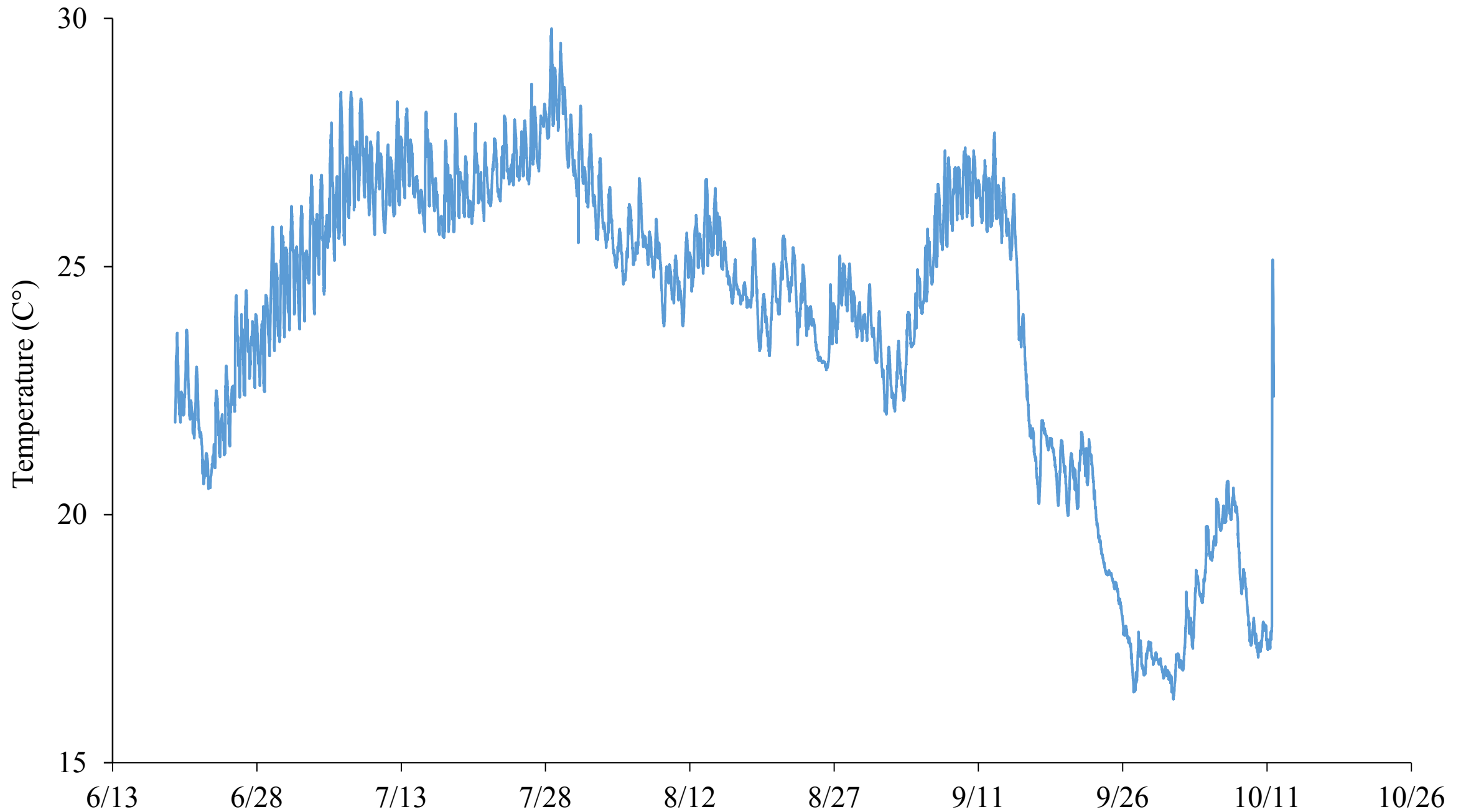
Sag Harbor and Cove



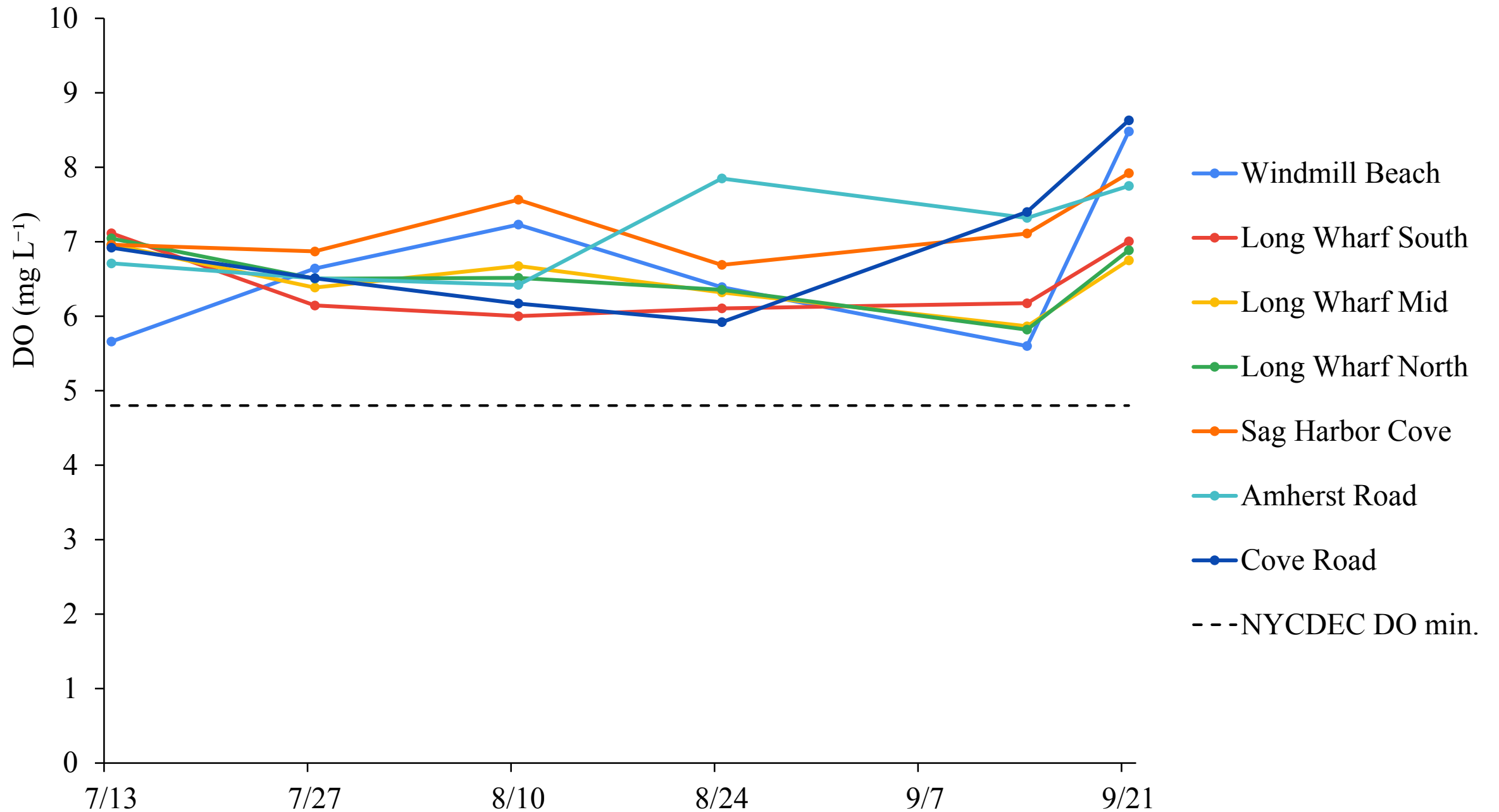
Surface water temperatures



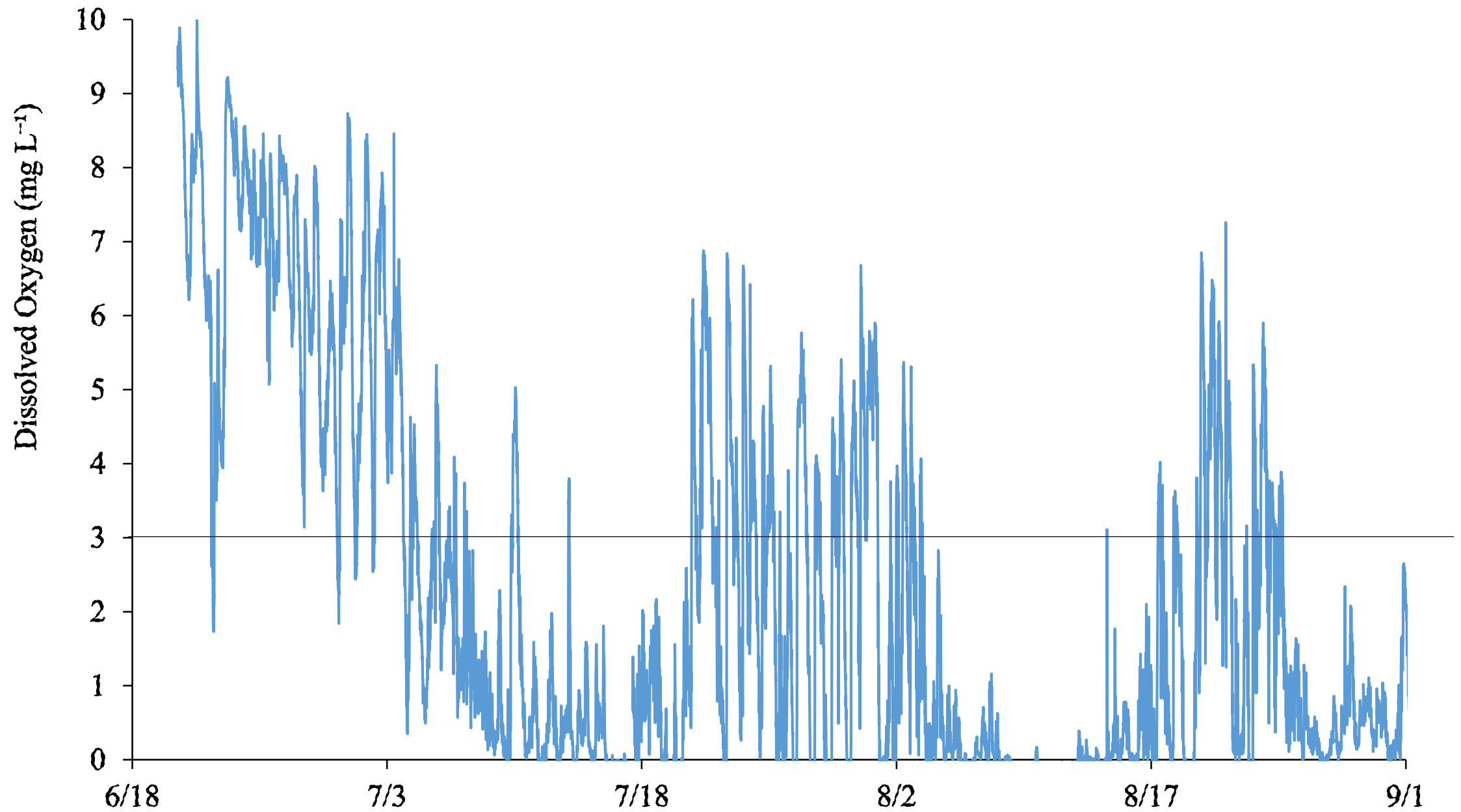
Surface water temperatures, Sag Harbor Cove



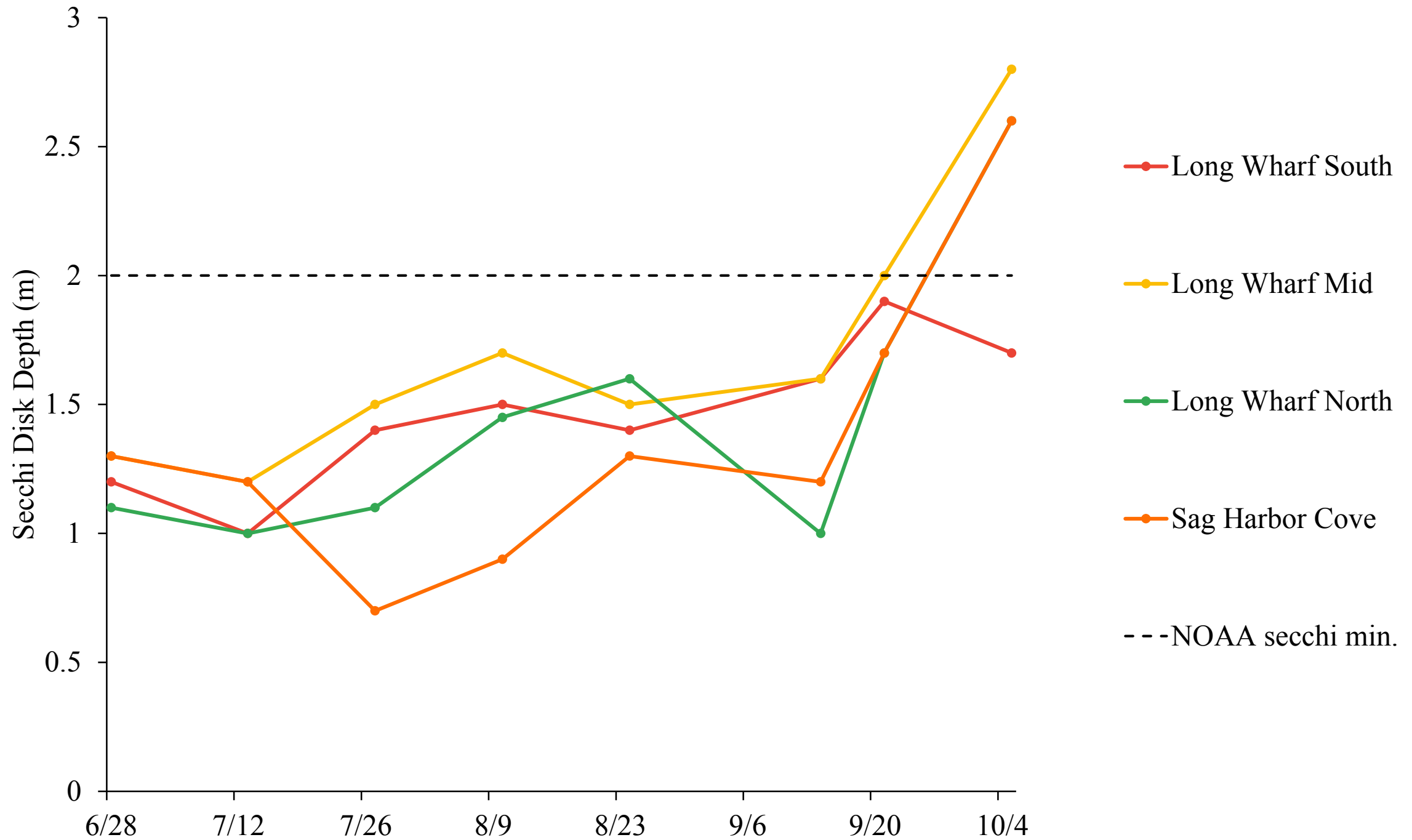
Dissolved oxygen levels



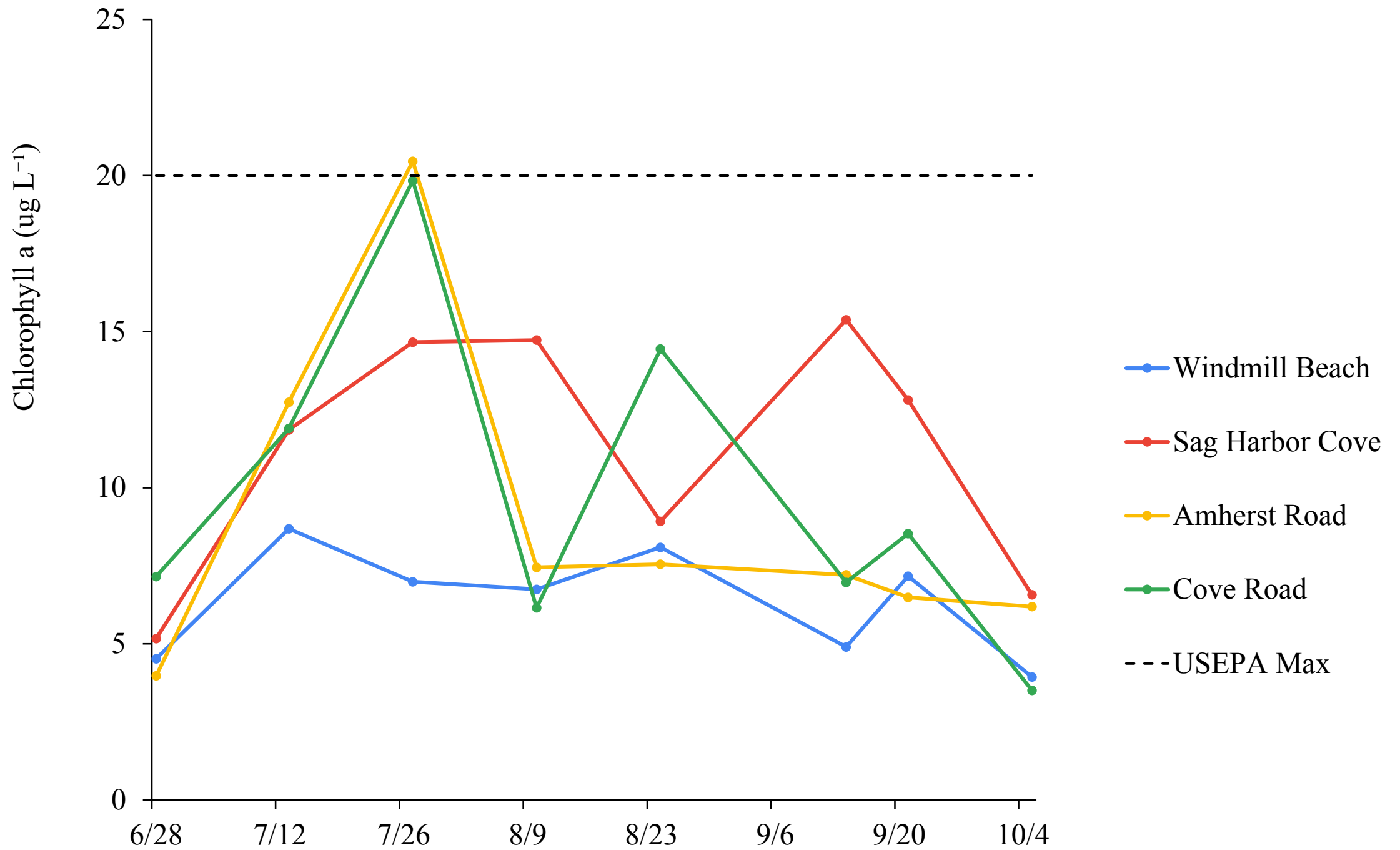
Dissolved oxygen, Sag Harbor Cove



Water clarity



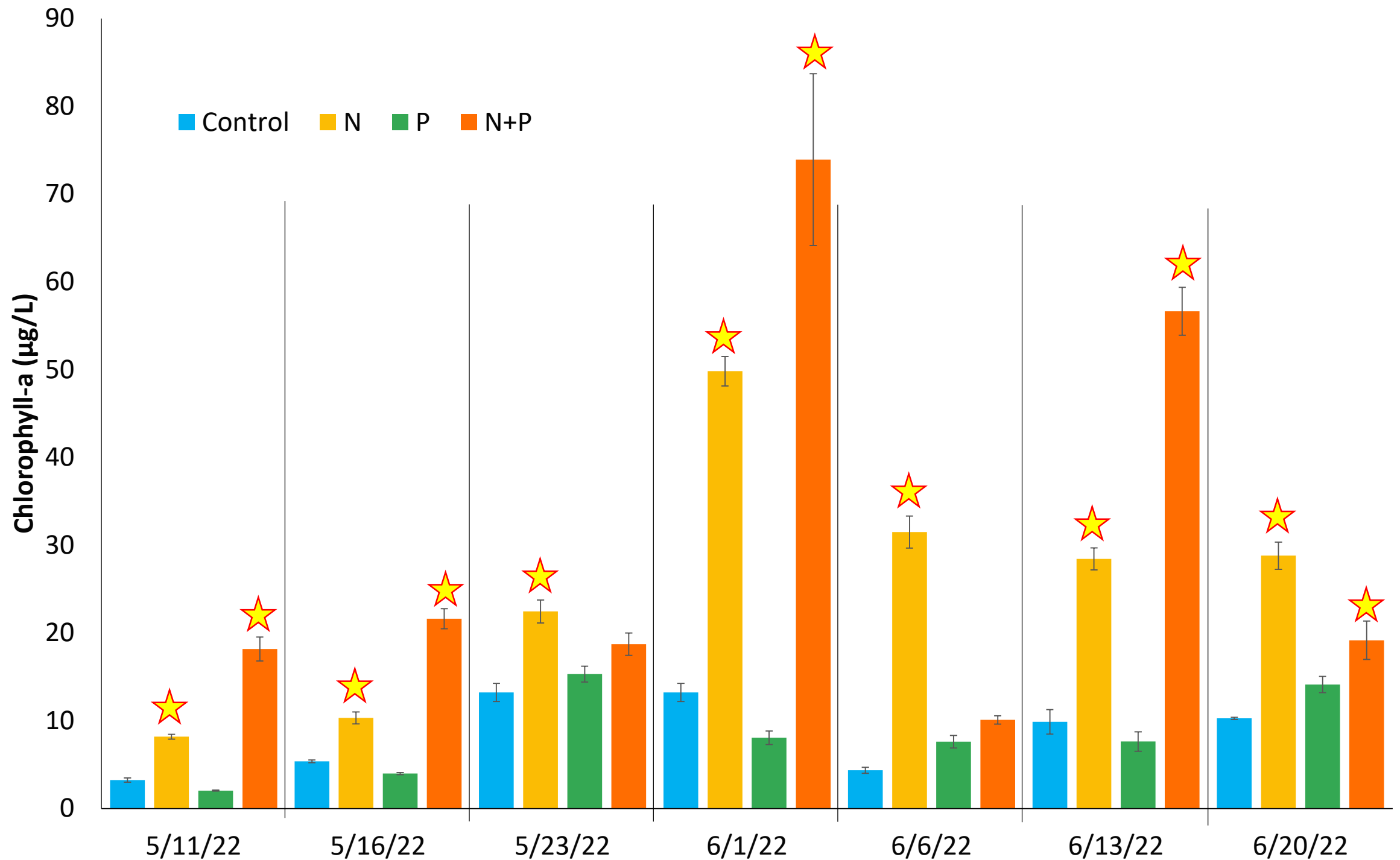
Levels of chlorophyll *a* (algae)



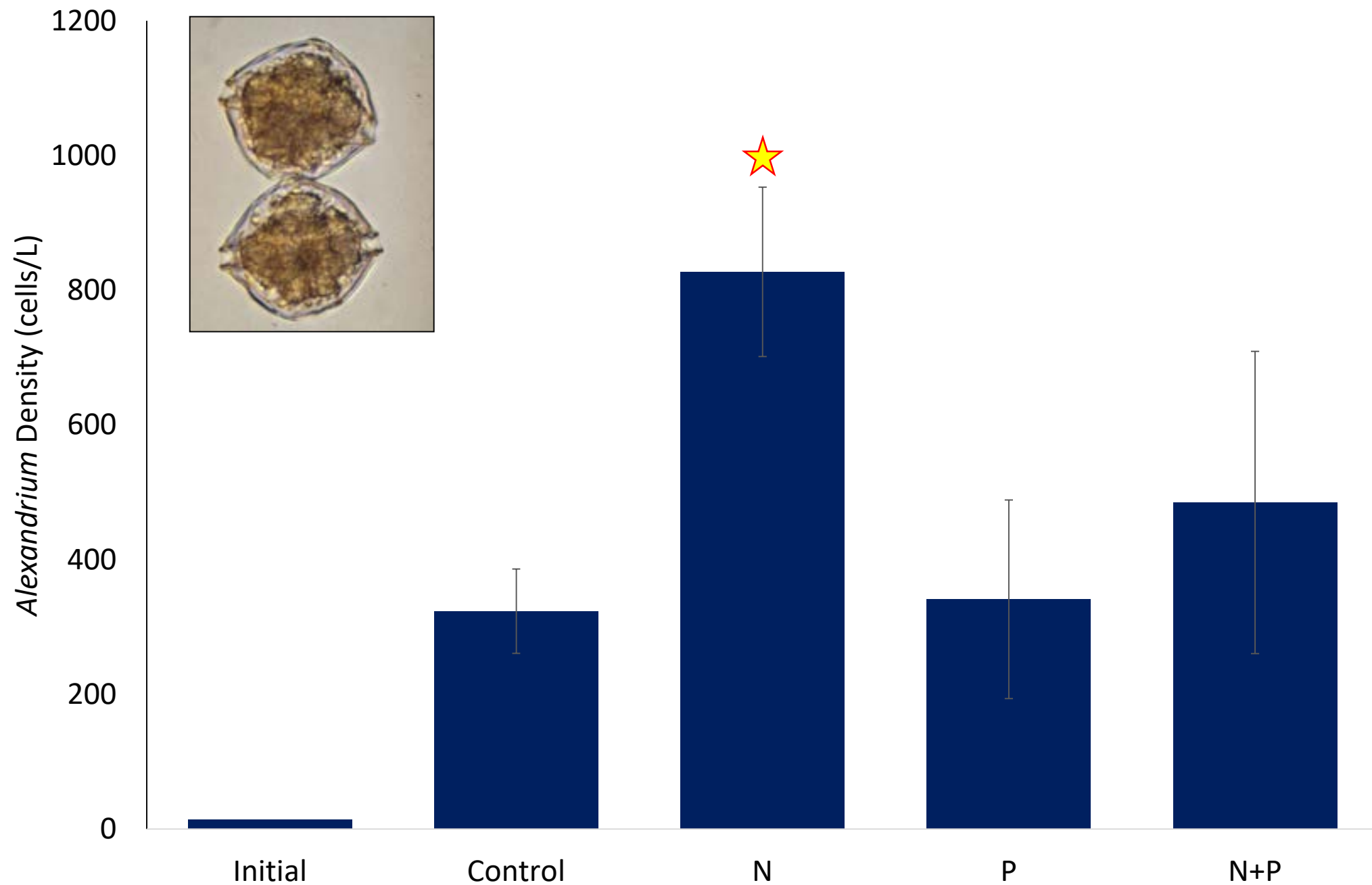
What nutrients are promoting algae and HABs in Sag Harbor Cove?



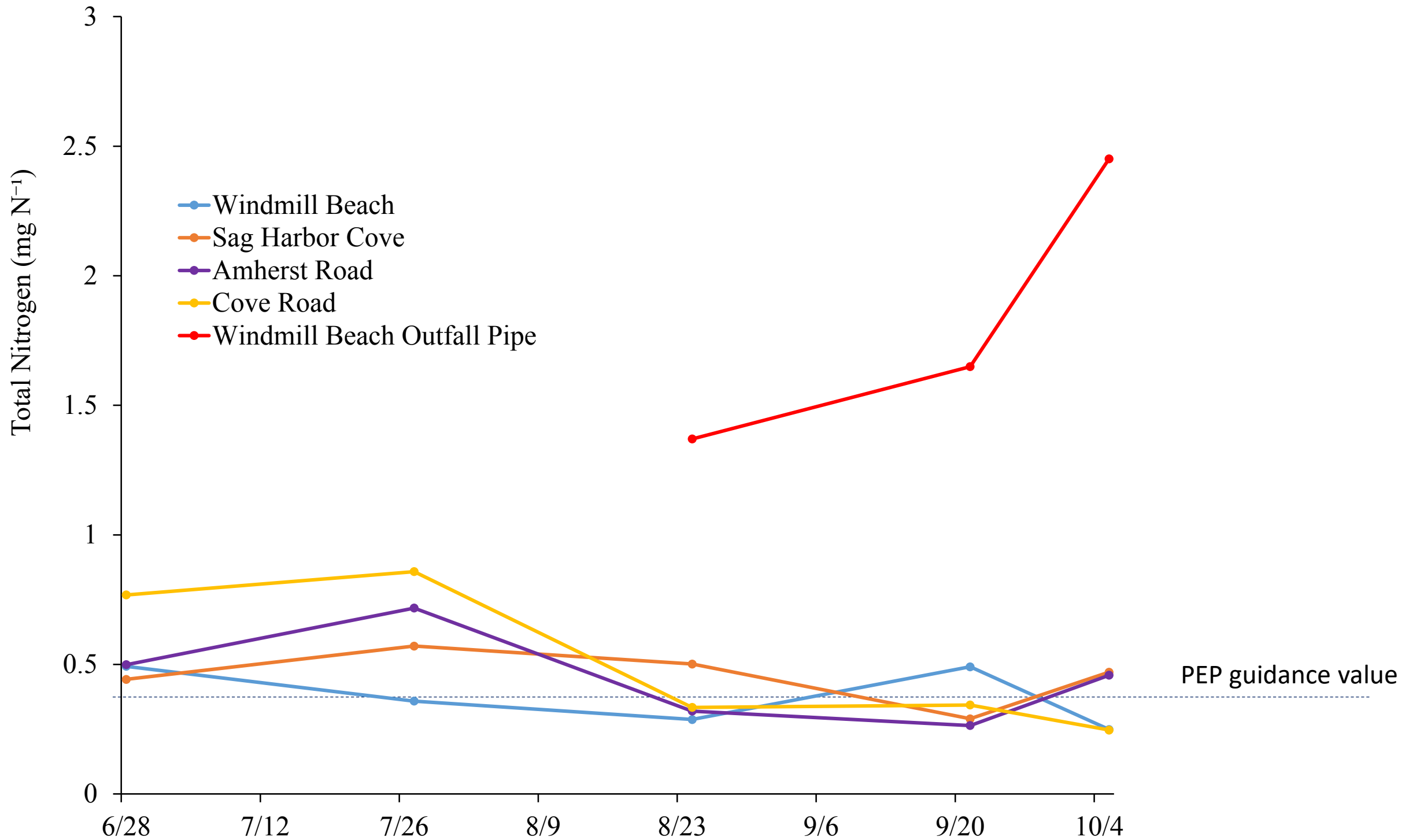
Sag Harbor Cove nutrient enrichment experiments



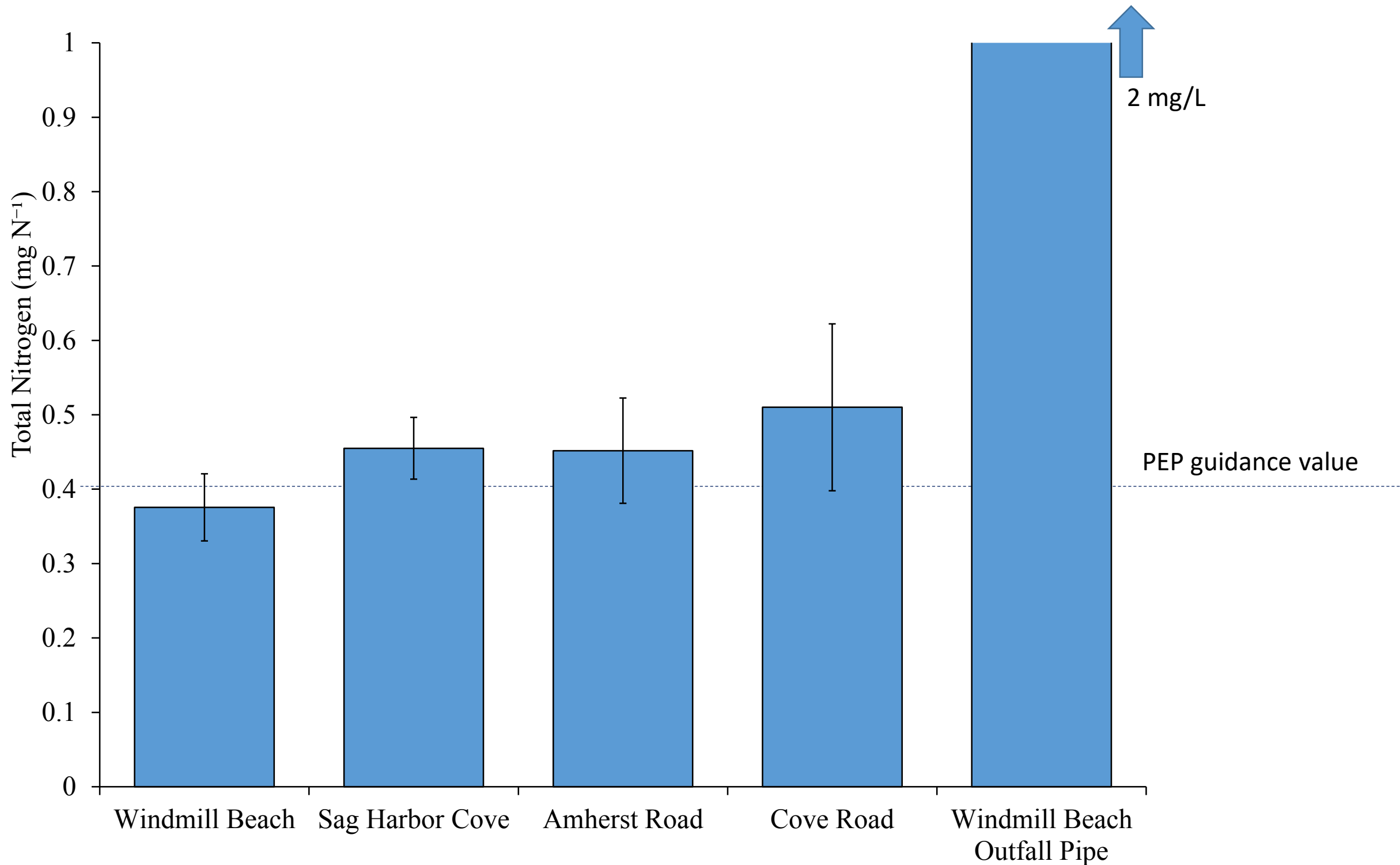
Sag Harbor Cove experiment with *Alexandrium*, 5/11/22



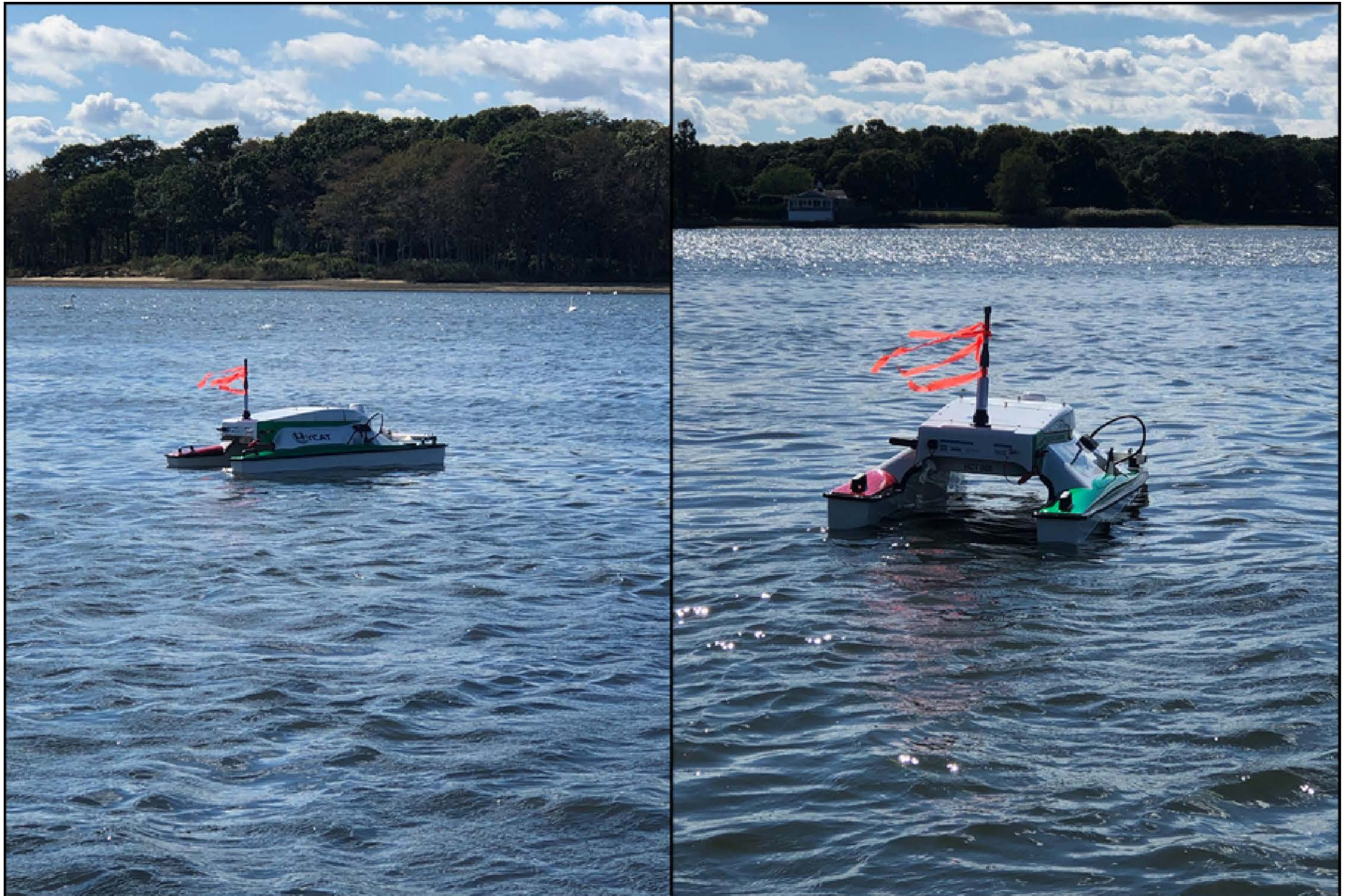
Total nitrogen levels

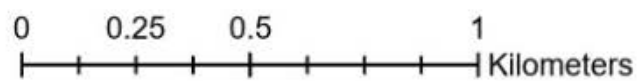
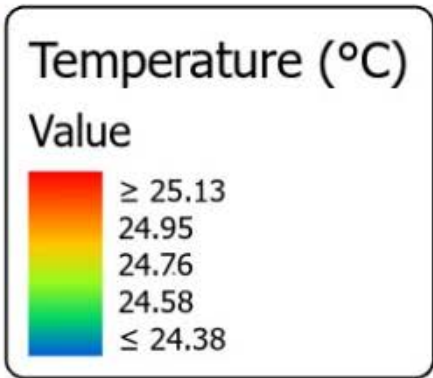
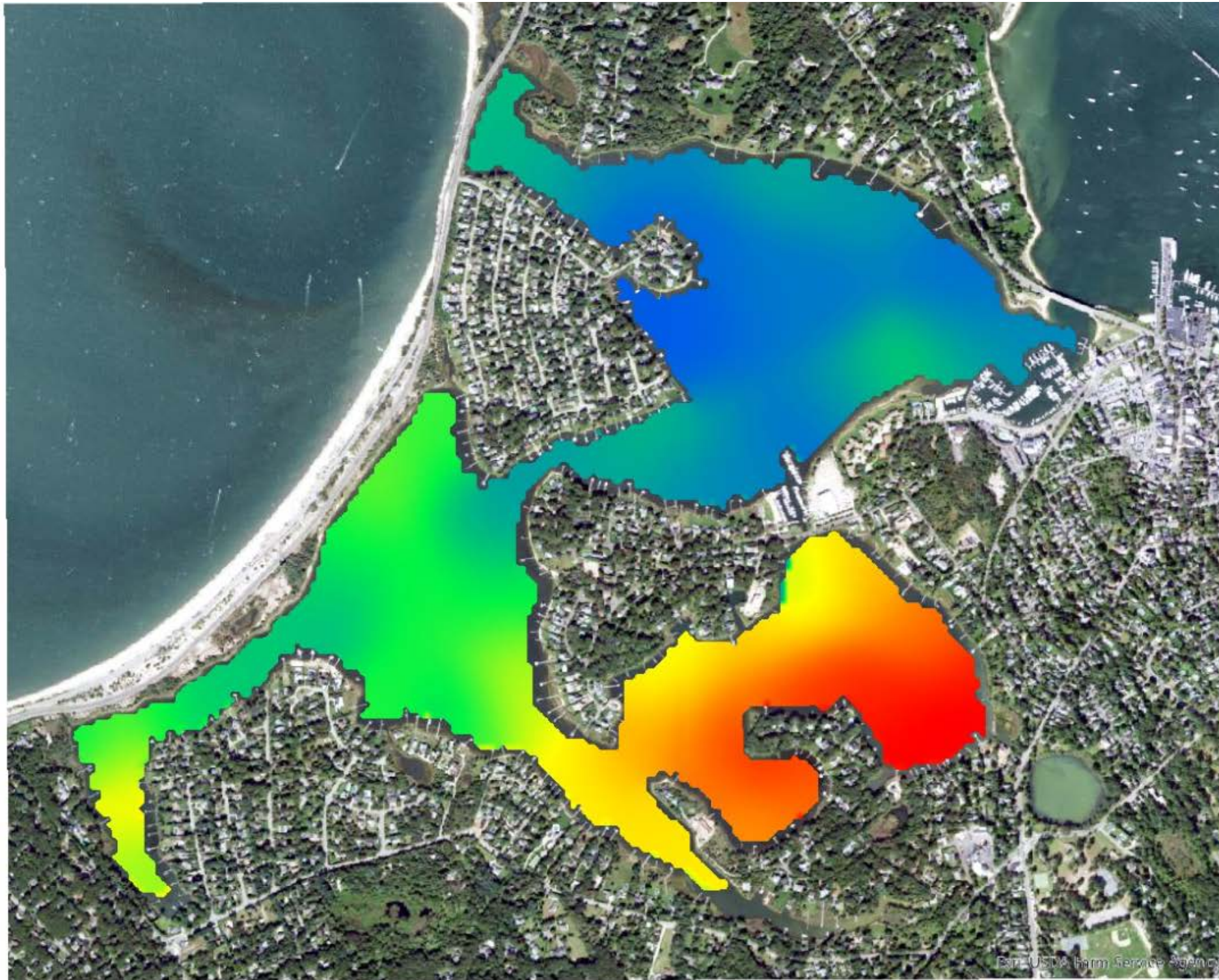


Total nitrogen levels

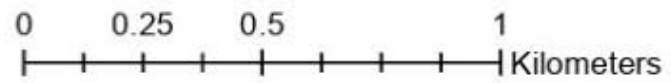
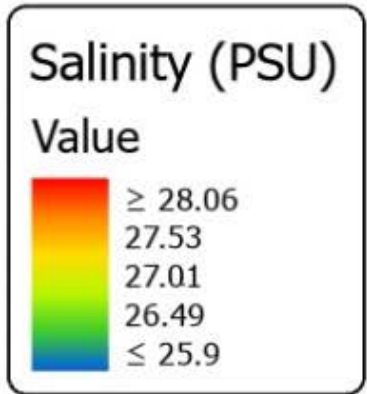
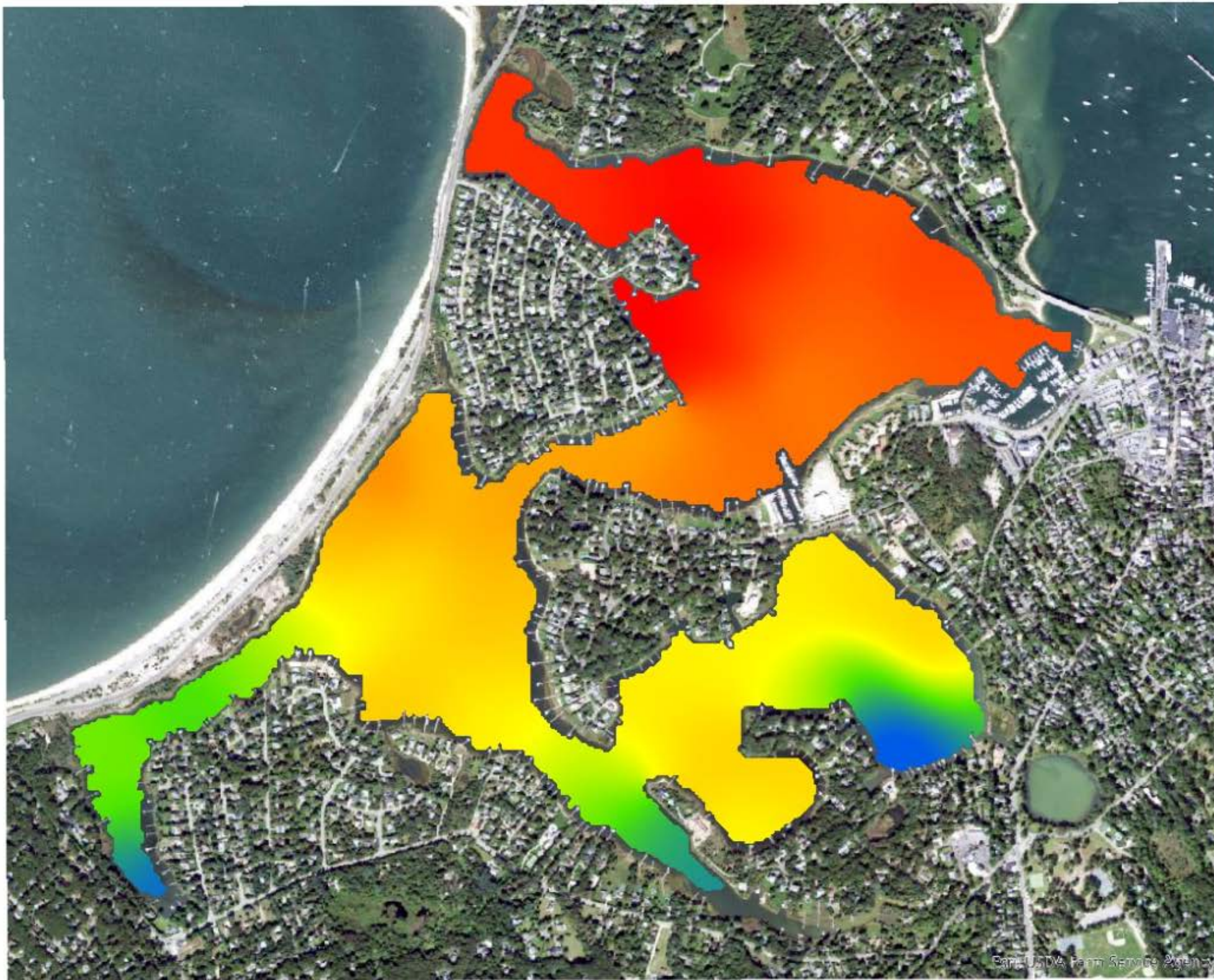


Water quality mapping with HYCAT surface autonomous vehicle (SUV); September 2023



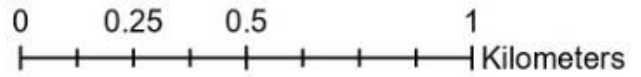
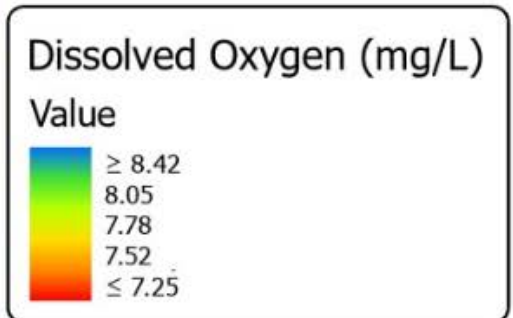
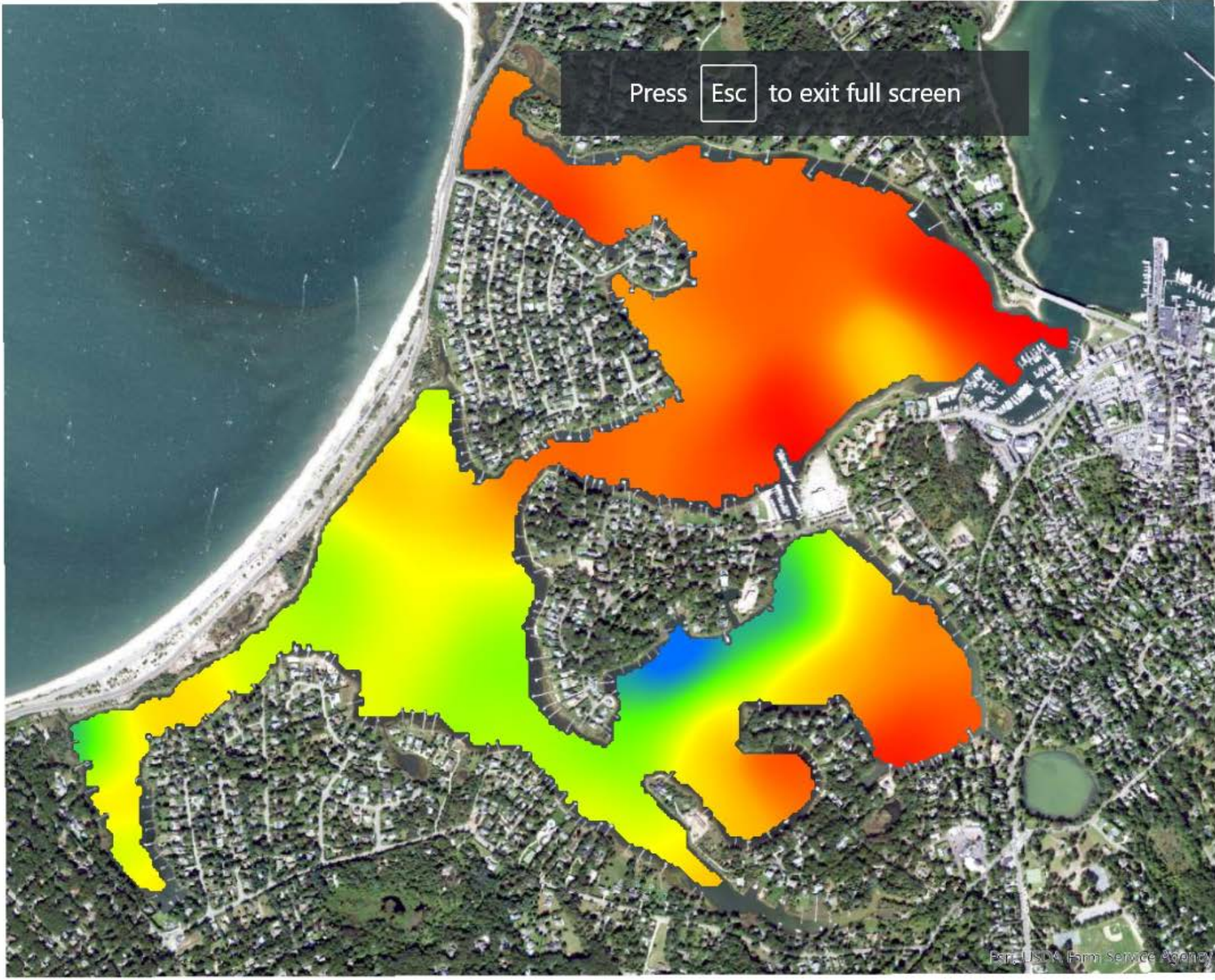


From USGS Farm Service Agency

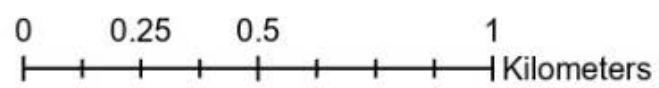
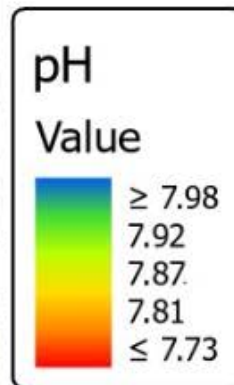
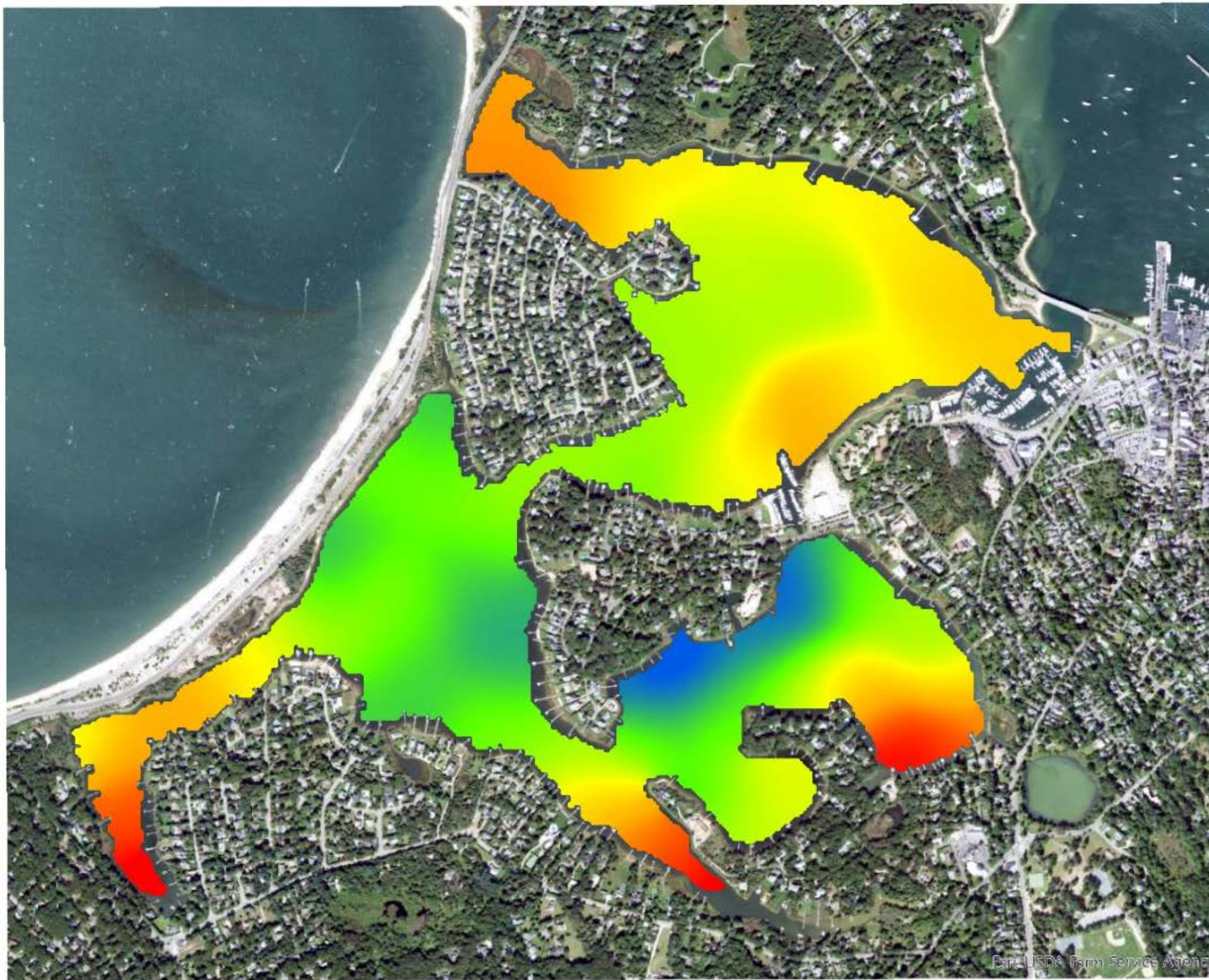


EPA/USDA Farm Service Agency

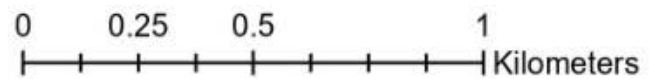
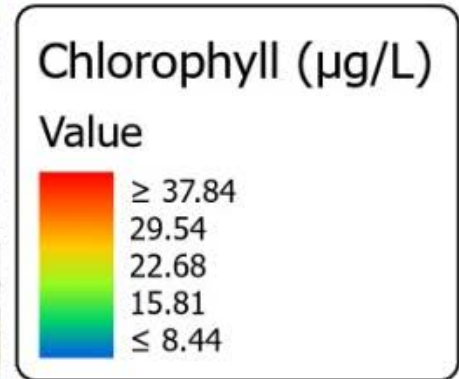
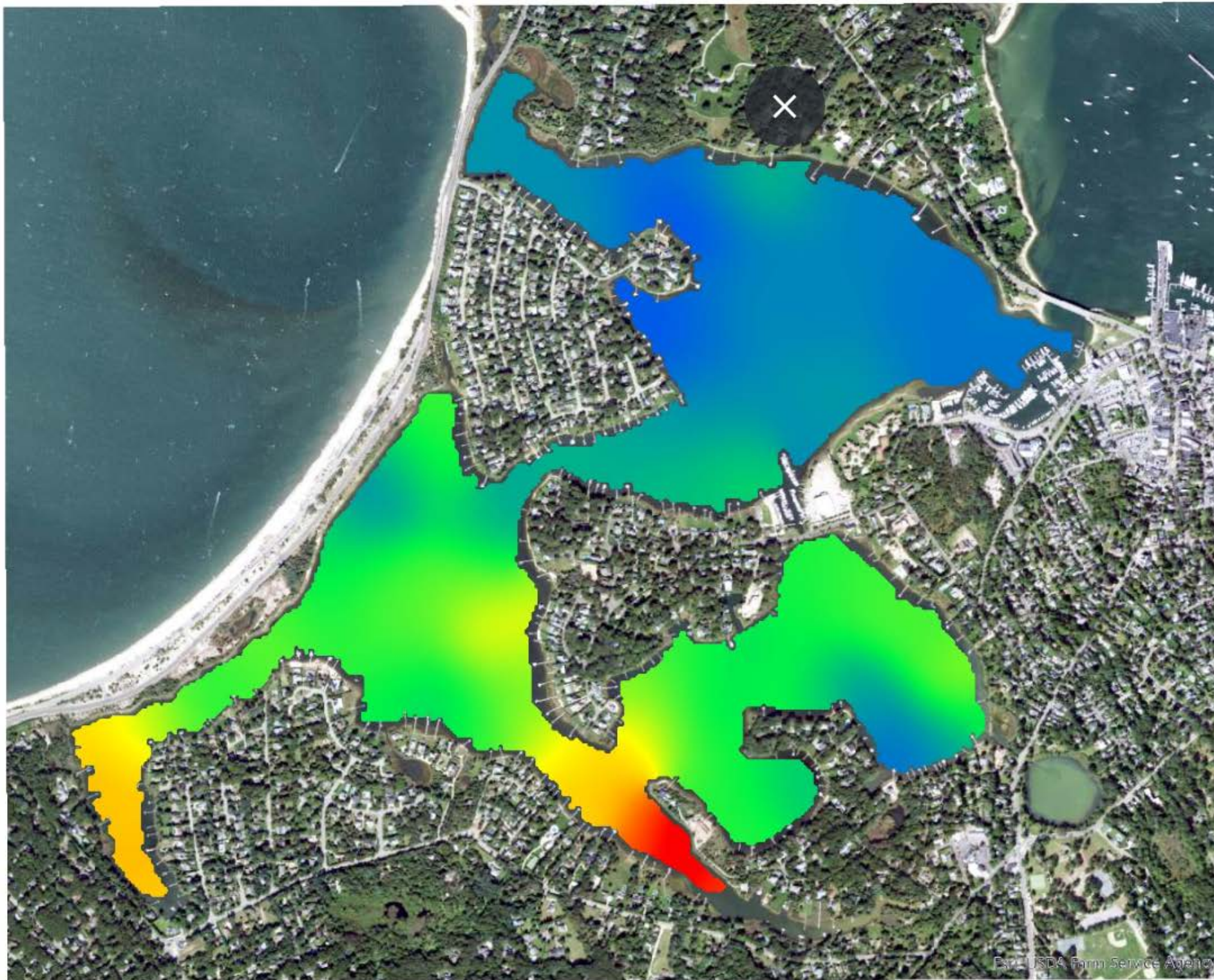
Press Esc to exit full screen



Esri, USDA, Farm Service Agency

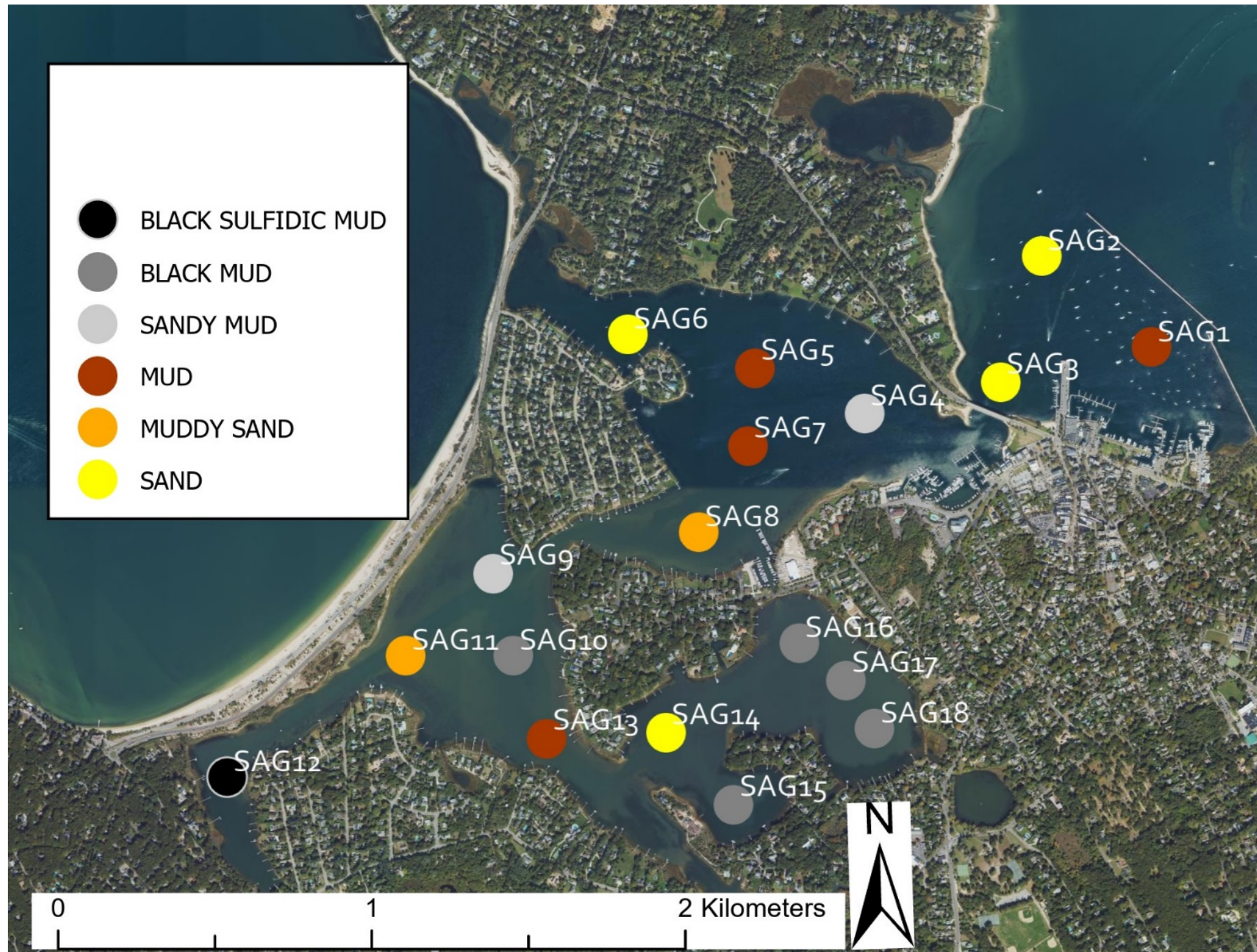


Esri, USDA Farm Service Agency

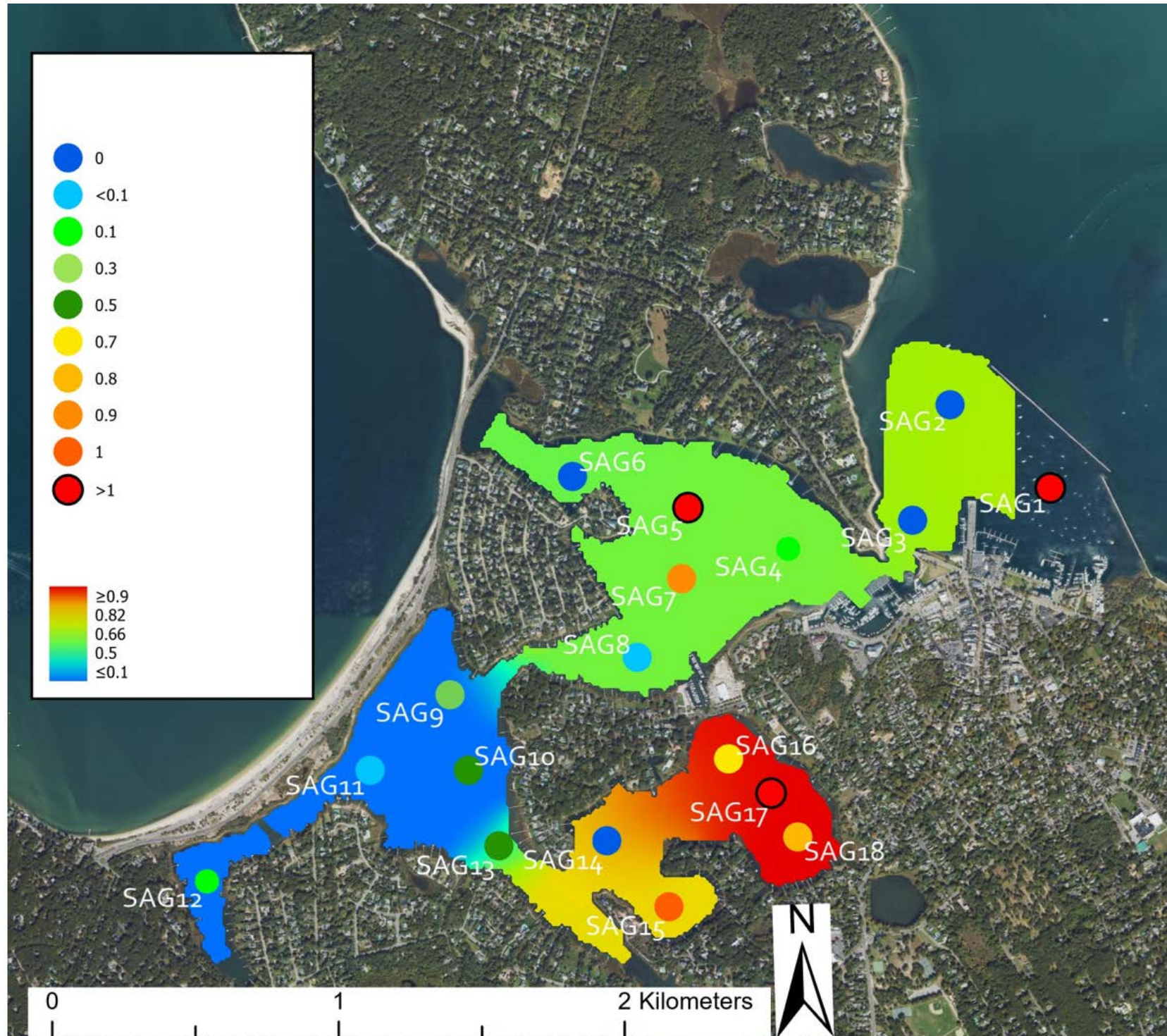


ESRI/USDA Farm Service Agency

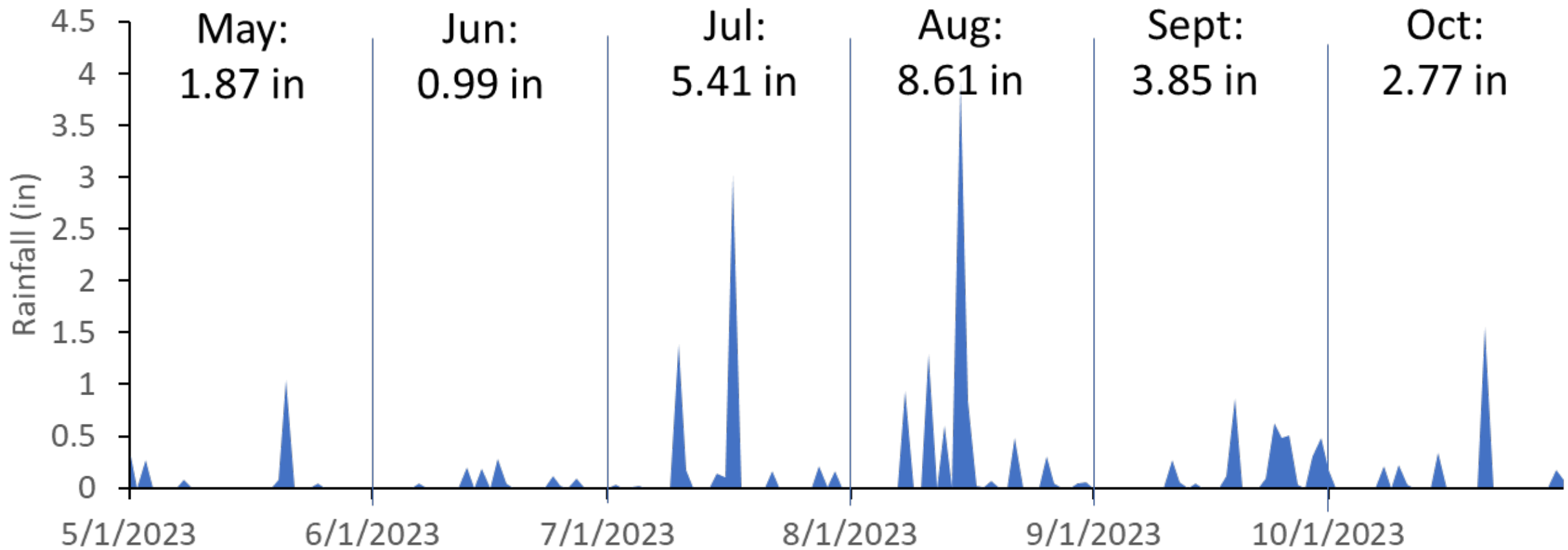
Sediment type



Depth of mud in sediments (meters)

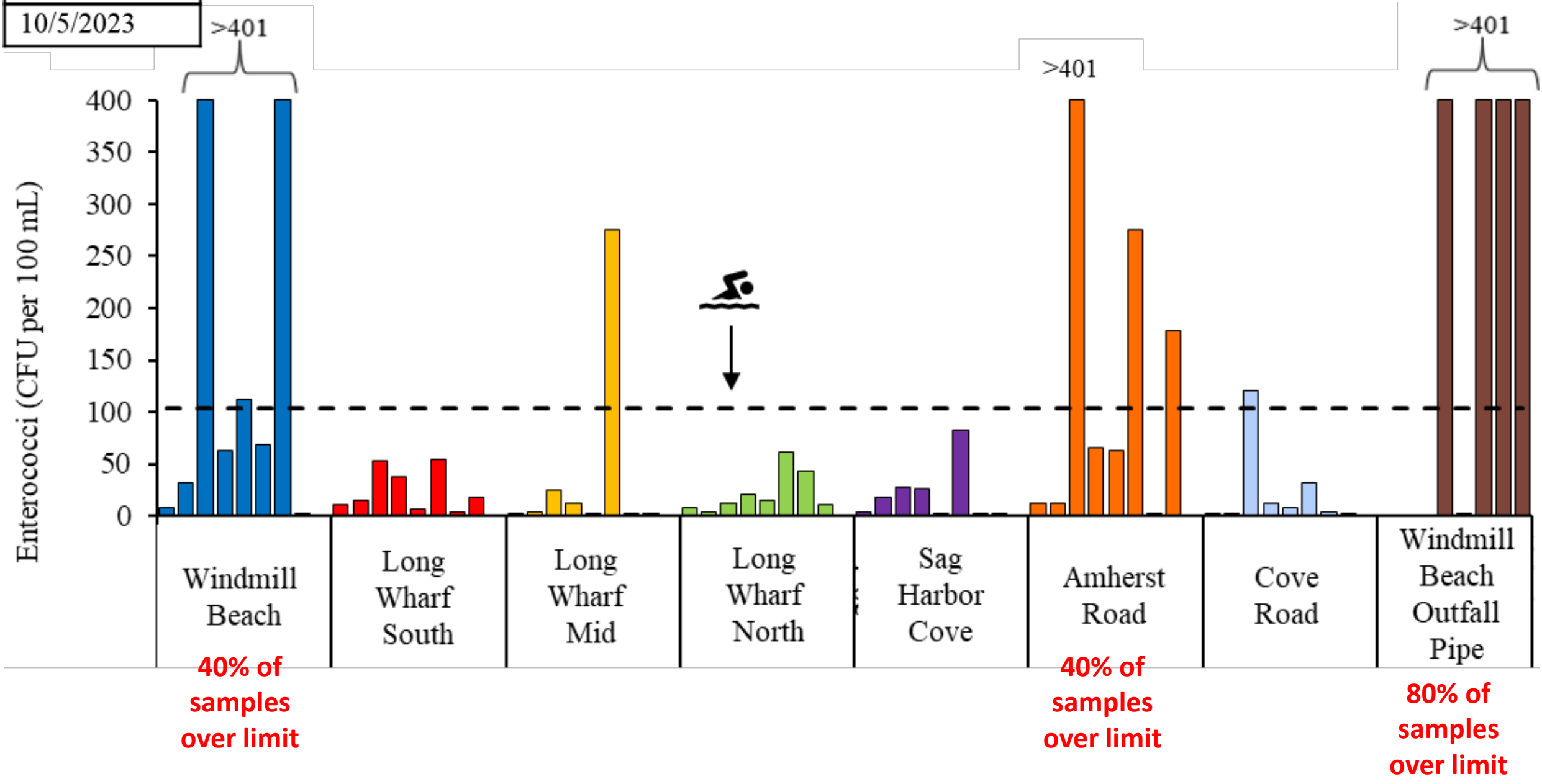


Rainfall, summer/fall 2023

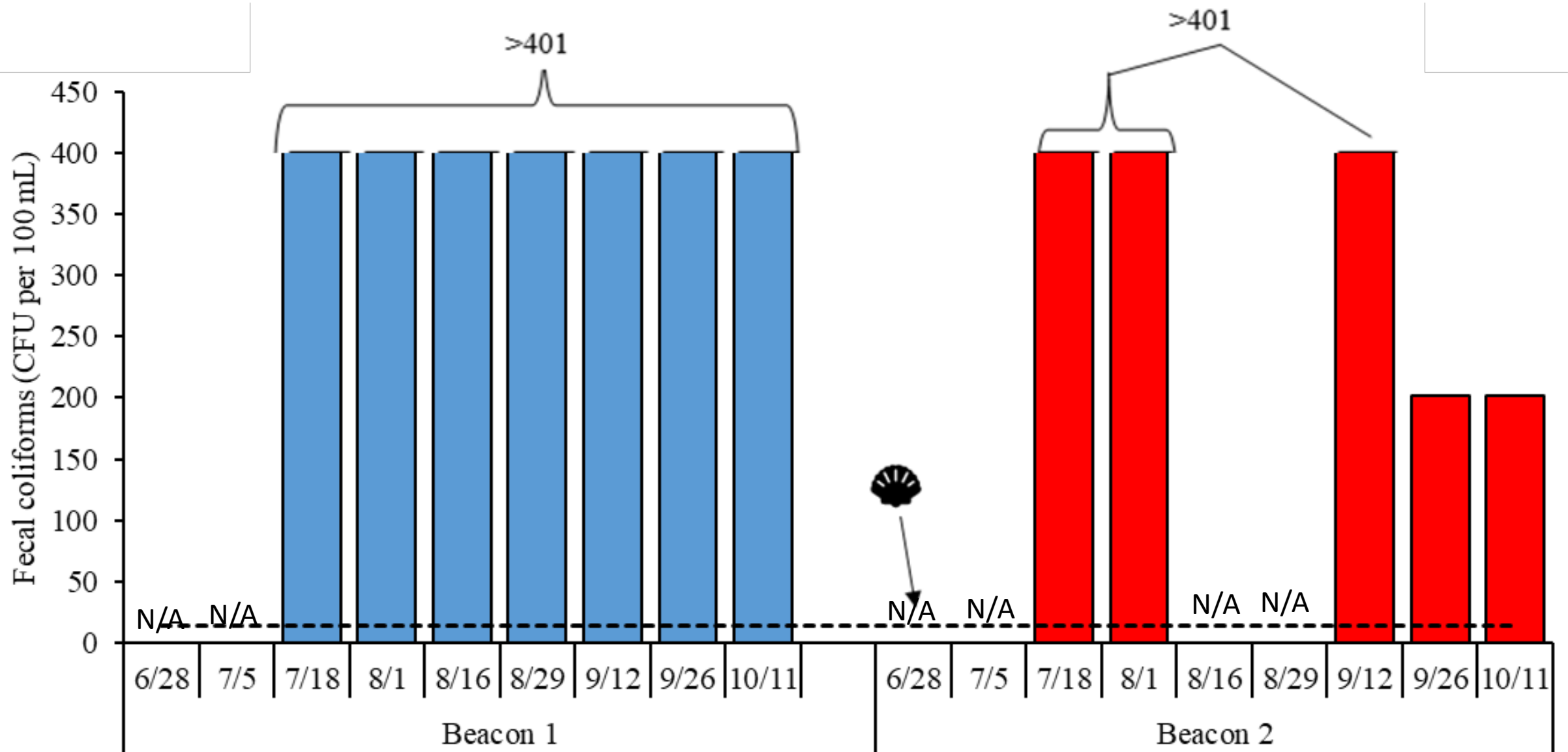


Enterococcus densities

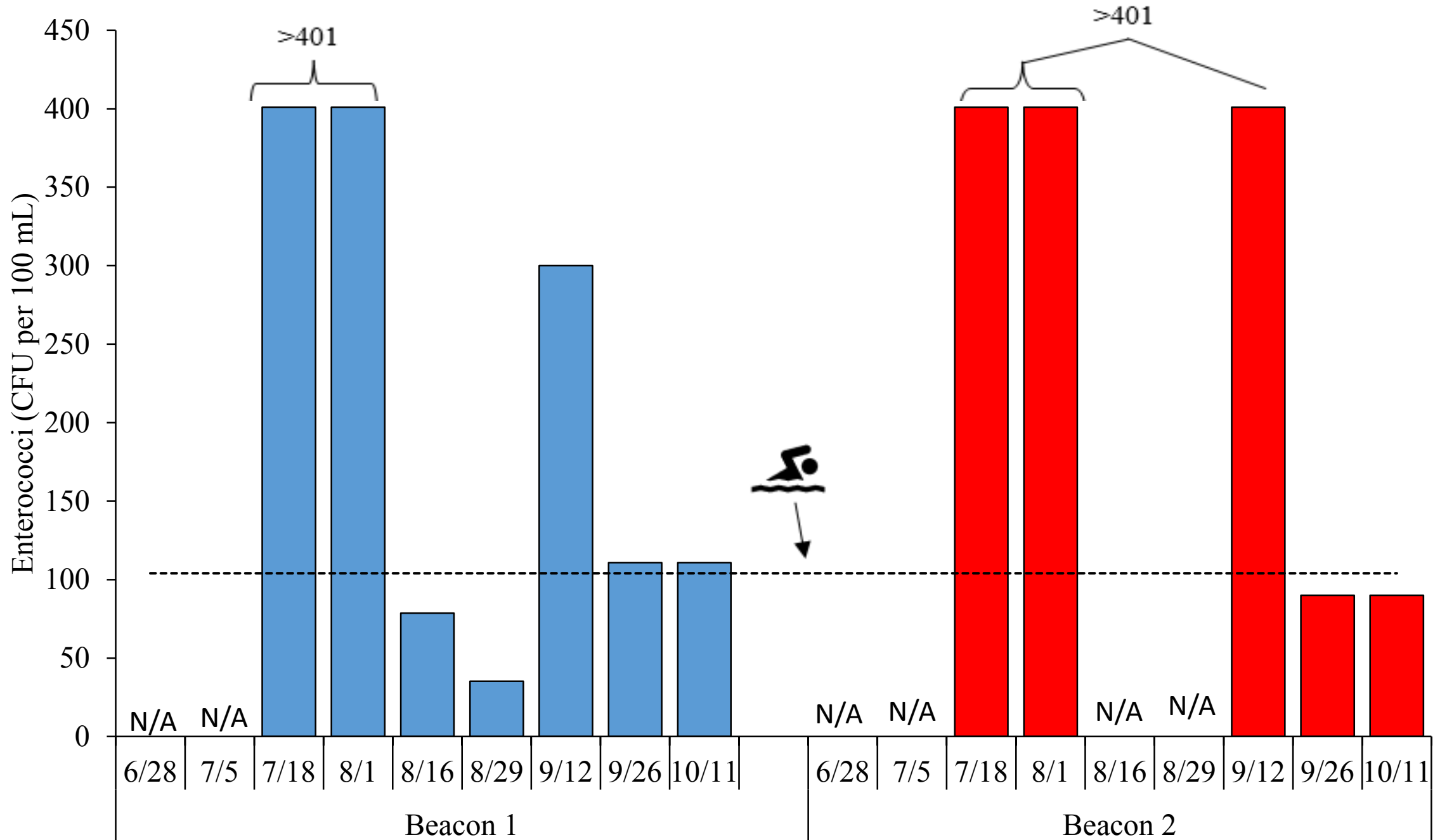
Sampling Dates
06/28/2023
07/13/2023
07/27/2023
08/10/2023
08/24/2023
09/14/2023
09/21/2023
10/5/2023



Fecal coliform bacteria, 2022, Beacon Vault



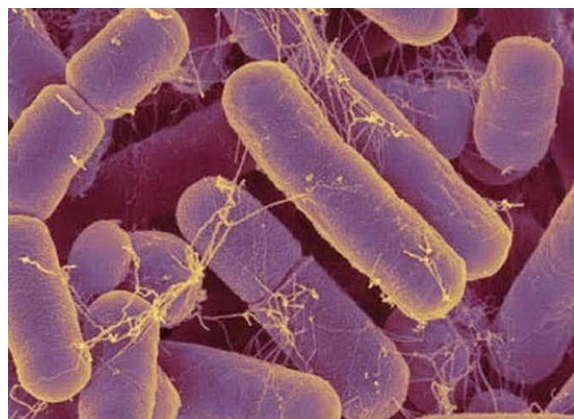
Enterococcus, 2022, Beacon Vault



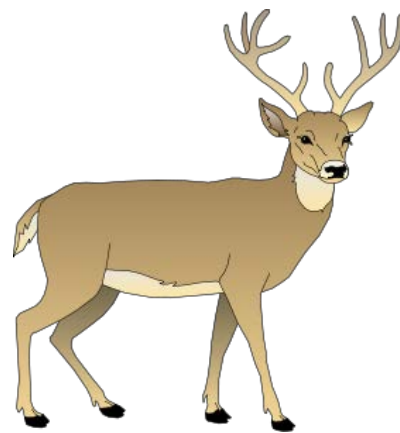
Microbial source tracking overview



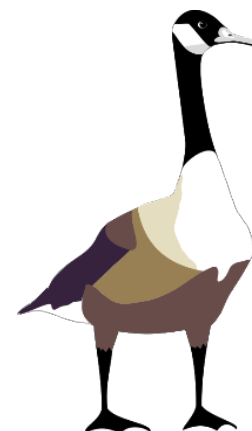
Fecal Bacteria:
Bacteroides



Target Host Organisms:



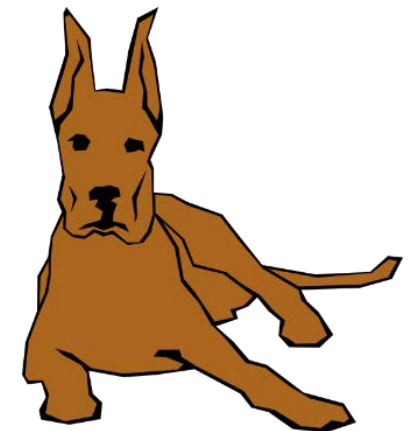
Ruminant



Birds

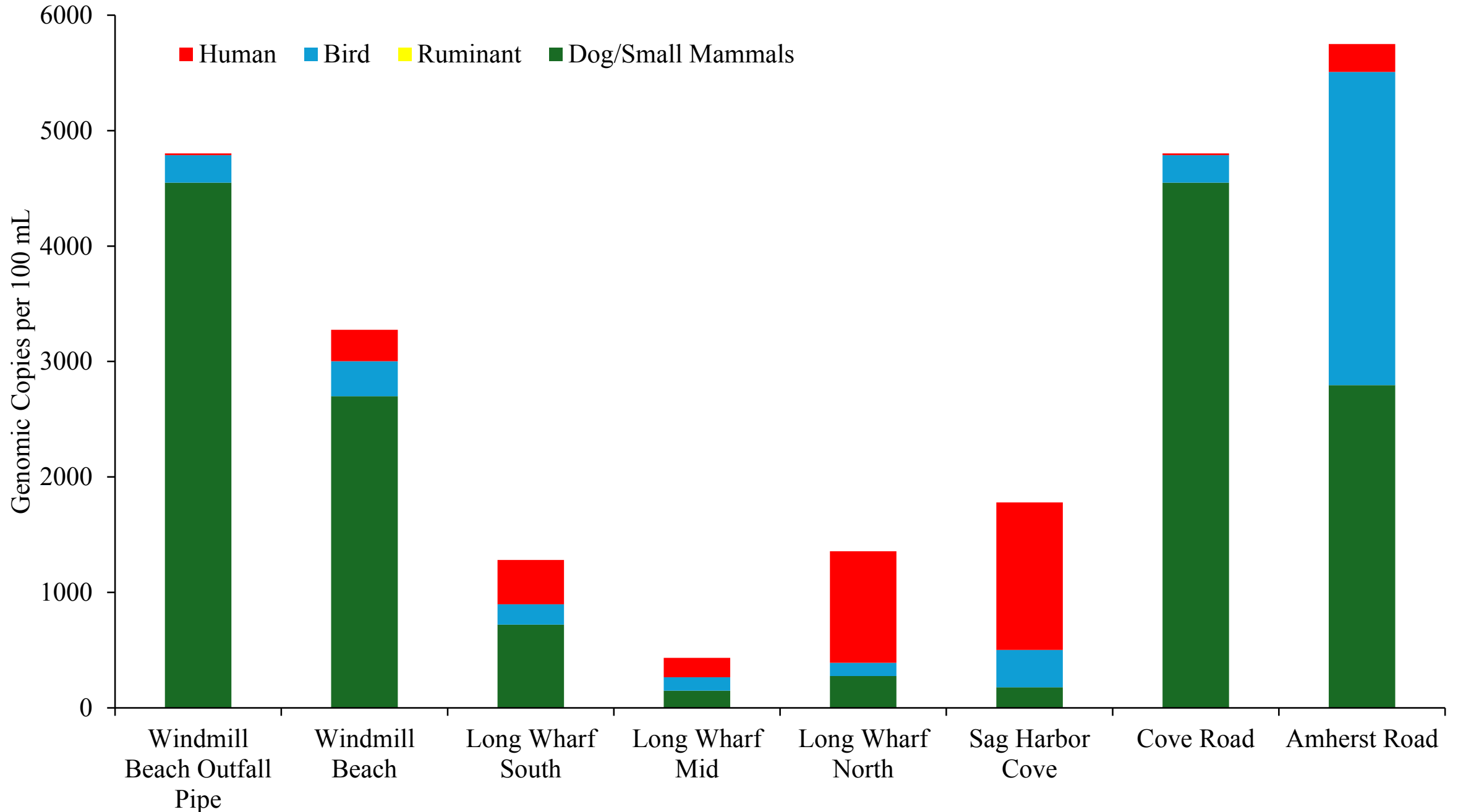


Human

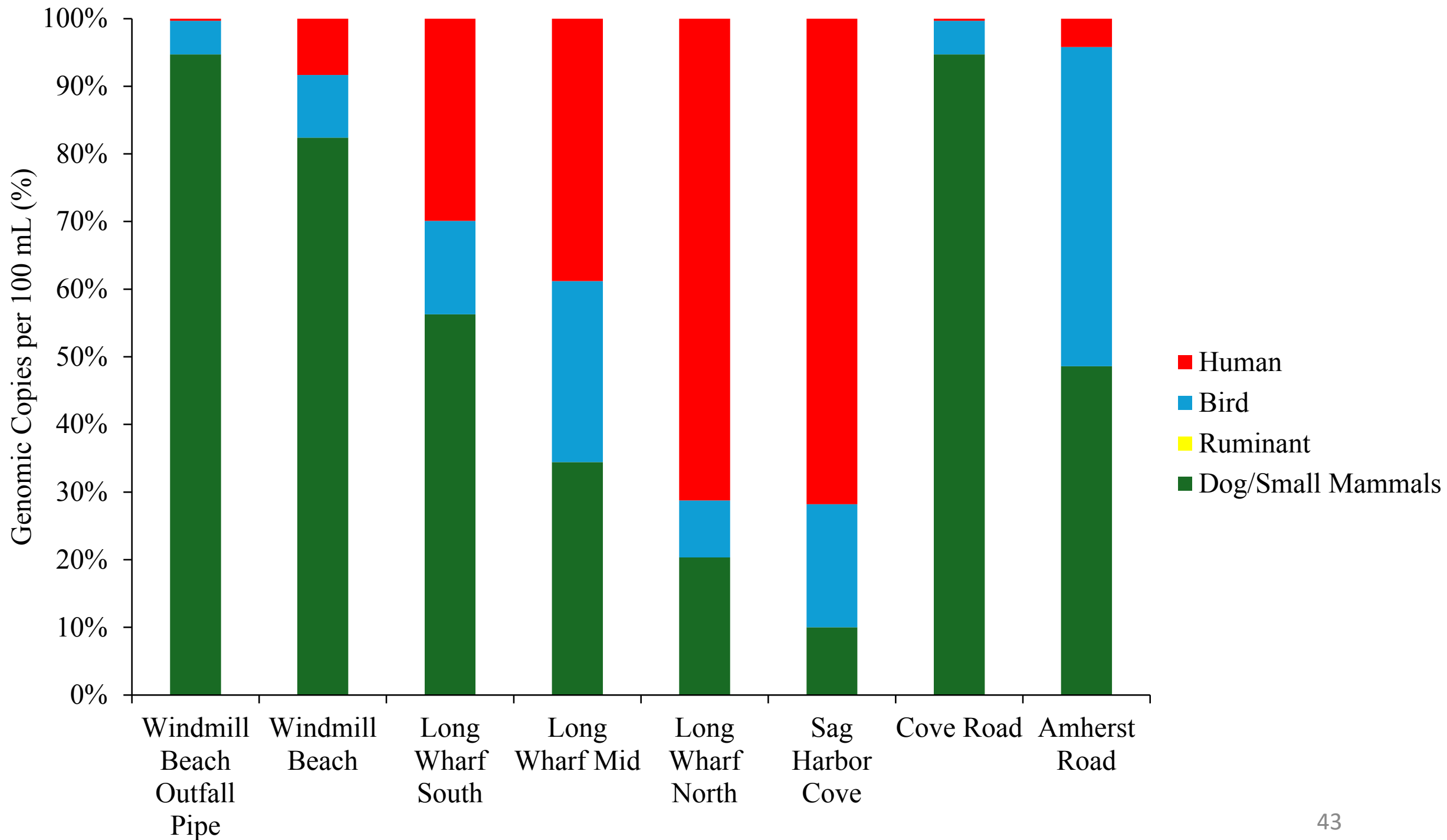


Dog

Microbial source tracking, absolute abundances



Microbial source tracking, relative abundances

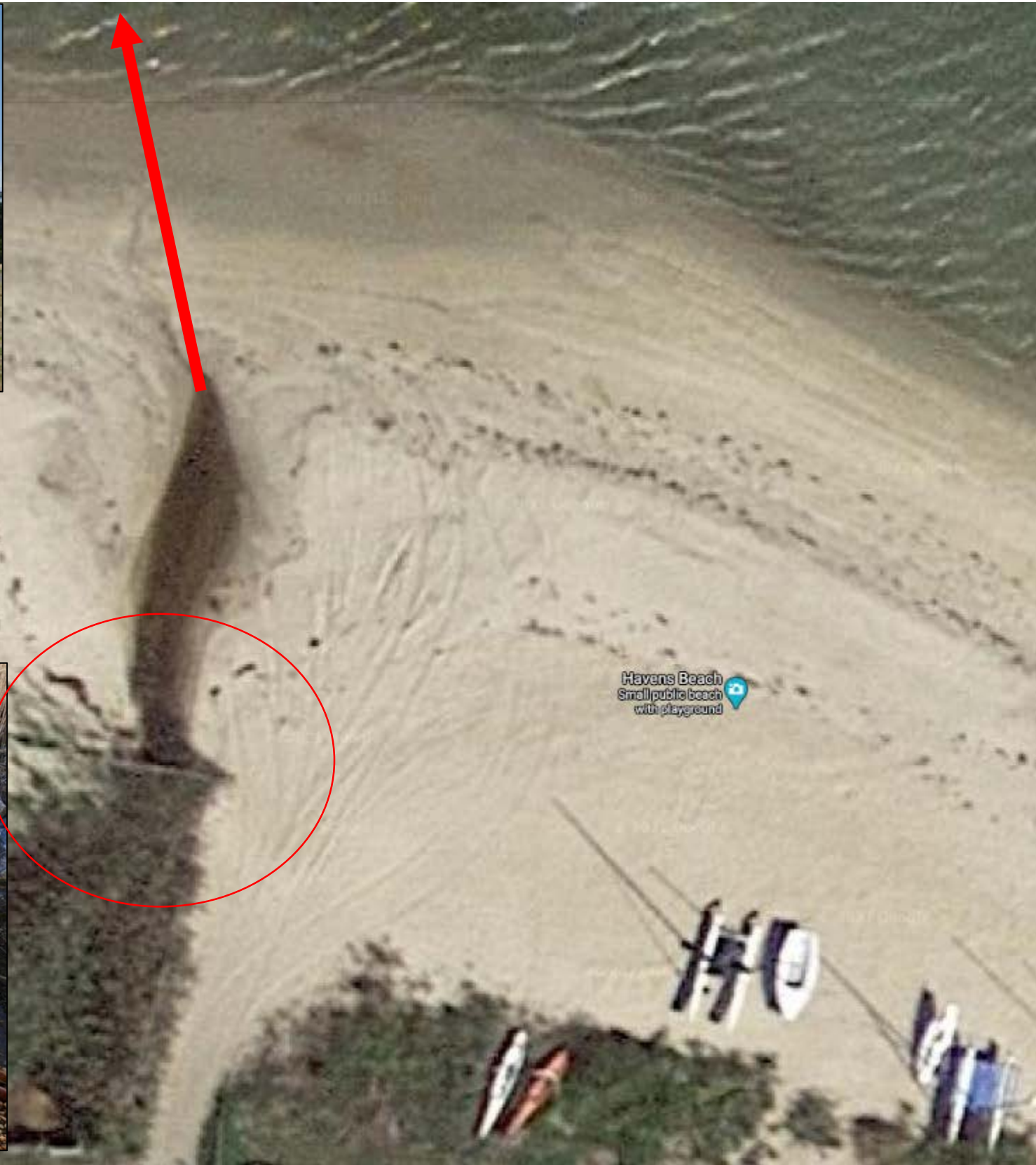


Havens Beach

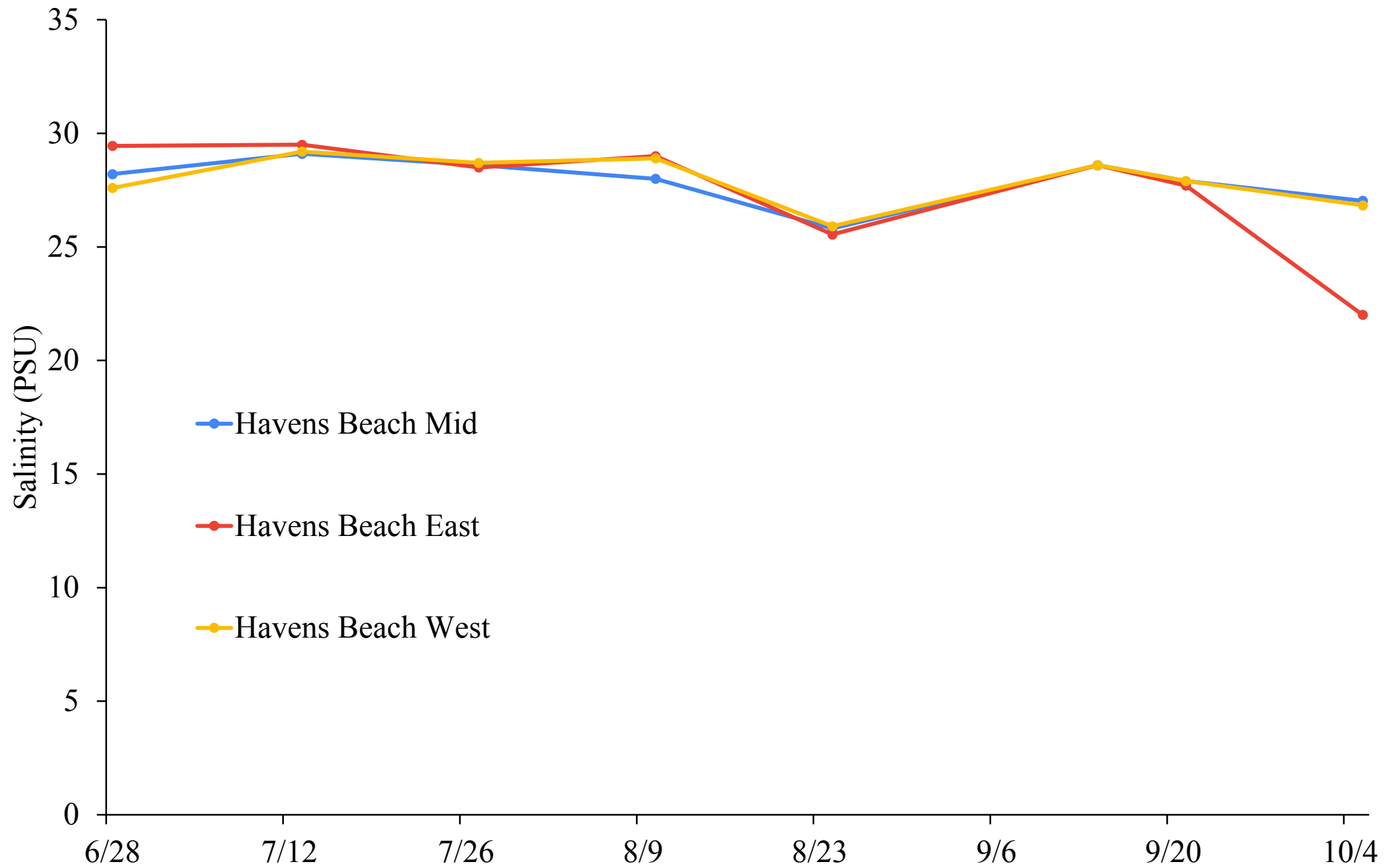


Havens Beach study, 2023

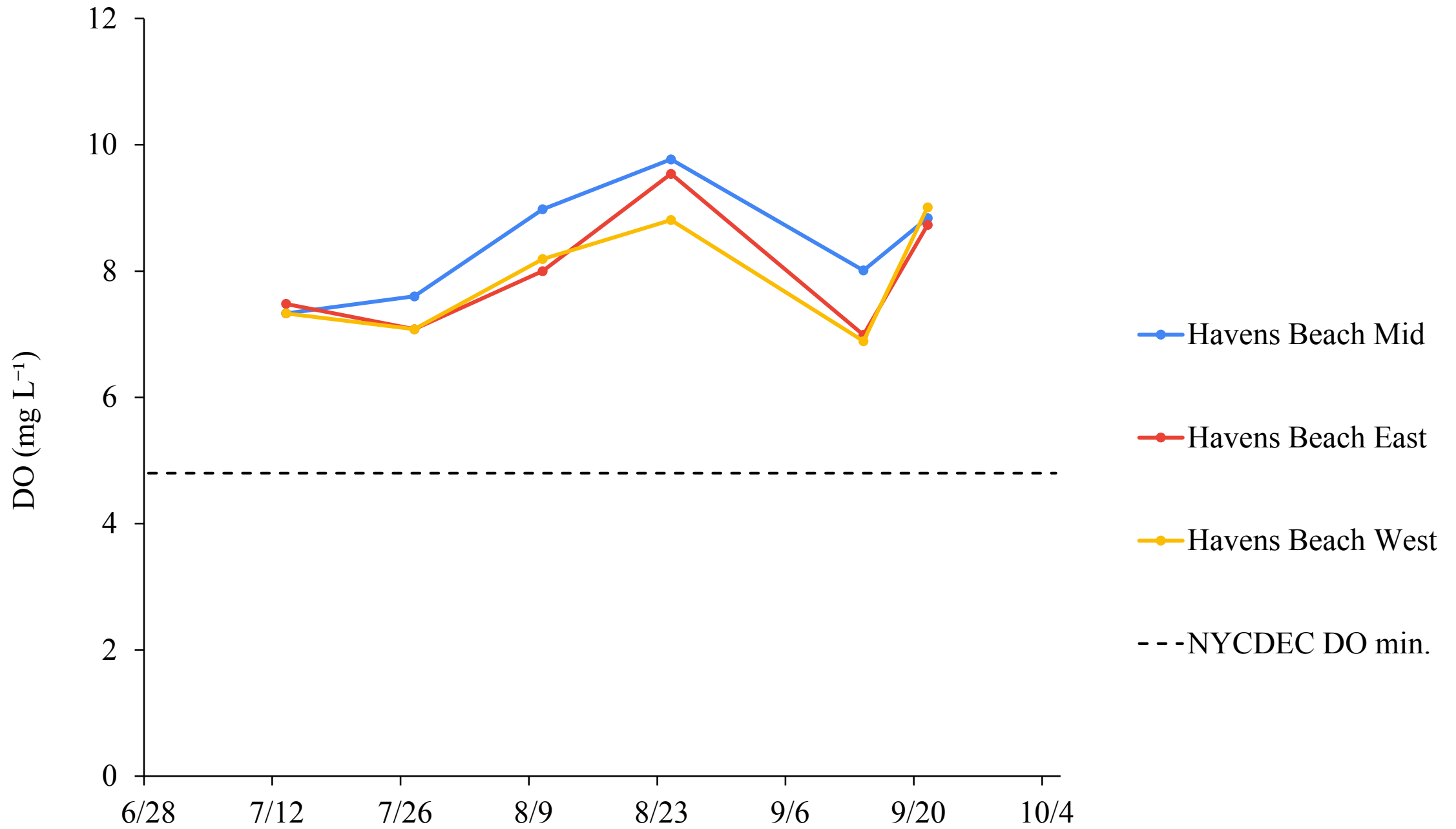




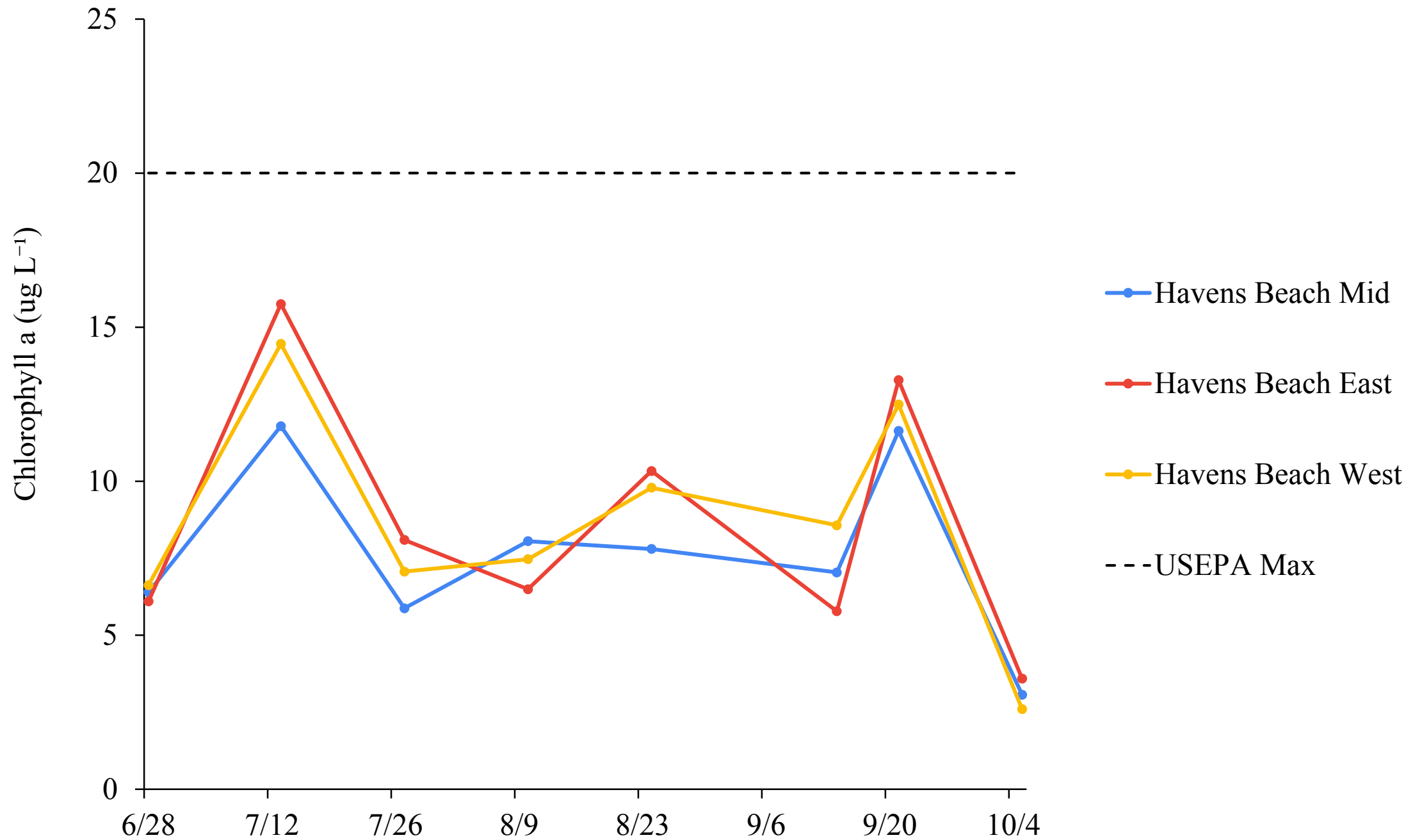
Salinity



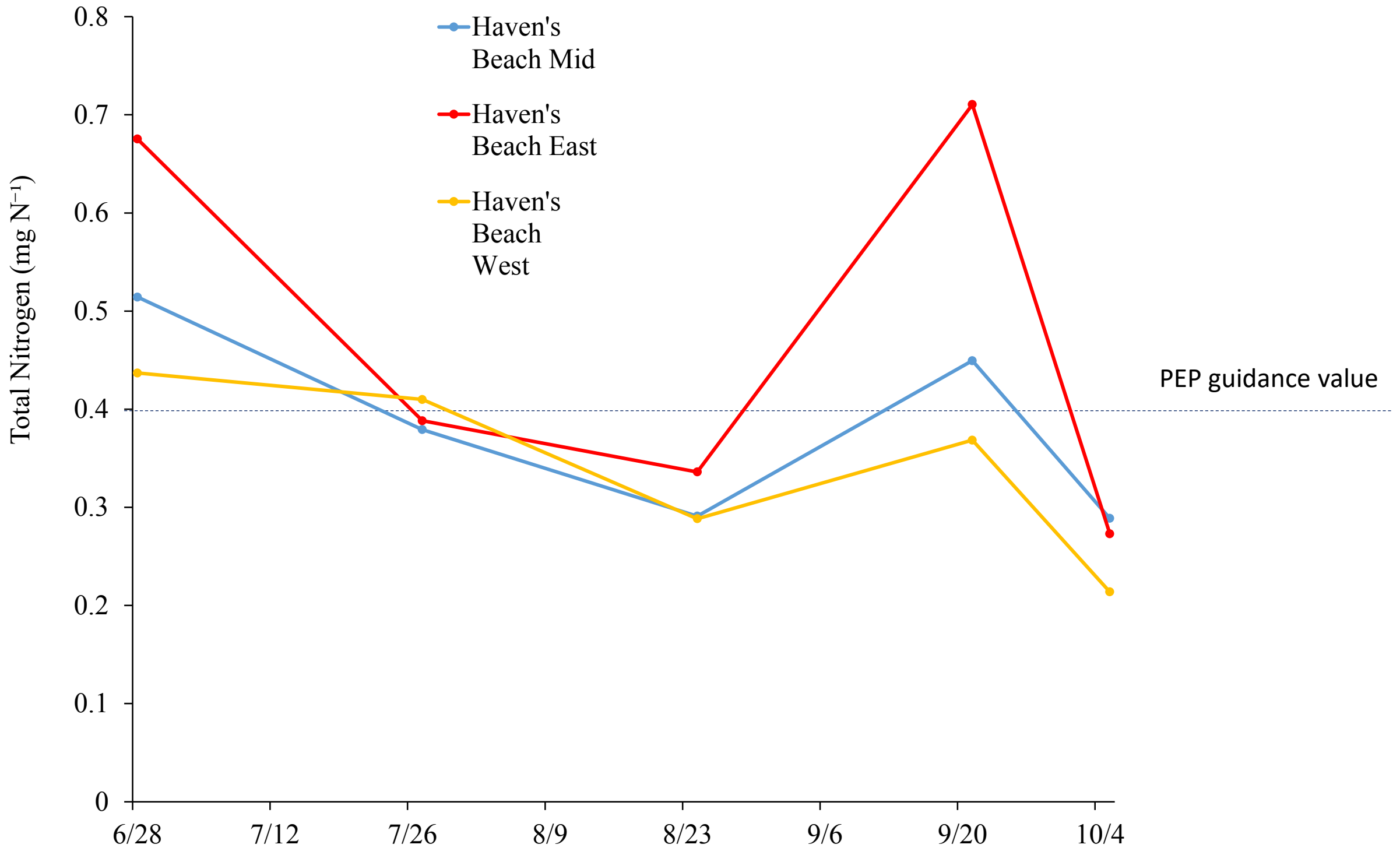
Dissolved oxygen levels



Chlorophyll *a* (algae) levels



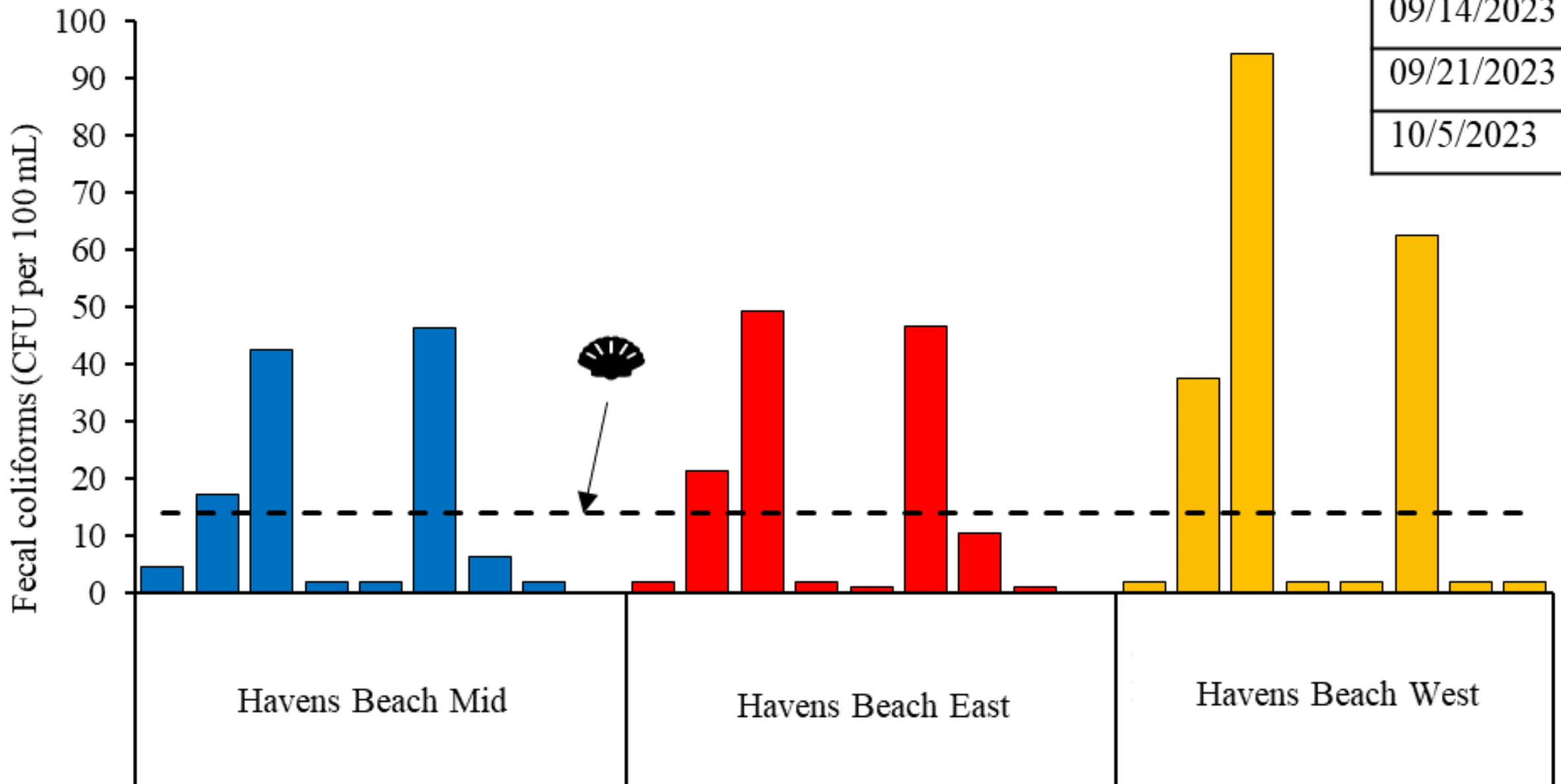
Total nitrogen levels



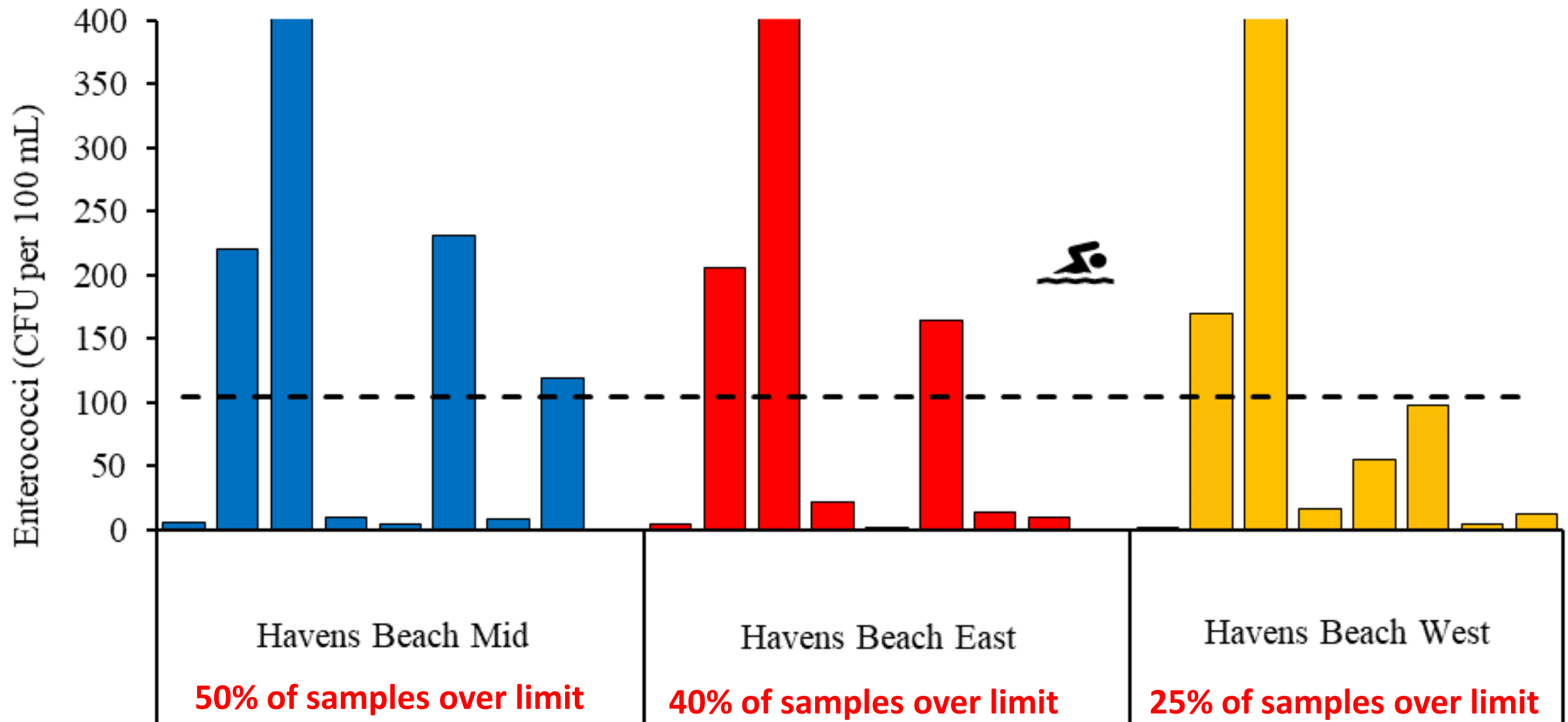
Fecal coliform bacteria

40% of samples over limit

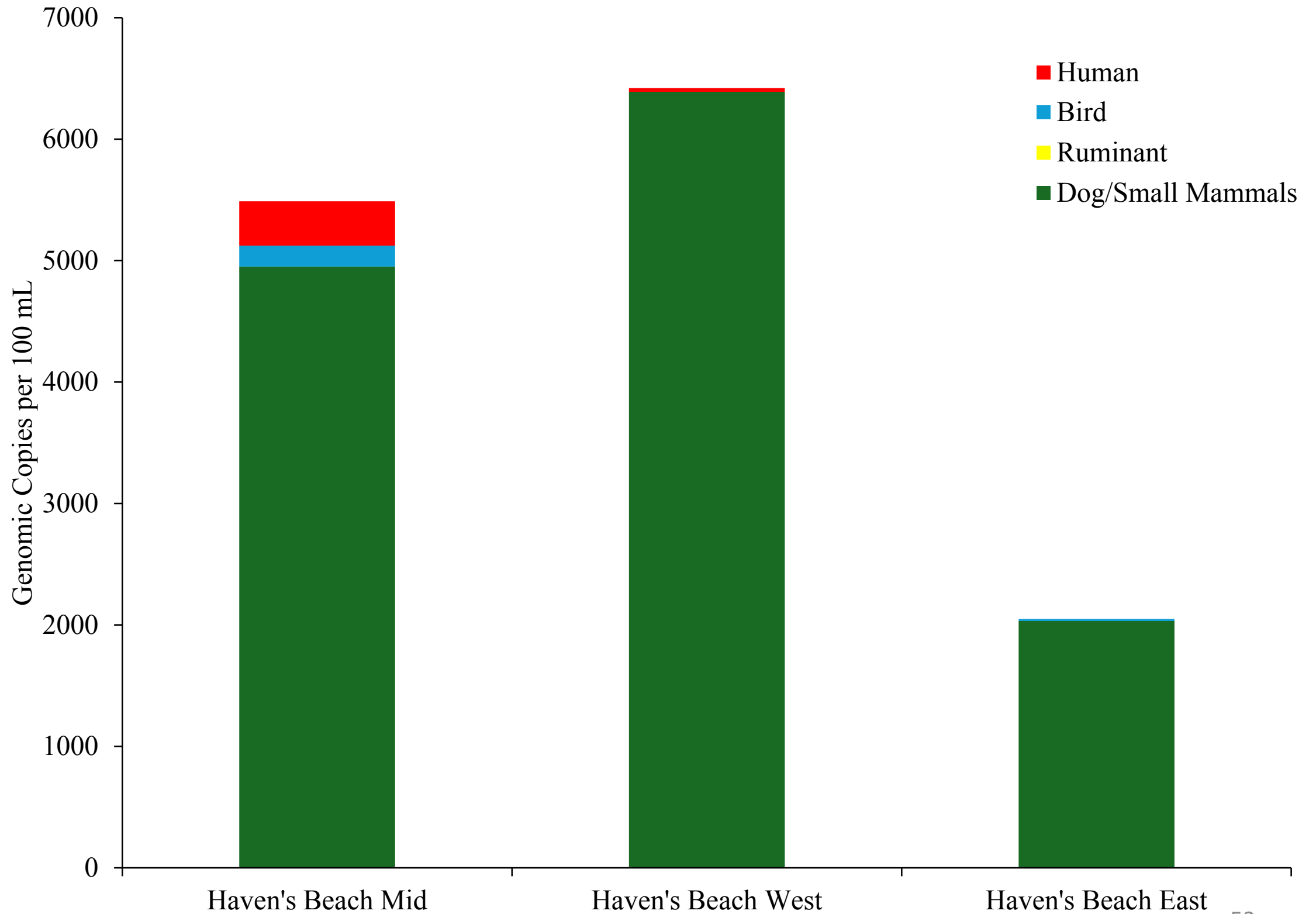
Sampling Dates
06/28/2023
07/13/2023
07/27/2023
08/10/2023
08/24/2023
09/14/2023
09/21/2023
10/5/2023



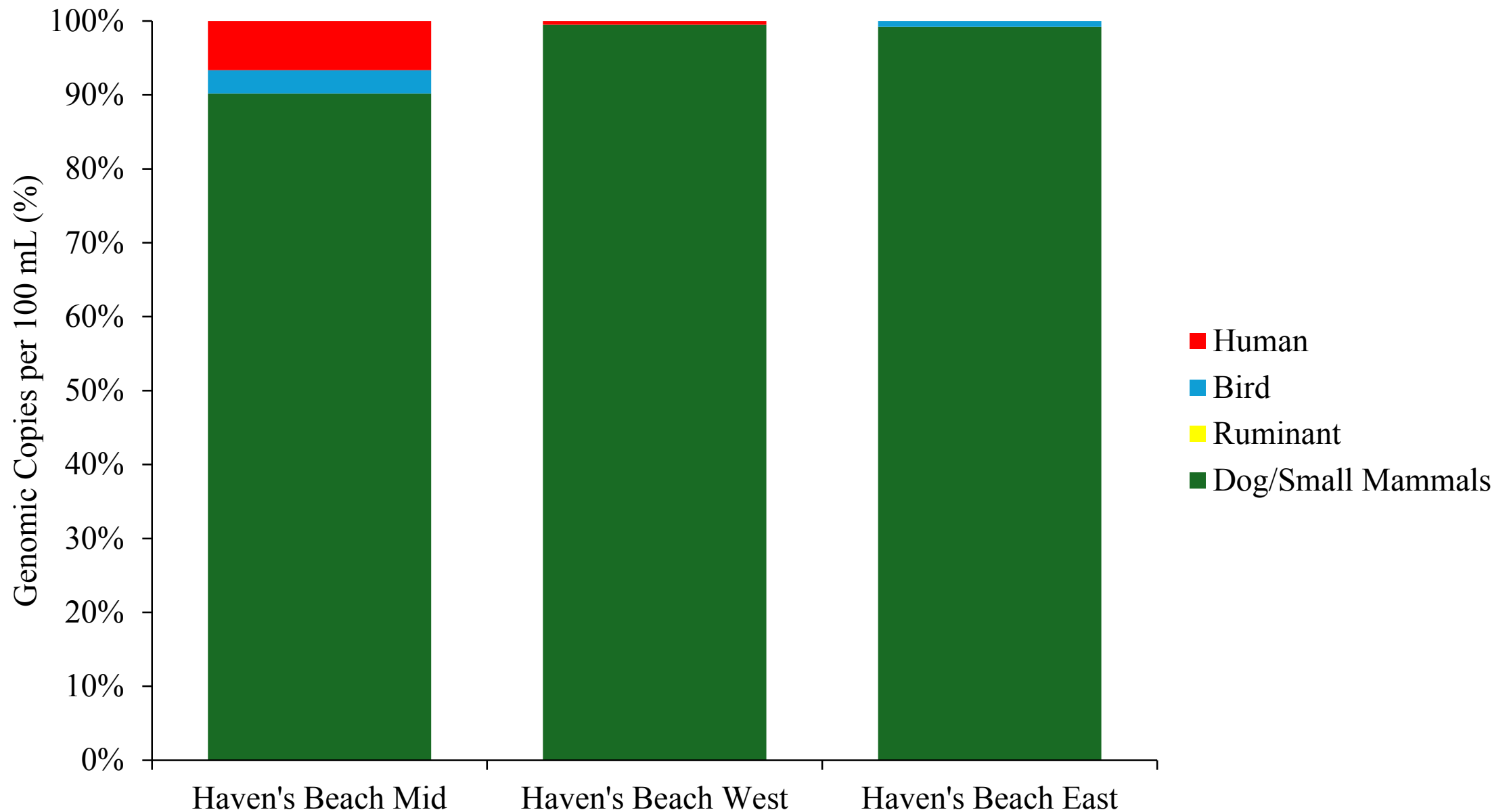
Enterococcus bacteria



Microbial source tracking, absolute abundances

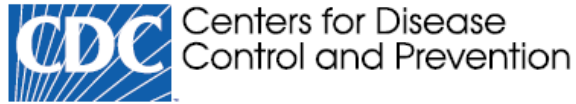
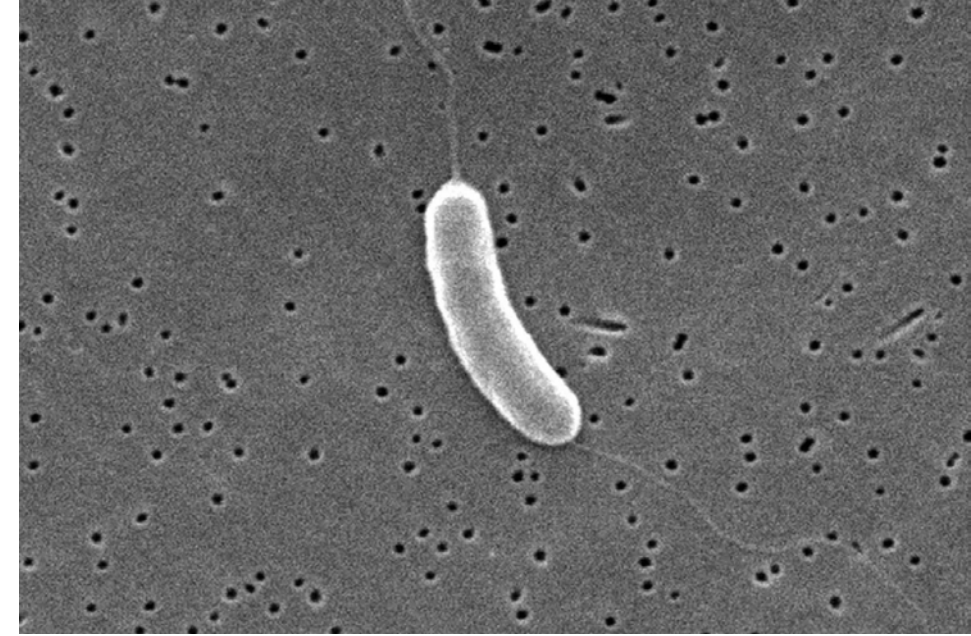


Microbial source tracking, absolute abundances



3 Die in N.Y. Area From Infection Spread Through Seawater and Oysters

The bacteria are found in raw seafood, like oysters, and warm, brackish waters. Climate change may increase the risk of infections from the deadly bacteria farther north.



Emergency Preparedness and Response

[Emergency Preparedness and Response Home](#)

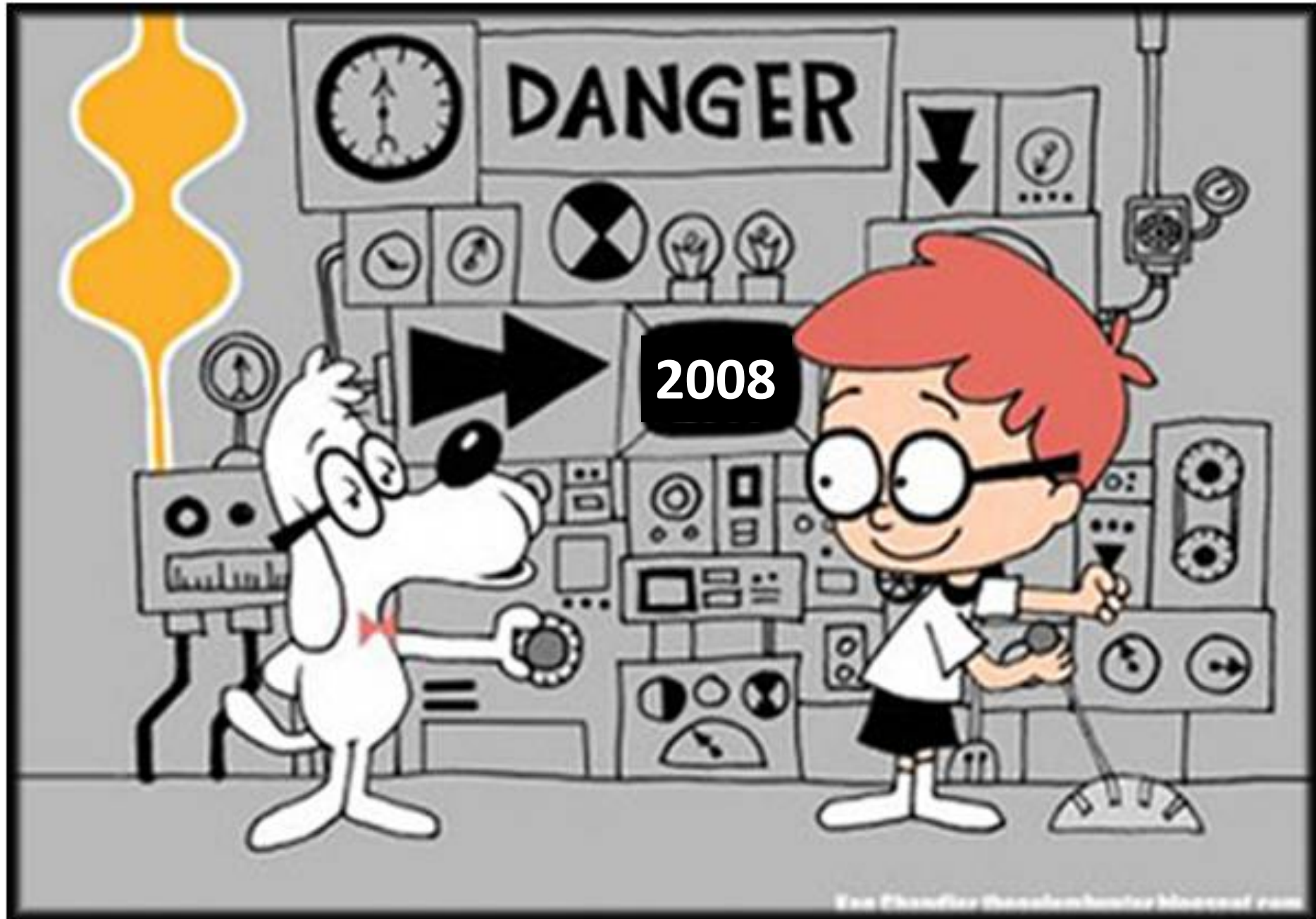
Severe *Vibrio vulnificus* Infections in the United States Associated with Warming Coastal Waters



Distributed via the CDC Health Alert Network

September 01, 2023, 12:30 PM ET

The WayBack Machine

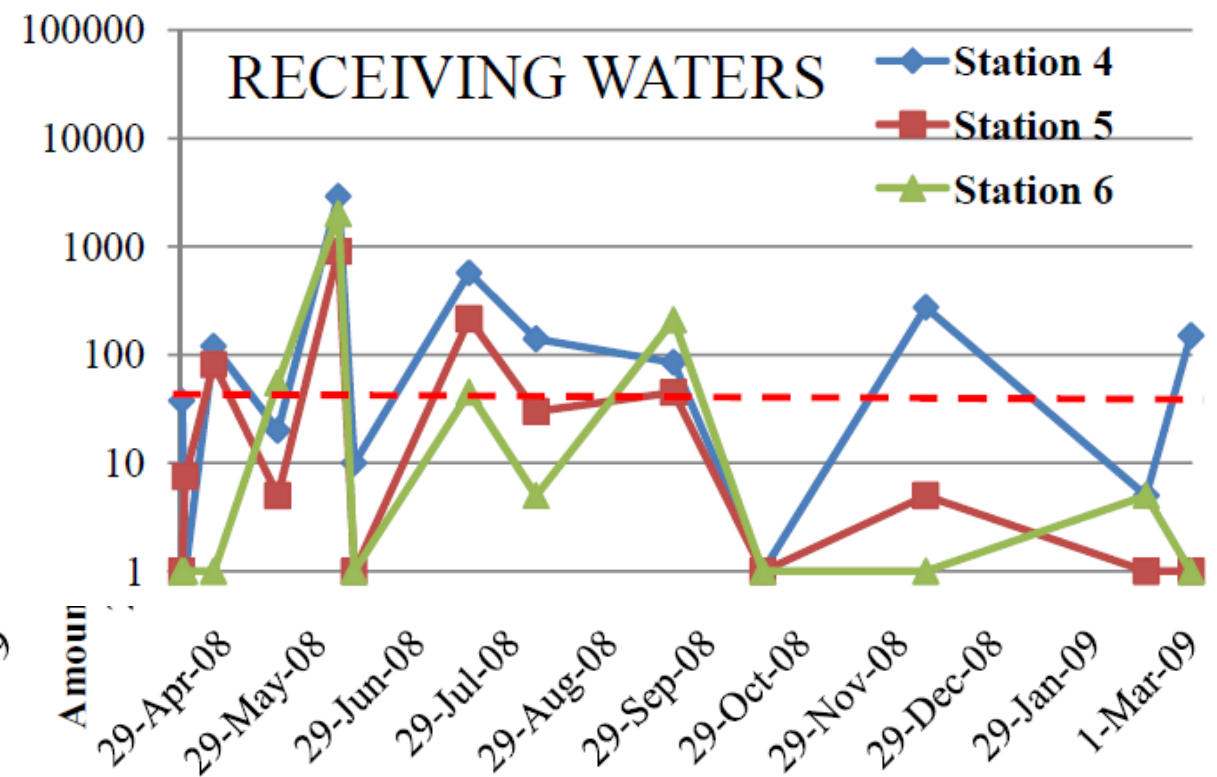
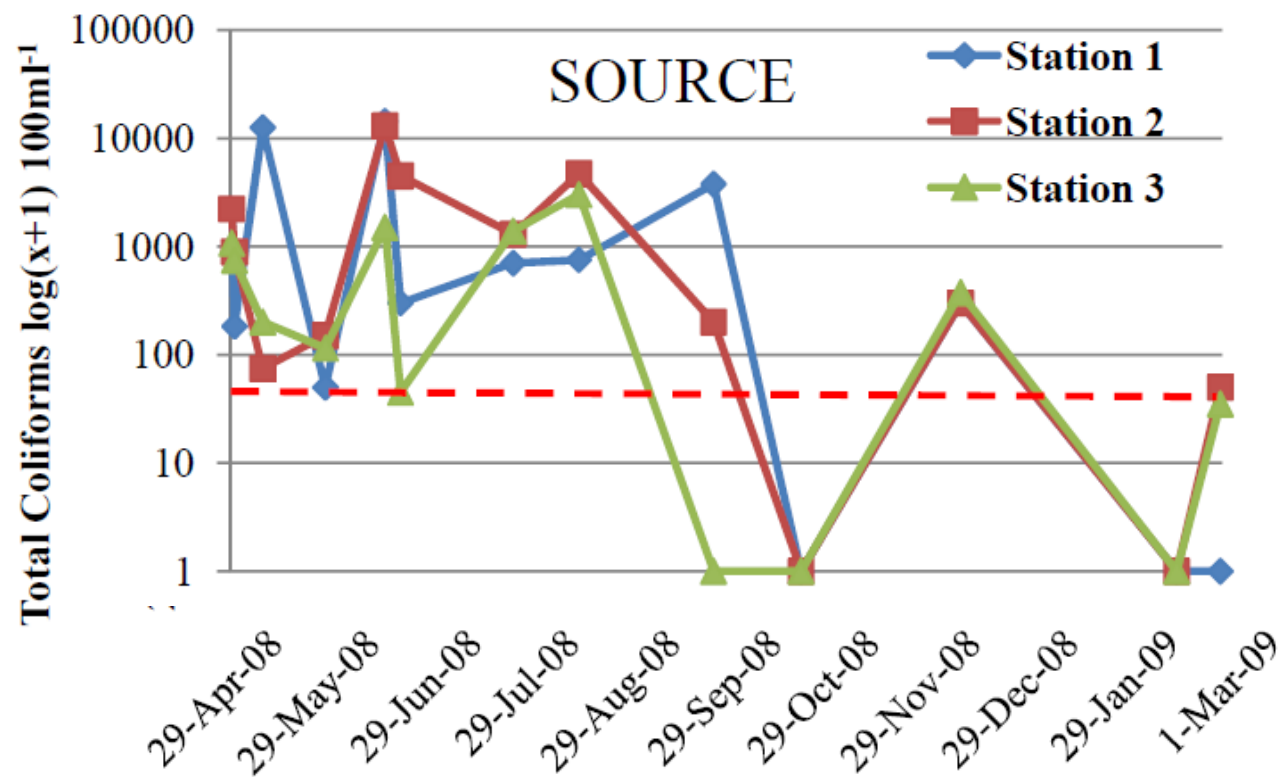


Mr. Peabody's Improbable History

The Wayback Machine: 2008 study



2008 Study, Gobler Lab

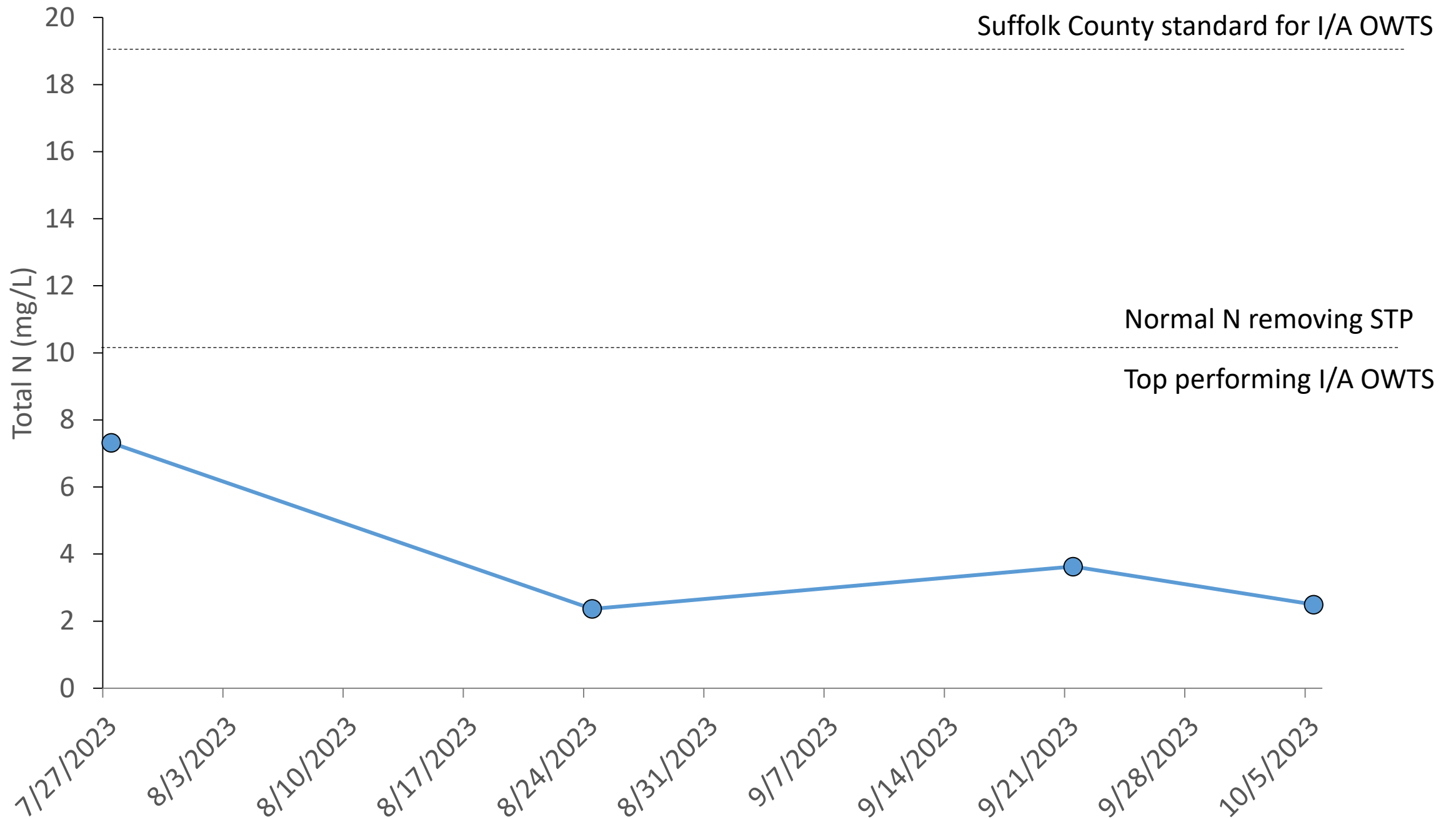


2023 results confirm 2008; see also 2020, 2021, 2022

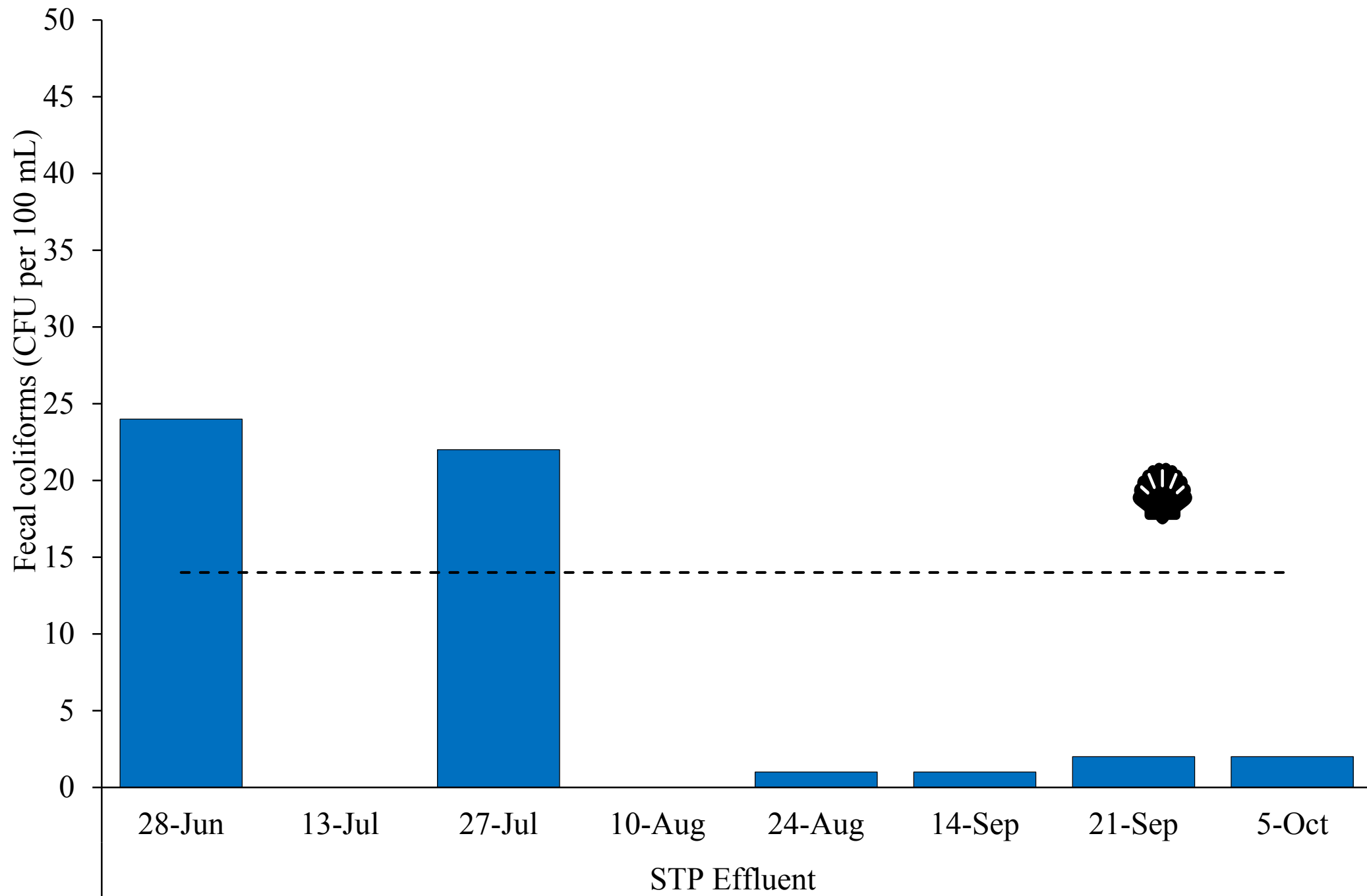
Sag Harbor sewage treatment plant



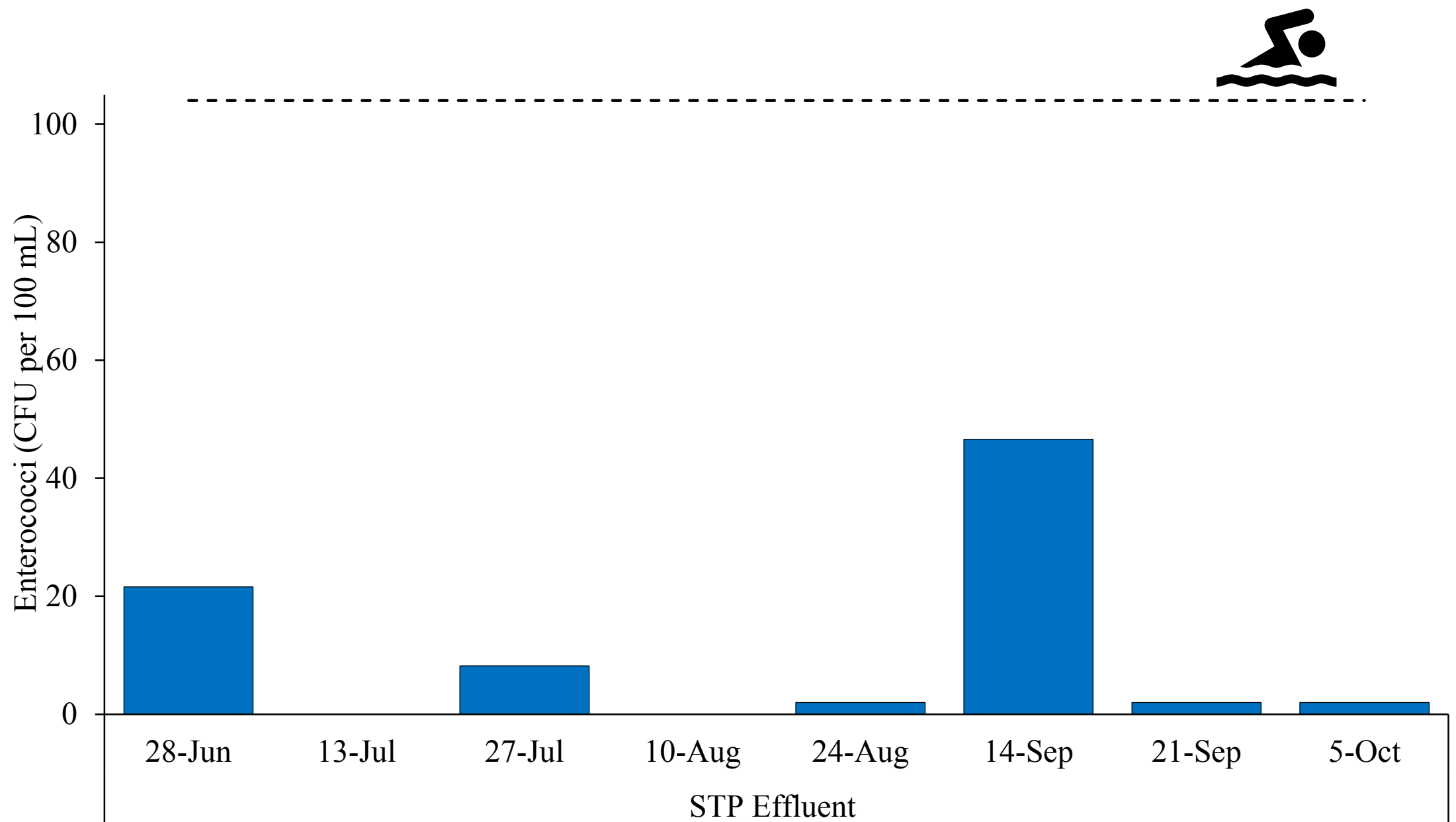
Nitrogen discharge from STP



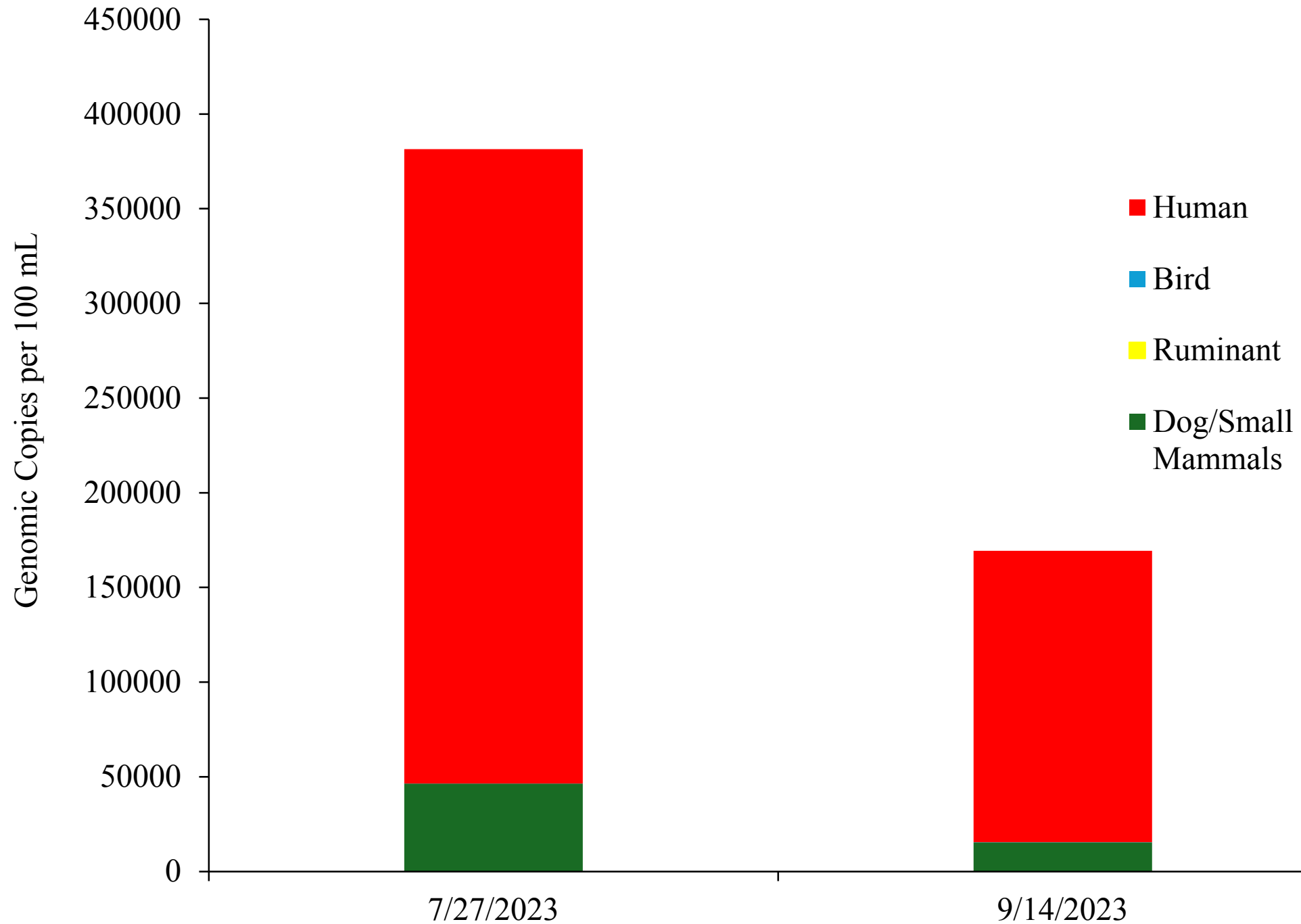
Sag Harbor sewage treatment plant



Sag Harbor sewage treatment plant



Microbial source tracking, STP, mostly human-derived bacteria

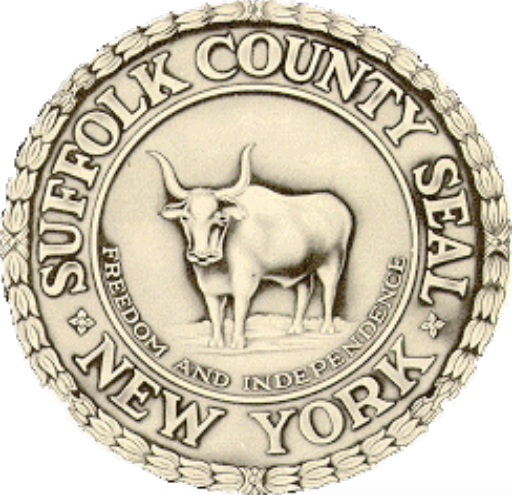


WHAT ARE THE OPTIMAL MANAGERIAL OPTIONS TO IMPROVE WATER QUALITY IN SAG HARBOR?



Steps to improve water quality

- **Nitrogen** was the main source of nutrients promoting algal growth and, in turn, harmful algal blooms, low water clarity, and low oxygen.
- **Wastewater from on-site septic systems** was the primary source of nitrogen in Sag Harbor and Sag Harbor Cove.
- **Upgrading septic systems** and/or **connecting homes to the sewage treatment plant** will reduced the incidence of rust tide, algal blooms, and hypoxia while improving water clarity.
- A cost and feasibility study should be performed to identify regions ideal for **sewering** vs regions where advanced on-site systems would be optimal.



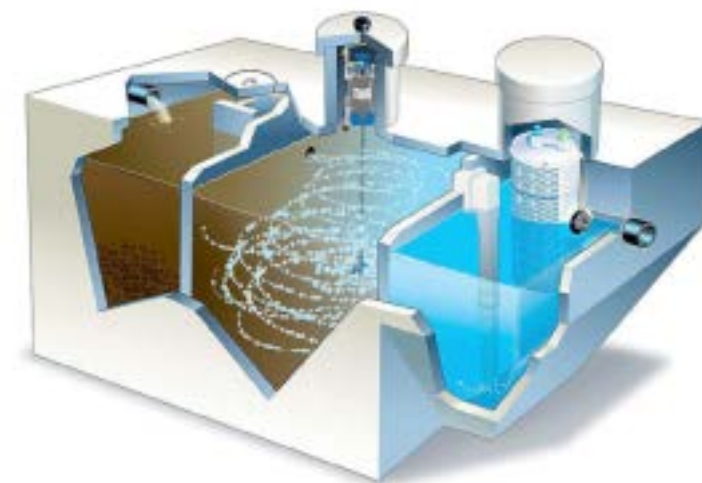
PROVISIONALLY APPROVED LOW N SEPTIC SYSTEMS



Hydro-Action



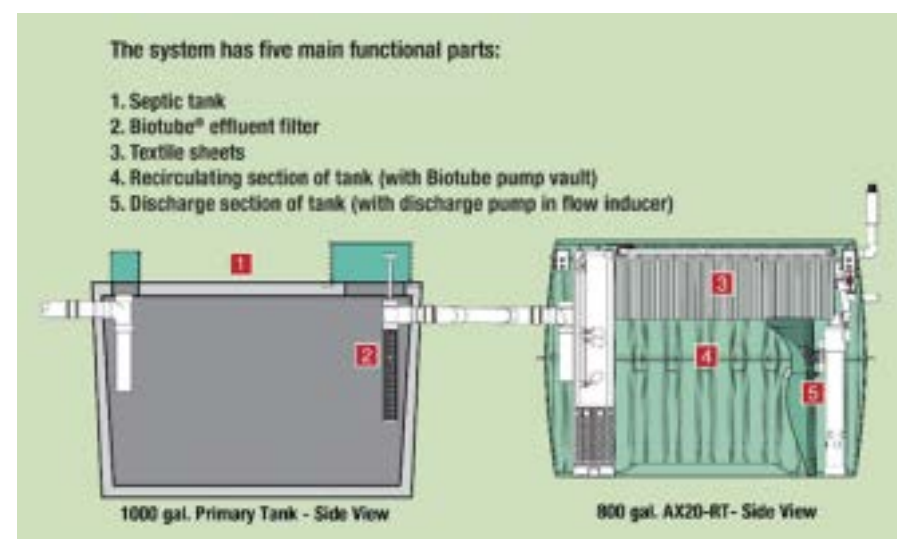
Fuji Clean System



Norweco Singlair TNT



Norweco Hydrokinetic

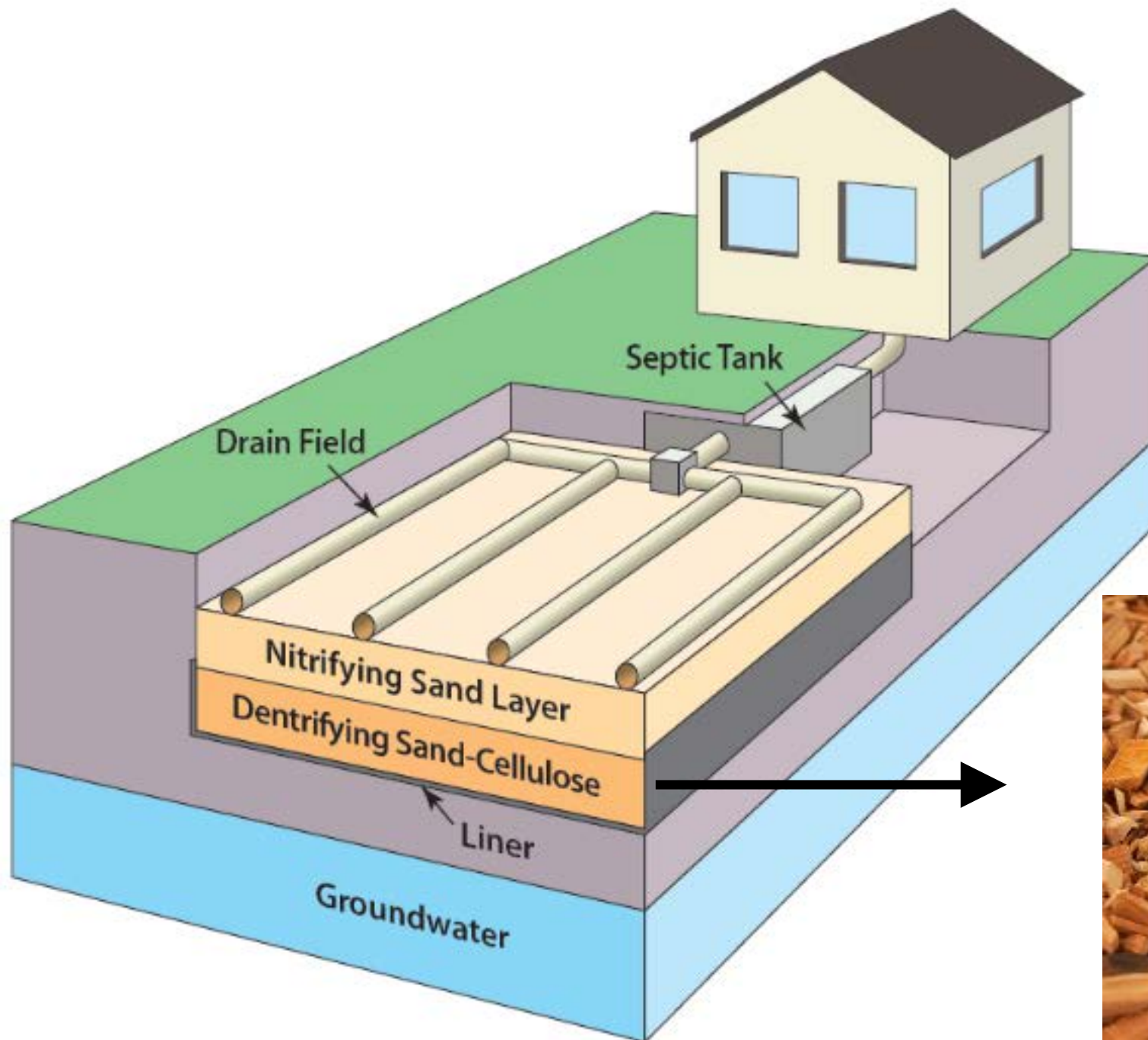


Orenco Advantex AX-RT

The New York State Center for Clean Water Technology:

*Harnessing science to engineer clean water for
the protection of public health and the
environment in New York and beyond.*

Nitrogen Removing Biofilters (NRB)

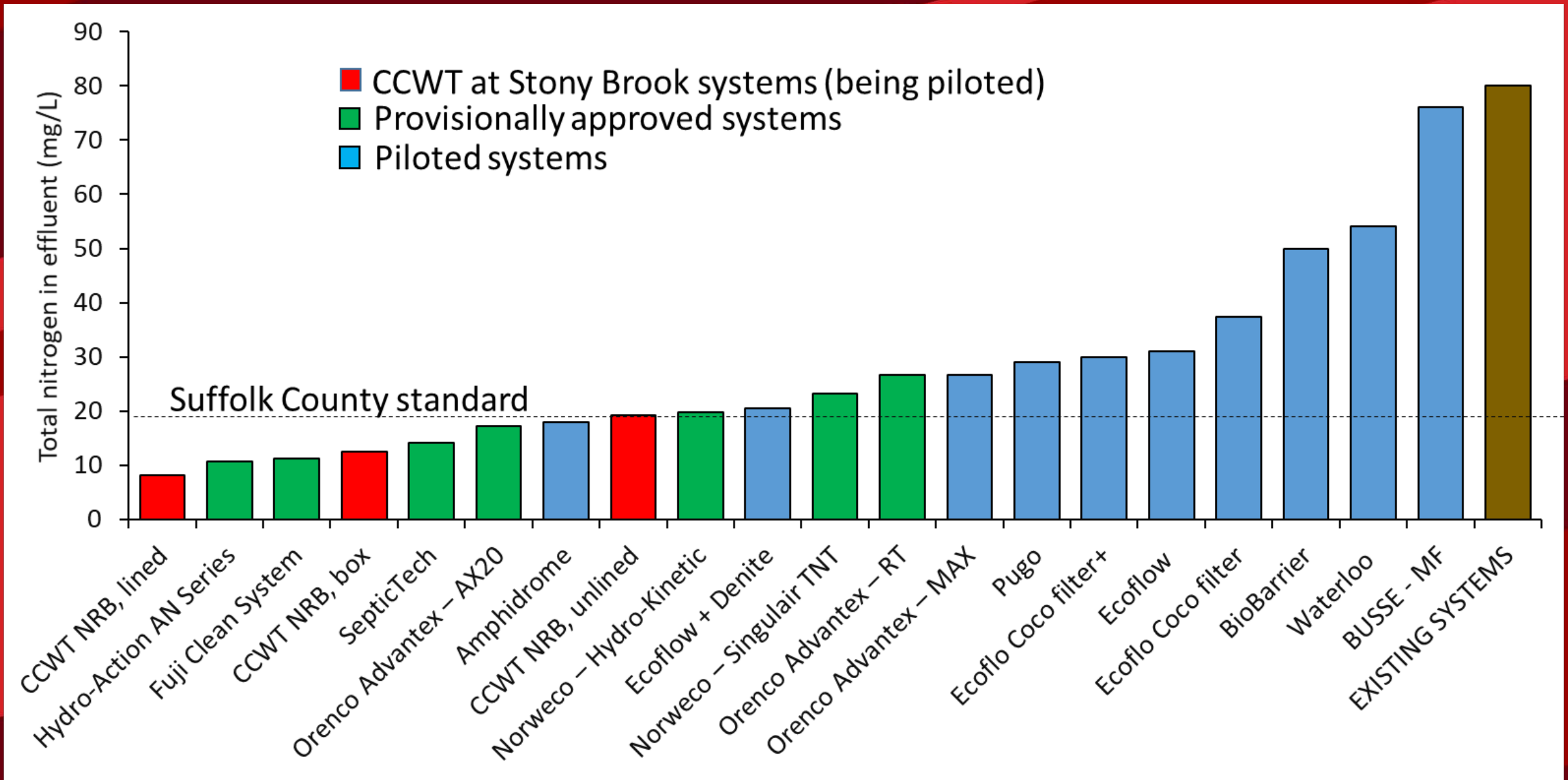


Lignocellulose = wood, chips



Carbon source to promote denitrification

Comparison of I/A performance in Suffolk County

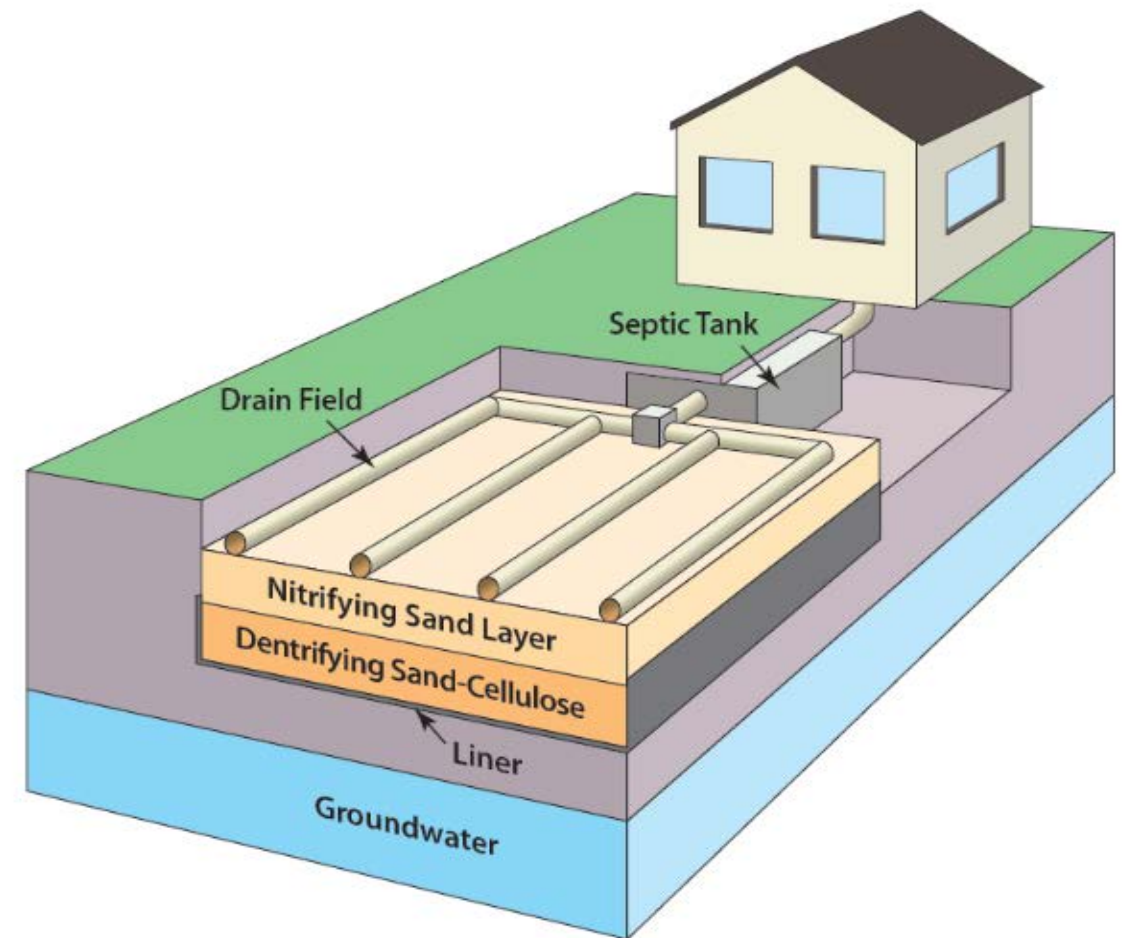


50 – 100% removal of two dozen drugs, pharmaceuticals, personal care products by NRBs in Suffolk County; more than other systems and STPs

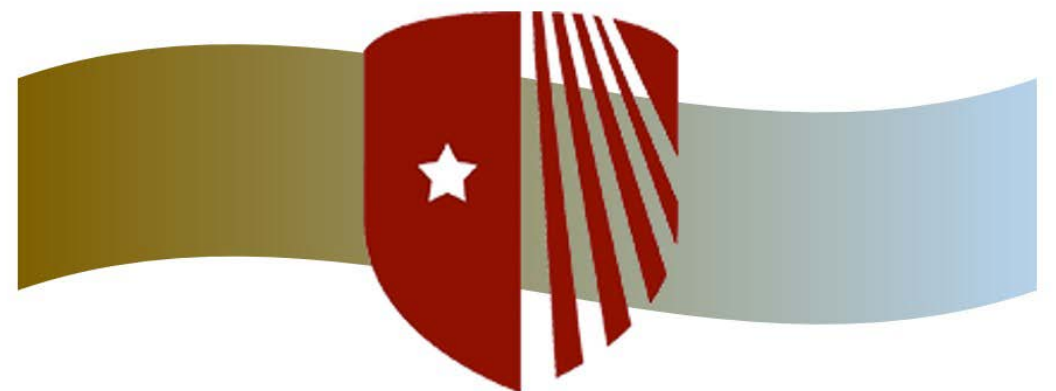
Compound	Use	Removal (%)
Acetaminophen	NSAID	94 – 100
Caffeine	stimulant	99 – 100
Paraxanthine	human metabolite of caffeine	98 – 99
DEET	mosquito repellent	82 – 96
Nicotine	stimulant	92 – 97
Cotinine	human metabolite of nicotine	86 – 98
Sulfamethoxazole	antibiotic	85 – 97
Diphenhydramine	antihistamine	97 – 95
Trimethoprim	antibiotic	87 – 90
Ciprofloxacin	antibiotic	64 – 78
Atenolol	beta blocker	88 – 97
Metoprolol	beta blocker	85 – 90
Diltiazem	calcium channel blocker	76 – 90
Carbamazepine	anticonvulsant	51 -60
Ketoprofen	NSAID	68 – 74
TCEP	flame retardant	60 – 70
Salbutamol	bronchiodialator	50 – 78
Ranitidine	anti-acid	82 – 100
Diclofenac	NSAID	76
Propranolol	beta blocker	98 – 100
Venlafaxine	antibiotic	98
Fluoxetine	antidepressant (SSRI)	64 – 66
Lamotrigine	anticonvulsant	82
Primidone	anticonvulsant	58

Nitrogen Removing Biofilters (NRB)

- Lined NRBs have outperformed all I/A OSWTS in Suffolk County and remove emerging contaminants better than STPs.
- Lined NRBs have received provisional approval for installation in Suffolk County and are eligible for grant funding by SC, EH, and SH.
- CCWT can assist in facilitating installations



New York State Center for Clean Water Technology
Stony Brook **University**



WHAT ARE THE OPTIMAL MANAGERIAL OPTIONS TO IMPROVE WATER QUALITY IN SAG HARBOR?



NYSDEC shellfish bed closures



Addressing fecal bacteria contamination

- **Mitigating surface run-off from Haven's Sump to reduce levels of fecal bacteria should be a priority; adjacent region is open for shellfishing and swimming.**
- Runoff from Windmill Beach, the Beacon Vaults, and other sources should be mitigated; discharge to ground could be an option.
- Vessel discharge is a second source of contamination and should be tightly regulated.
- No swimming orders based on rainfall should be in place to minimize exposure fecal bacteria within inner harbor and Windmill Beach and Havens Beach.

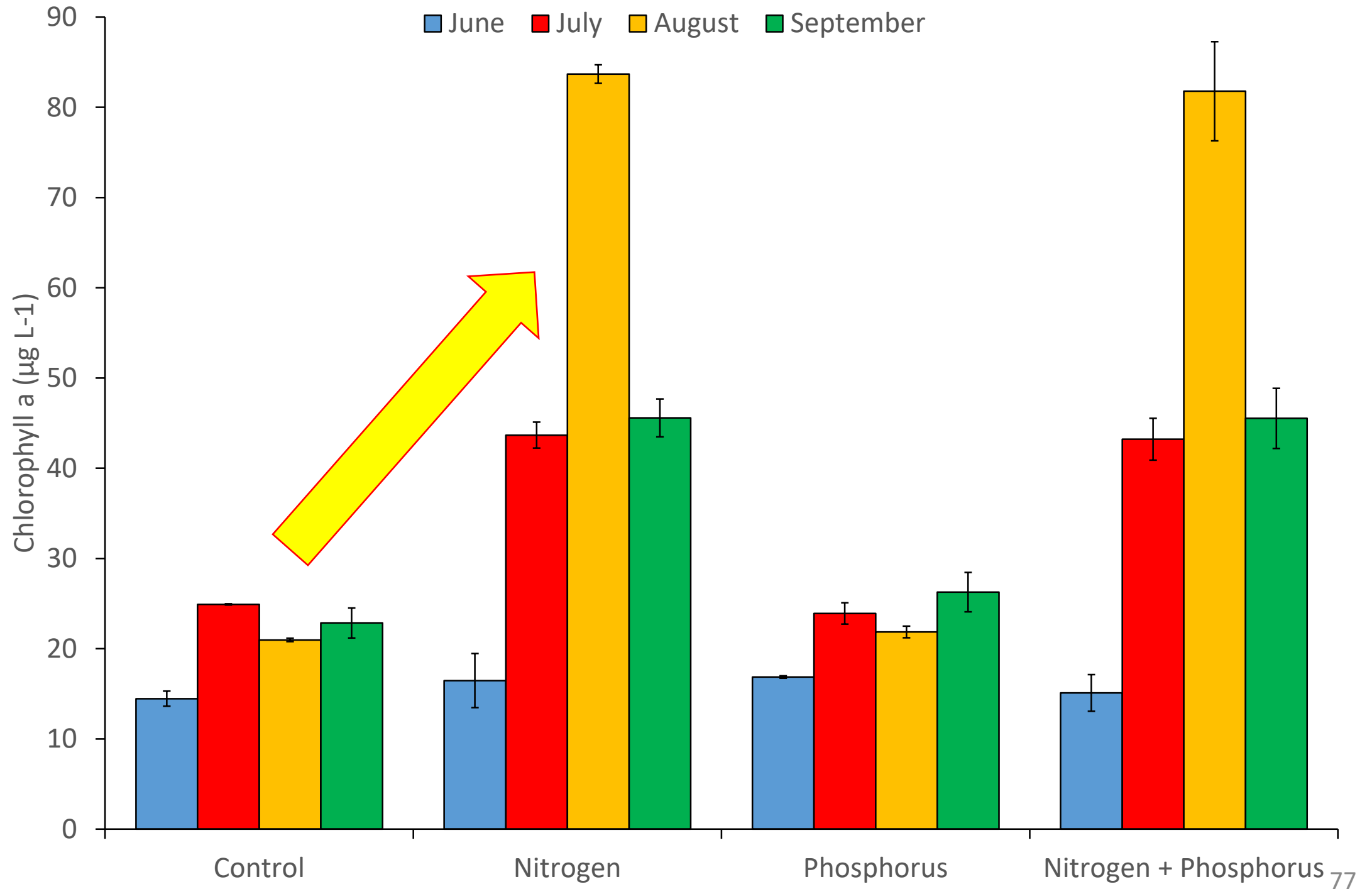
Conclusions:

- Water quality conditions in Sag Harbor were, on average, good.
- Water quality impairments included low oxygen, algal blooms, and pathogenic bacteria detected at levels exceeding state and federal guidance values.
- The Haven's Sump is contaminating Haven's Beach; Mitigating runoff Haven's Beach to reduce levels of fecal bacteria should be a priority; this region is open for shellfishing and swimming.
- Treating land runoff from the Beacon site and the Windmill Beach outfall before discharge is recommended.
- Upgrading septic systems and/or connecting homes to the sewage treatment plant will reduced the incidence of rust tide, algal blooms, and hypoxia while improving water clarity.
- Continued monitoring will be required to document future changes and improvements.

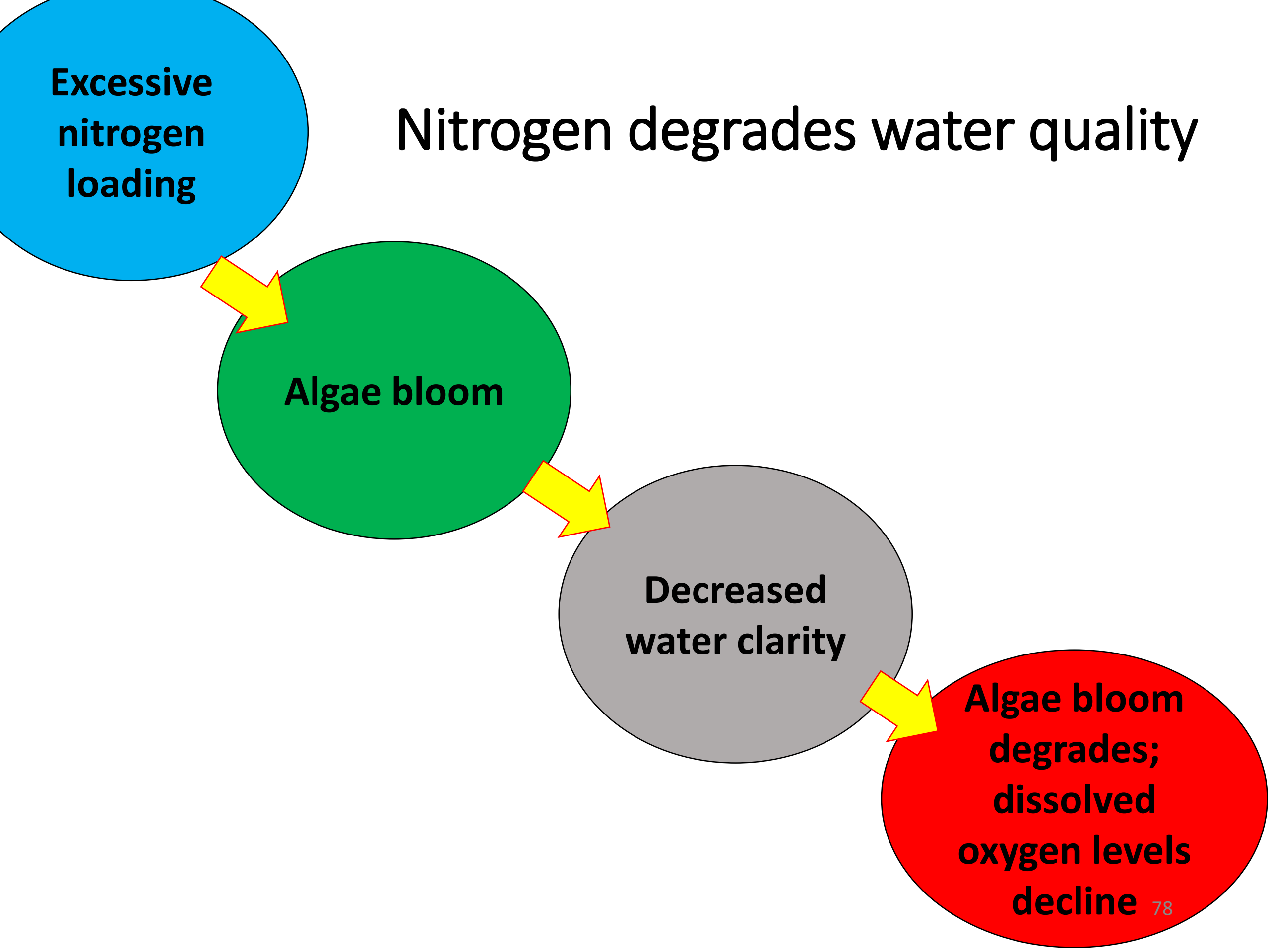
Acknowledgements

- Thank you to:
 - **Mary Ann Eddy** for her tireless efforts in organizing and supporting this (*complex*) study.
 - The Sag Harbor Water Quality Committee for their support and patience.
 - All other supporters of the project: East Hampton Town Trustees, Southampton Town Trustees, Southampton Town, Sag Harbor Village, individual donors.
 - Students and scientists from the Gobler Lab including Jen Goleski, Ruthie Drinkwater, Tim Wong, Lucas Chen, and many more...

Response of algal populations to nitrogen and phosphorus, Upper Sag Harbor Cove 2019



Nitrogen degrades water quality



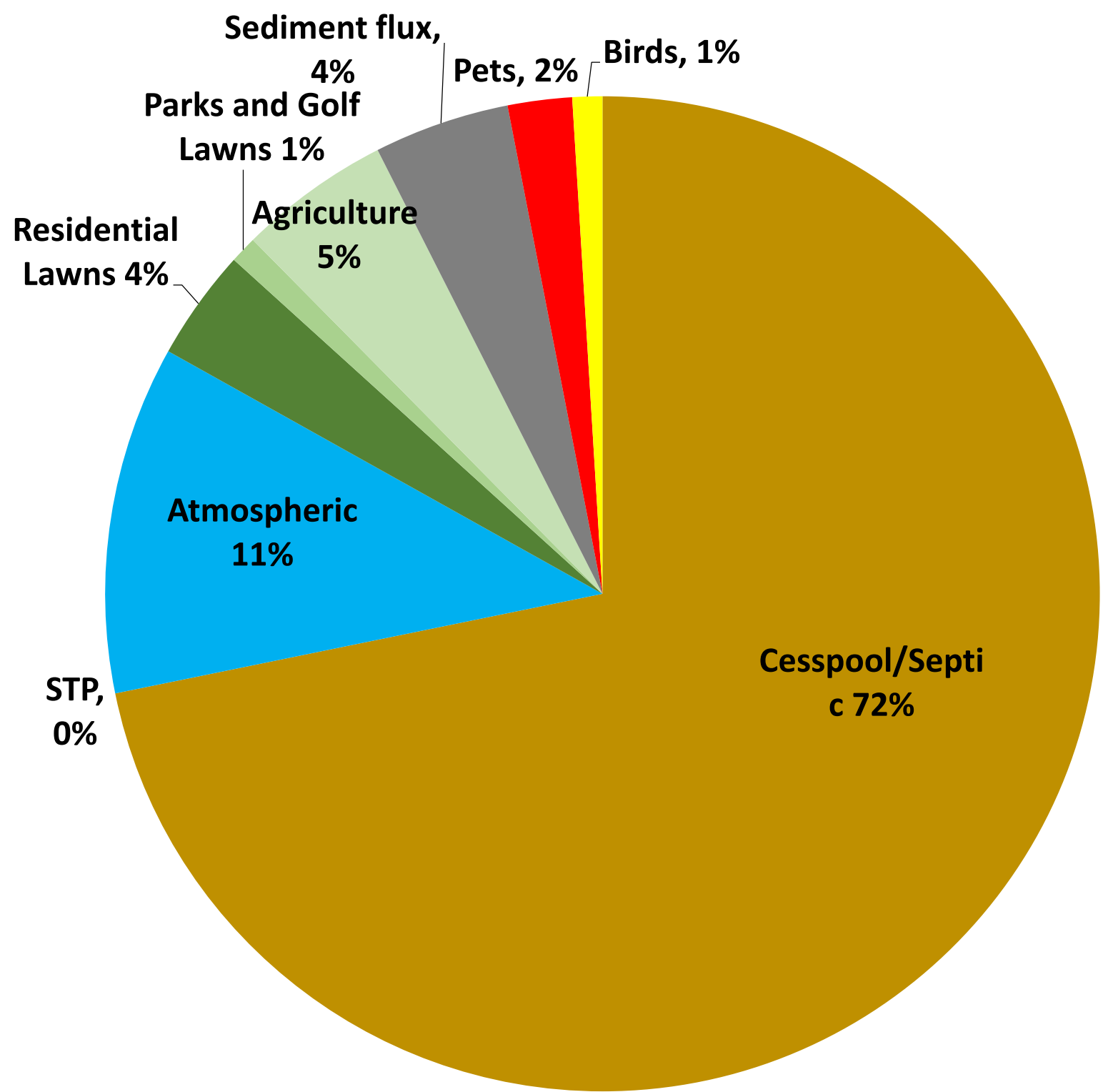
**Excessive
nitrogen
loading**

Algae bloom

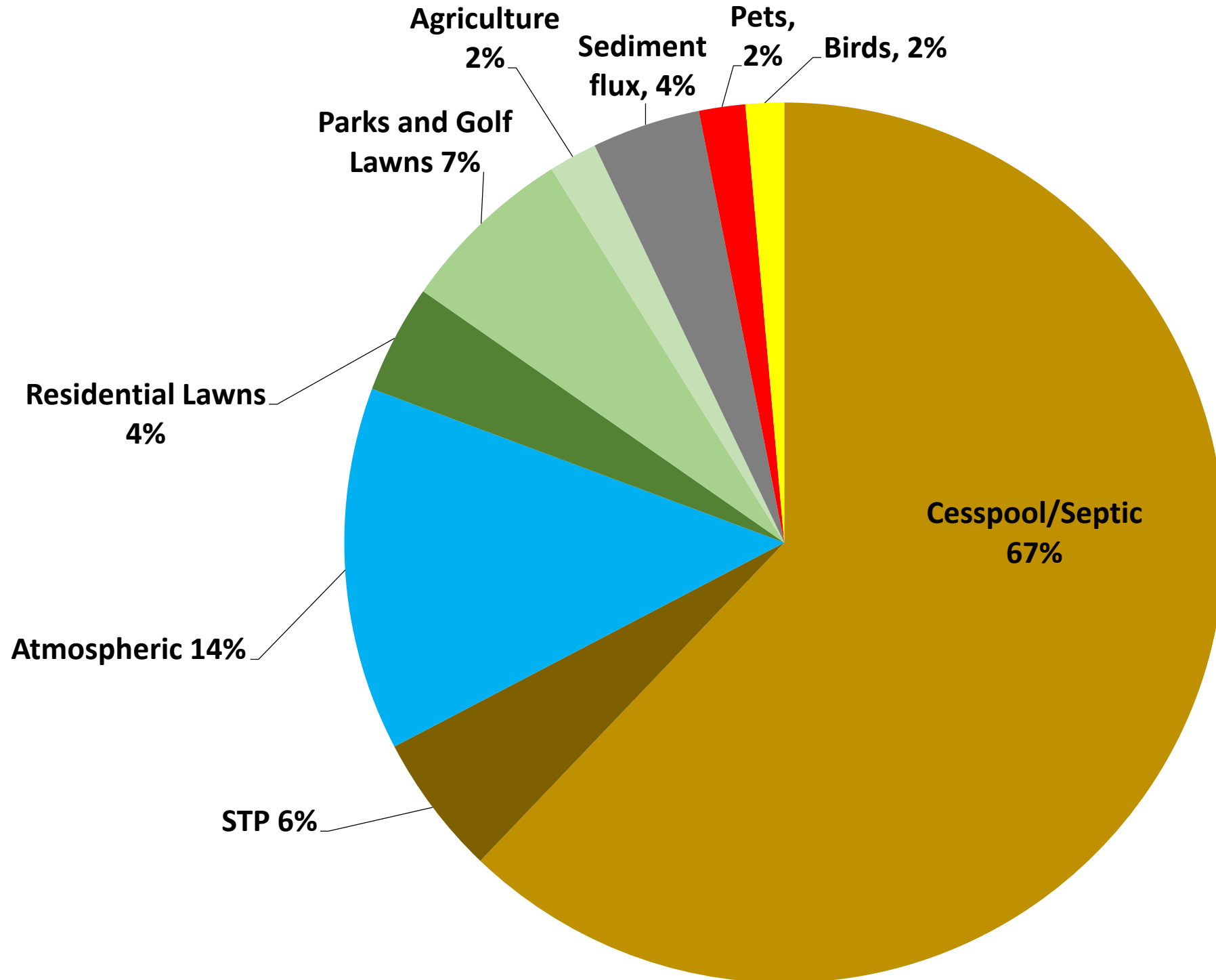
**Decreased
water clarity**

**Algae bloom
degrades;
dissolved
oxygen levels
decline**

Percent nitrogen loads from various sources to Sag Harbor Cove



Percent nitrogen loads from various sources to Sag Harbor



Appendix J

Budget Estimate

SHORT BEACH ROAD/POLLES CREEK STORMWATER RUNOFF BIOSWALE WATER QUALITY IMPROVEMENT PROJECT

Construction and Maintenance Cost Estimate

Description of Item	Unit of Measurement	Estimated Quantity	Estimated Unit Cost	Extended Amount
Site Preparation including Clearing & Grubbing	LS	1	\$6,000.00	\$6,000.00
Unclassified Excavation (Unsuitable Subgrade Soils for Drainage)	CY	300	\$30.00	\$9,000.00
Pea Gravel	CY	20	\$110.00	\$2,200.00
Crushed Gravel	CY	120	\$85.00	\$10,200.00
Mulch	CY	20	\$85.00	\$1,700.00
Planting Soil	CY	100	\$55.00	\$5,500.00
Grading, Furnish & Spread Topsoil and Seed	SY	25	\$18.00	\$450.00
Filter Fabric	SF	2,000	\$3.00	\$6,000.00
Bioretention Plantings	LS	1	\$20,000.00	\$20,000.00
Maintenance/Cleaning of Bioretention Facility (Semi-Annual)	LS	2	\$2,250.00	\$4,500.00
TOTAL ESTIMATED CONSTRUCTION & MAINTENANCE COST				\$65,550.00

Prepared 03/08/24 by The Raynor Group, P.E. & L.S., PLLC

Appendix K

Letters of Support

Village of North Haven

335 FERRY ROAD
SAG HARBOR, NEW YORK 11963

PHONE: 631-725-1378

FAX: 631-725-1120

March 15, 2024

Ms. Maria Moore, Supervisor
Town of Southampton
116 Hampton Road
Southampton, New York 11968

Re: Community Preservation Fund – Water Quality Improvement Projects

Dear Supervisor Moore and Town Councilmen & Councilwoman,

I am writing to you on behalf of the North Haven Village Water Quality Improvement Committee to support the three 2024 CPF applications from North Haven Village Hall for water quality improvements. These applications support our overall plan in North Haven to improve water quality in our ponds, creeks, bays and aquifers.

The 2024 applications submitted are for stormwater infrastructure improvement on Fresh Pond Road to mitigate pollutants in Great Salt Pond and Fresh Pond, a stormwater runoff and rain garden installation to improve water quality in Ryders Pond and a bioswale project on Short Beach Road to mitigate stormwater runoff into Polles Creek. All of these waterbodies – Great Salt Pond, Fresh Pond, Ryders Pond and Polles Creek are important natural resources that have been enjoyed by generations of families on North Haven, and that we seek to protect and improve for future generations. Great Salt Pond, Fresh Pond and Polles Creek are currently impaired as demonstrated by water quality testing performed by Dr. Christopher Gobler's lab at Stony Brook University School of Marine and Atmospheric Sciences.

Our Committee formed in 2022 with the objectives to establish a plan to measure the water quality in our creeks, coves, ponds and shoreline and to define the actions that can be taken to address and mitigate the causes of pollution. The Committee also desires to raise the awareness of the community on the importance of clean water quality initiatives and actions. Since our establishment, our Committee has formed strong partnerships with the Peconic Estuary Partnership and Dr. Chris Gobler, Stony Brook



School of Marine and Atmospheric Sciences. We have begun tracking the number of I/A septic systems installed and in-progress in North Haven.

In 2023 a CPF grant was approved for the installation of an I/A sanitary system at Village Hall. The system will be installed in 2024 and will set the example for the North Haven Community.

Following are the 2023/2024 North Haven Village Water Quality Improvement Committee's Program & Accomplishments:

1. EDUCATION & ENGAGEMENT OF RESIDENTS

- a. Innovative/Alternative Septic Systems & Grants Available to Homeowners
 - Presentation delivered in 2023 by Peconic Estuary Partnership & SCDOH on impact on water quality of traditional cesspool septic systems
 - Recording available on Village Website
 - Grant Information on Village Website & at Village Hall
 - Track # of I/A systems in the Village
 - Focused mailing to be sent to waterfront homeowners in 2024
- b. Impact of Fertilization on Water Quality
 - Presentation delivered in 2023 by Edwina Von Gal, Perfect Earth Project, on fertilization alternatives
 - Recording available on Village website
 - Committee currently researching legislative ban on fertilization

2. PECONIC BLUE CARBON PILOT

- a. Village of North Haven is supporting Dr. Gobler and Stony Brook University and PEP by participating in pilot activities
 - Summer/Fall 2023 – water quality testing, bottom mapping
 - Winter/Spring 2024 – kelp lines

3. VILLAGE INFRASTRUCTURE PROJECTS

- a. Identify with Village Engineer infrastructure projects within the Village to improve storm water runoff
- b. Apply for CPF water quality improvement program funds to support costs

4. ENFORCEMENT OF VILLAGE VEGETATED BUFFER CODE

- a. Initiate a focused effort to enforce zoning code section 163-20 regarding vegetated buffers for waterfront and wetland facing homes

5. ONGOING WATER QUALITY TESTING

- a. Contracted with Dr. Chris Gobler, Stony Brook University, to perform testing of five key North Haven water bodies from May to October.
 - Post results on Village website
 - Completed in 2023
 - Contracting for 2024

6. RESTORE HEALTH OF GENET CREEK, FRESH POND AND GREAT SALT POND

- a. Initiate a plan to dredge the inlets to Genet Creek, Great Salt Pond to restore historical tidal flow to these key estuaries and improve water quality

Thank You for your consideration of these important applications and water quality projects for the Village of North Haven,

Terie Diat, Village Trustee

North Haven Water Quality Improvement Committee

Terie Diat, North Haven Village Trustee

Jeffrey Sander, (Former Mayor North Haven Village) Committee Member

Wes Frye, Committee Member

Christopher Remkus, Committee Member

James McCarthy, Committee Member