

The Plan to Address Toxic Cyanobacteria Blooms in NH

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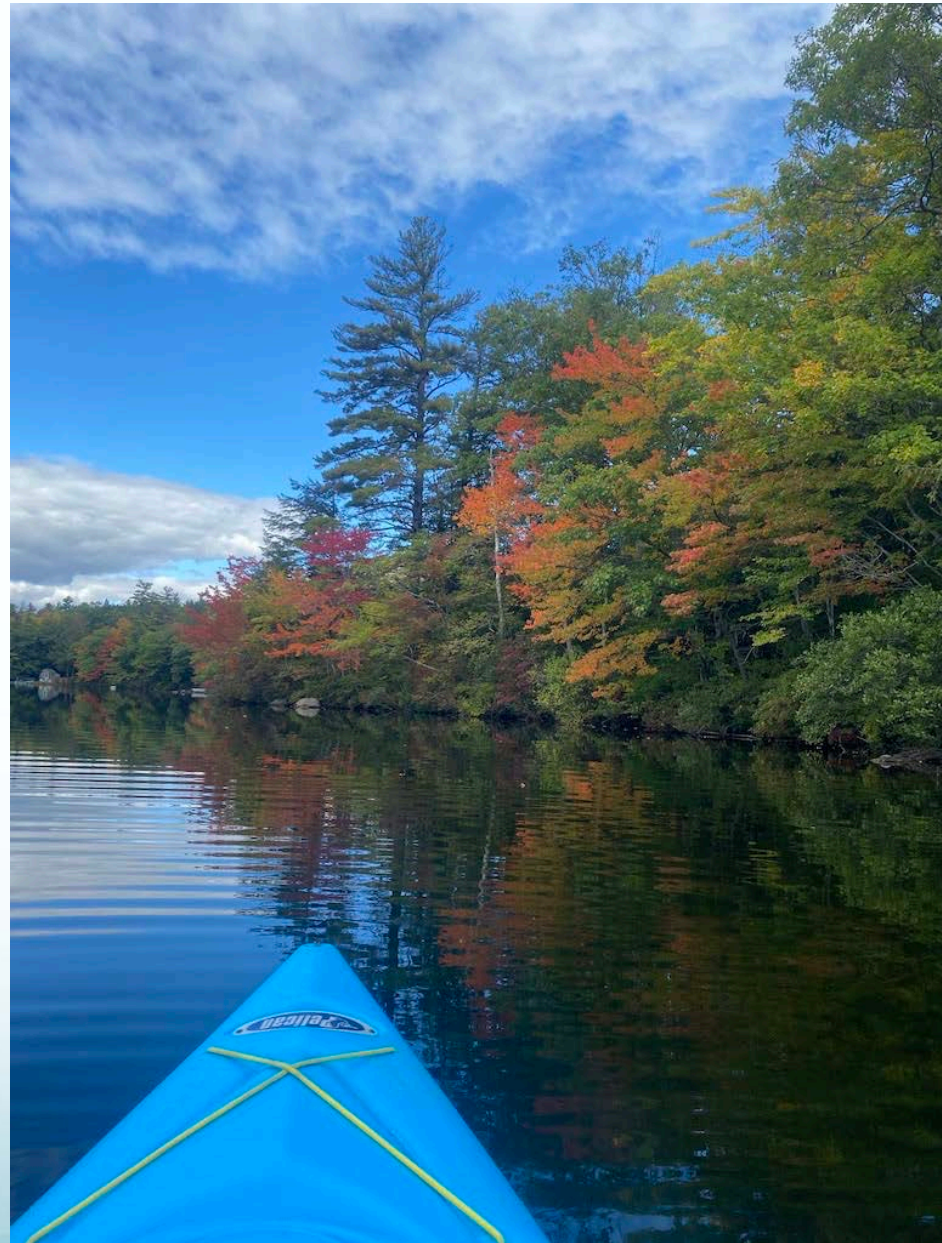
NH Lakes Congress, June 2, 2023

Cyanobacteria Blooms

- ❑ Cyanobacteria can produce toxins (cyanotoxins) that pose a threat to the health of humans, livestock, pets and wildlife. The toxins can bio-accumulate.
- ❑ Cyanobacteria can hurt local economies by disrupting drinking water systems and source waters, recreational uses, commercial fishing, and property values.
- ❑ Causes of blooms: excess nutrients (**phosphorus**, nitrogen), i.e., eutrophication. Climate change (warmer water, shorter winters, stronger rainstorms).
- ❑ Bloom intensity and frequency is increasing globally. Historically, blooms dissipate by 2 – 3 weeks.

Tucker Pond

- Small 58-acre lake in Salisbury, NH
- Oligotrophic until recently
- The watershed is forested



The Cyano Bloom of 2020



Aug 24, 2020



Sept 28, 2020

And Again in 2021



Cyano for 100 Days in 2022



Cyanobacteria Blooms On Tucker Pond

NH DES Advisories:

2019	14 days	Fall
2020	132 days	July - Nov
2021	57 days	June – Aug
2022	100 days	Aug - Nov

These blooms have been prolonged, pronounced, and a danger to our health and property values.

NH House Bill 1066

- ❑ Given the problem of increased cyanobacteria blooms affecting the economy and health in NH,
- ❑ Representative Rosemarie Rung and Senator Suzanne Prentiss sponsored HB-1066.
- ❑ Hearings on HB-1066 were held in January and April 2022. Strong public support (YOUR support) was essential for passing HB-1066.
 - NH Lakes Public Policy & Advocacy Program

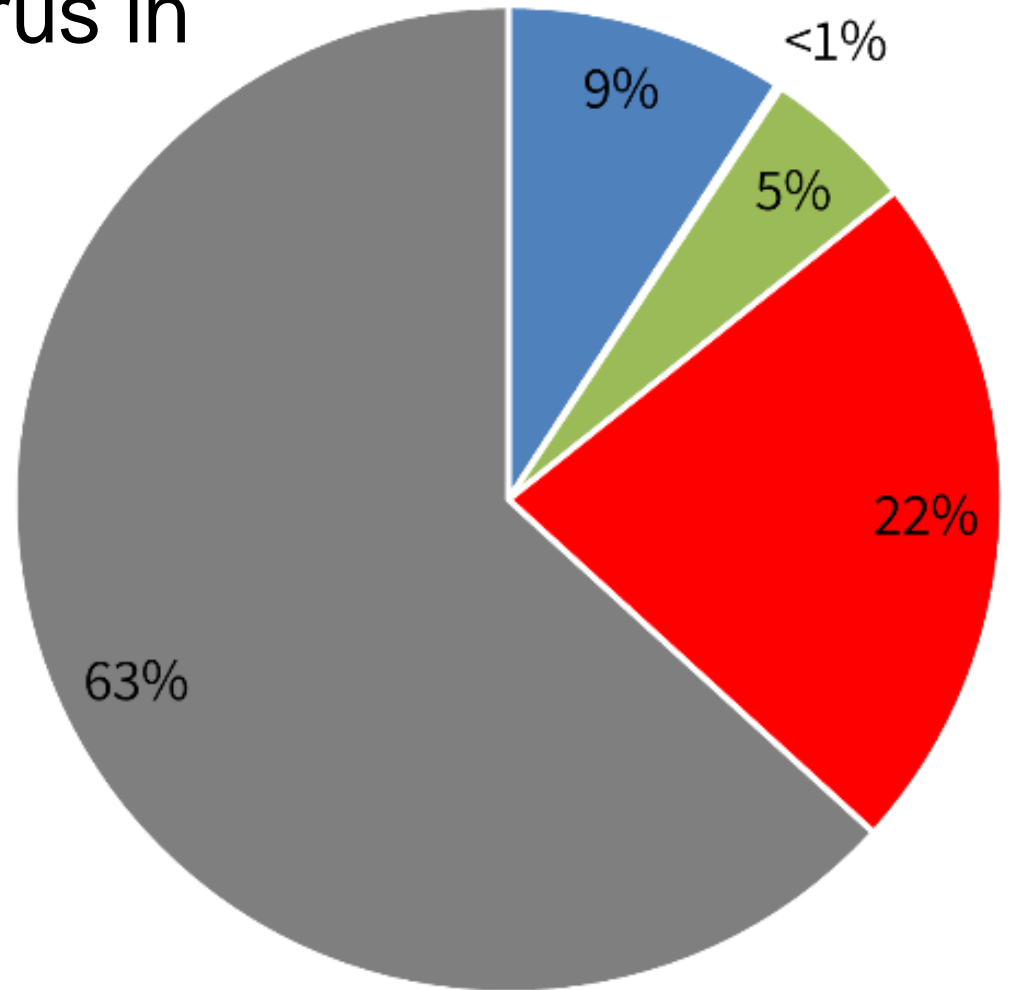
HB1066 Cyano Advisory Com.

- ❑ Requires the commissioner of NHDES to prepare a plan relative to cyanobacteria blooms in New Hampshire
- ❑ Required NHDES to establish a Cyanobacteria Advisory Committee to provide input on actions necessary to address bloom impacts.
- ❑ 17 members; including NH Lakes, lake associations, Environmental Engineers, NHDES, veterinarian, UNH, The Nature Conservancy, NH Rivers Council, NH Fish + Game, NHDHHS,

What did the Cyano Advisory Committee Discuss?

Sources of Phosphorus in Tucker Pond

- Atmospheric
- Internal Loading
- Waterfowl
- Septic Systems
- Storm Runoff



Statewide cyanobacteria plan for New Hampshire's surface waters: A preview



← Less of this

More of this →



Statewide cyanobacteria plan for New Hampshire's surface waters

TIMELINE:

Draft early July

Internal / Committee review end August

Finalize report

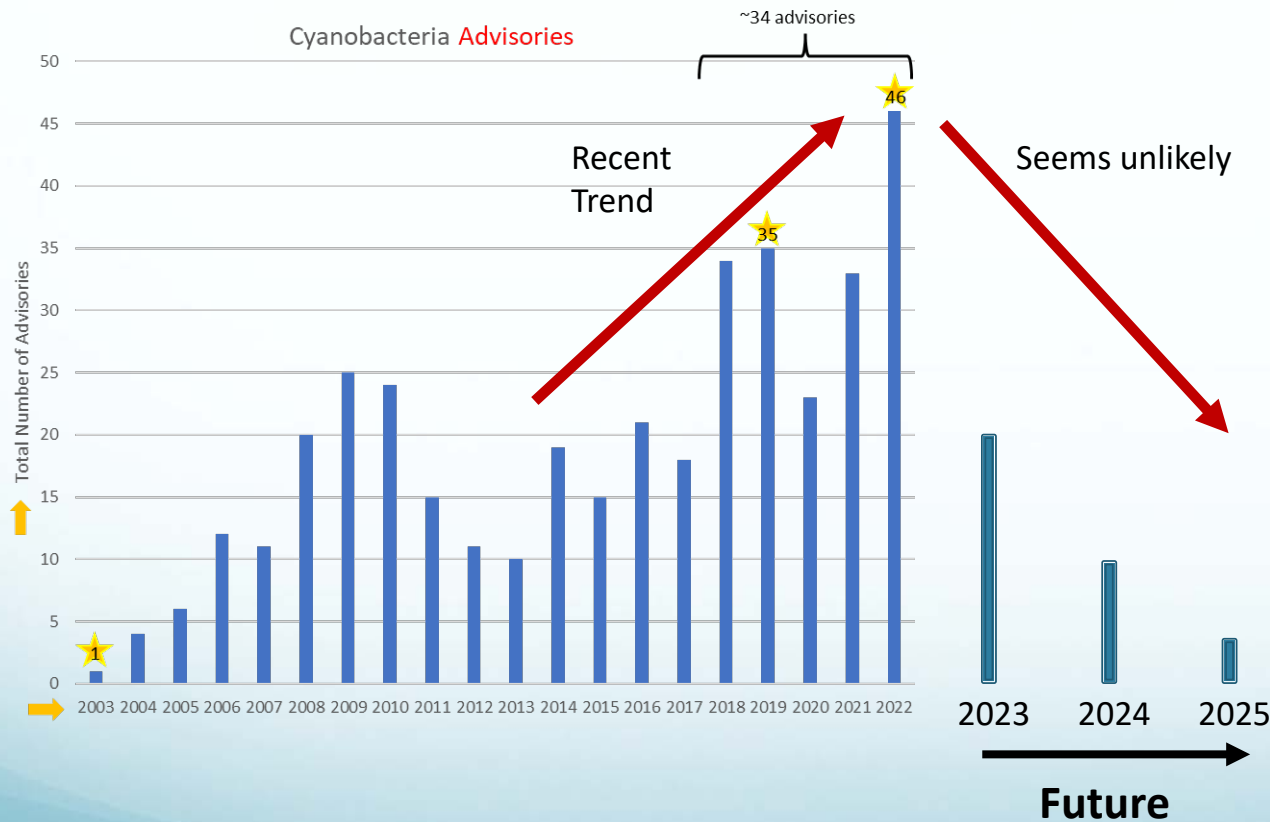
Submit to Governor by Nov. 1

- Will focus on 10-year period
- Serve as an “action document”
- Not all-inclusive

Major Focal Categories Identified by Cyanobacteria Plan Advisory Committee and NHDES staff

- Improved reporting and communication system.
- Focus on outreach material development and messaging.
- In-lake management guidance and policies.
- Additional support for watershed planning and implementation.
- Emphasis on nutrient reduction and control.

Bloom Status Check



Reality: Blooms aren't going away.

Improved reporting and communication system

Advanced Information Transfer Tools

Updated Mapper

The screenshot displays the 'Healthy Swimming Mapper' interface. On the left is a map of Vermont with a black oval highlighting the White Mountains region. To the right are three panels:

- Current Beach Advisories:** No current advisories.
- Current Cyanobacteria Alerts:** No current alerts.
- Current Cyanobacteria Warnings (Advisories):** ARLINGTON MILL RESERVOIR - Issued on 5/16/2023.

A separate panel on the right shows detailed information for 'ARLINGTON MILL RESERVOIR':

Status	Advisory
Town	Salem
Most Recent Sampling Date	5/16/2023
Date Issued	5/16/2023
Bloom Description	Green accumulations on shorelines.
Initial Cyanobacteria Identified	Dolichospermum
Initial Total Cyanobacteria Density (cells/mL)	422,200
2023 Advisory History	No advisories issued
Historical Advisories	View

Images taken 5/15/2023 and 5/16/2023


1) Full state view with highlighted advisories

2) Real-time dashboard

3) Waterbody-specific pop-up details

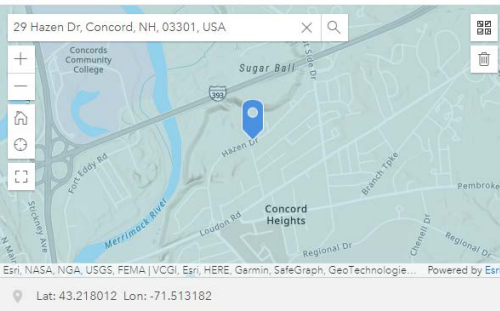
Standardized Bloom Reporting

New Standardized Bloom Report Form

Bloom Information 

Date bloom observed*

Location of bloom*



Esri, NASA, NGA, USGS, FEMA | VCOI, Esri, HERE, Garmin, SafeGraph, GeoTechnology... Powered by Esri

Lat: 43.218012 Lon: -71.513182

Waterbody name*

Example: Silver Lake



Weekly Updates


FOR IMMEDIATE RELEASE
DATE: xx Month 2023
CONTACT: Kate Hastings, HAB@des.nh.gov
[Healthy Swimming Mapper](#)
des.nh.gov
twitter.com/NHDES

Cyanobacteria Updates for April 10 to April 14

Check out the NHDES Healthy Swimming Mapper for more details and daily updates.

[Healthy Swimming Mapper](#)

Active Cyanobacteria Advisories (Warning):




New Advisories

- Lake Kanasketka, Moultonborough, issued xx Month 2023
- Silver Lake, Hollis, issued xx Month 2023

Continuing Advisories


- Baboosic Lake, Amherst, issued xx Month 2023

Active Cyanobacteria Alerts:



- Waterbody name, town, issued xx Month 2023
- Waterbody name, town, issued xx Month 2023

Cyanobacteria Advisories (Warnings) Removed:



- Waterbody name, town, issued xx Month 2023, removed xx Month 2023

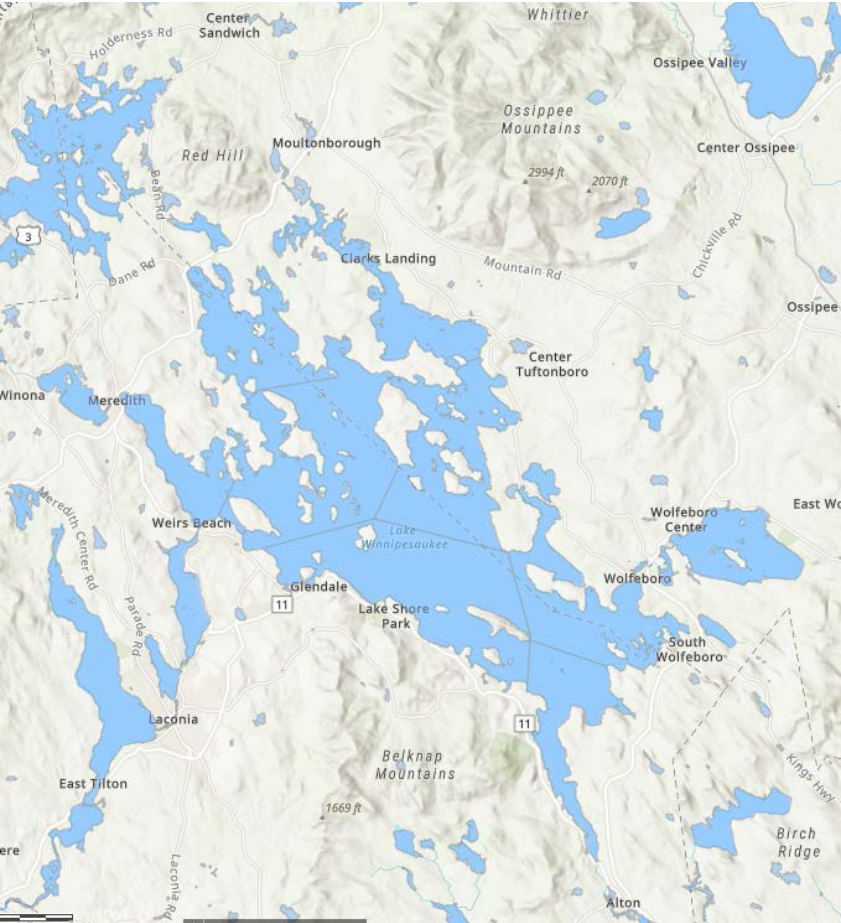
If you notice anything resembling cyanobacteria, please refrain from wading, swimming, or drinking the water. Keep all pets out of the water and report it to NHDES immediately. Remember, when in doubt, stay out.

[Report A Bloom](#)

(Instead of Individual Press Releases)

Focus on outreach material development and messaging

How Many Lakes are in NH?



NHDES staff tracking cyano?



1,000 Lakes

1 Kate

Conduct a Personal Risk Assessment

- 1) Look at the water.
Is it green? Discolored?
- 2) Check the Mapper.
Is there a current advisory?
- 3) Consider look-alikes
- 4) Report it!

Cyanobacteria

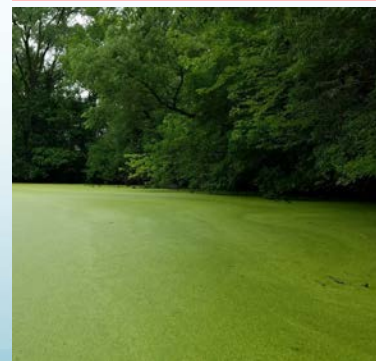


WHEN IN DOUBT, STAY OUT

Green Filamentous Algae



Duckweed



In-lake management technique guidance and policies

Sonication



Microbial additions



Chemical additions



Aeration



Granular Algae Control

Controls most species of algae
like filamentous & string algae



Also, Lots of Questions

What technique is best?

Will it solve the problem?

What do you mean I can't just put this in the lake?

What kind of permit do I need?

How much will it cost?

Does the state have money to pay for it?

Permitting Policy

State Surface Water Discharge
Permit No. Nippo Lake – 001

Admin Rule Env-Wq 301

Table 1. Limits of chemical addition to Nippo Lake, Barrington, NH.

Chemical Additive	Limit of Application ¹		
	Approximate Ratio of Application ²	Maximum Daily Dose ³ (grams of aluminum / m ²)	Permit Dose Maximum ⁴ (grams of aluminum / m ²)
Aluminum Sulfate, Al ₂ (SO ₄) ₃ ; ~4.4% aluminum by volume	1.8 parts aluminum sulfate : 1 part sodium aluminate by volume	27	54
Sodium Aluminate, NaAlO ₂ ; ~10.2% aluminum by volume			
pH ⁵	None such that the receiving water limits are exceeded.		

1st aluminum treatment in 36 years

Permitting Policy

Long Pond, Pelham

- Blooms from 2005-2022
- Request for installation of sonication device



Water - Wetlands and Shoreland Permit Application Query

[Return to Query Results](#)

File Number	2022-03413	Application Type	STANDARD DREDGE AND FILL APPLICATION
Date Received	12/19/2022	Preliminary Category	MINOR IMPACT PROJECT
Owner Name	LONG POND CLEAN WATER COMMITTEE	Application Status	PERMIT APPROVED
Site Address	OFF OF VETLAN'S PARK WAY PELHAM, HILLSBOROUGH	Final Category	MINIMUM IMPACT PROJECT
Site Map/Lot	N/A N/A	DES Reviewer	Calvin Diessner
Waterbody Name	LONG POND	Agent	GES INC

Project Description

Install a single sonication device for the treatment of annual cyanobacteria blooms occurring in Long Pong in Pelham.

Current Requests:

- Enzymes+Bacteria
- Claims to be Non-toxic
- Environmentally friendly
- Magic!
- Waterfront homeowner interest

Microbial additions



Ongoing inquires:

- “Fixes” low dissolved oxygen
- Reduces sediment nutrient loads
- Improves fishery
- Online units for sale
- Offered by multiple companies

Highest Priorities: In-lake management technique guidance and policies

- 1) Explore and develop dedicated “approval” process for in-lake treatments.
- 2) Create source of funding to support projects



← Nippo Lake (\$200,000)

Lake Kanasatka →

Partridge Lake ↓



Additional support for watershed planning and implementation



October 2014



UNIVERSITY OF NEW HAMPSHIRE
STORMWATER CENTER



Watershed planning is the best option to:

- Understanding water quality conditions
- Building local capacity and understanding
- Establishing community-based water quality targets
- Identifying pollution sources and corrective actions
- Preparing for future impacts

Watershed plan development and implementation at NHDES

Watershed Assistance Section (WAS)

- ~40 lake-related plans since 2010
- \$75,000 of annual grant funds for planning + SRF loans
- \$500,000 of annual grant funds for implementation

Sounds good, right?

- \$100,000+ per watershed plan
- \$800,000 in unfunded implementation projects in 2023



Additional support for watershed planning and implementation

Highest Priority: Watershed Planning and Implementation

Establish a dedicated program and funding source.

- 1) Dedicated to waterbodies with recurrent cyanobacteria bloom
- 2) Could be used as “match” for federal grants
- 3) Considers the use of existing state Clean Lakes Program (RSA 487:17)
- 4) Encourages renewed funding of federal Clean Lakes Program (CWA Section 314).

Emphasis on nutrient reduction and control



Nutrients are the giant elephant in the room!

Simplified Cyanobacteria Bloom Equation



Light

+



Heat

+

Phosphorus (P)

Nitrogen (N)

Nutrients

=



Boom!

Emphasis on nutrient reduction and control

Facts:

- 1) STORMWATER is the greatest nutrient contributor.
- 2) There is a “legacy load” of nutrients that exists in all waterbodies.
- 3) Nutrient levels in most lakes are NOT rising in the epilimnion.



Emphasis on nutrient reduction and control

What watershed plans are telling us?

Summary of 37 watershed plans funded by NHDES

Modeled Phosphorus Sources	Percentage		
	Minimum	Maximum	Average
Watershed sources	4	96	65
Septic systems	1	22	11
Internal loading (sediments)	0	55	8
Waterfowl	0	10	3
Atmospheric deposition	0	27	11
Other sources	5	93	64

Focus on “watershed sources” = Landuse Practices

Highest Priority: Nutrient Reduction and Control

- Provide additional funding for projects that reduce external nutrient loads
- Promote landuse practices and regulations that minimize stormwater runoff
(Overlay districts, stormwater utilities, homeowner stormwater management)
- Maintain and protect shorelands
(Implement and enforce shoreland water quality protection act)
- Third party review of state regulations associated with nutrient management for effectiveness
- Require septic system inspections for shoreland properties and replacement if needed

In the long run, failure or success of the NHDES Cyano Plan will be determined by the extent of buy-in from those who enjoy the lakes and rivers of NH.

