Updates from the Field:

Bringing Lake Kanasatka Back to Good Health

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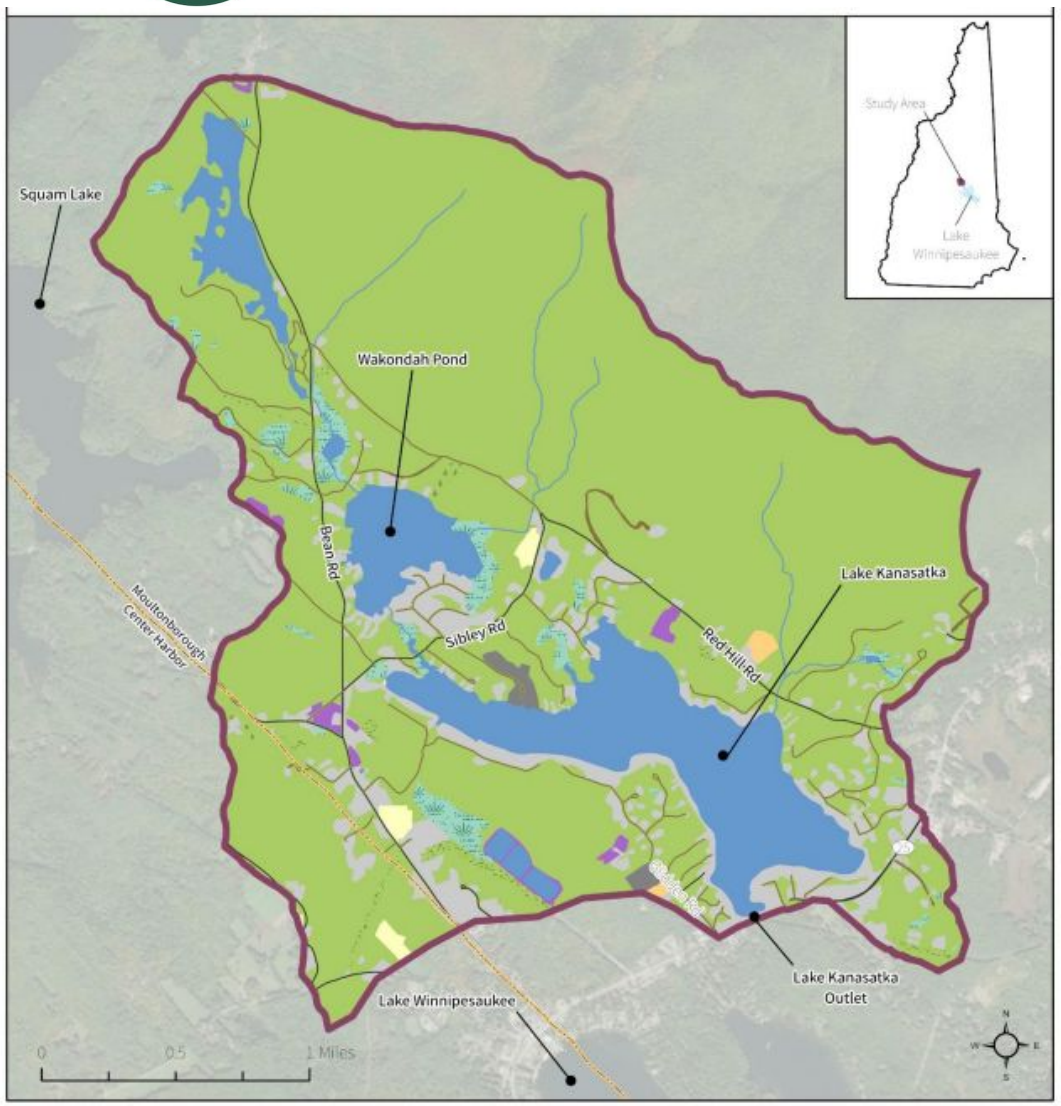
Getting to Know Lake Kanasatka



- 353-acre lake
- 4528-acre watershed
- Maximum depth 46’, average 18’
- Outlet into Winnipesaukee
- 182 waterfront properties
- Lake Kanasatka Watershed Association established early 1970s
- UNH Lakes Lay Monitoring Program since 1984
- Dimictic/stratified lake
- Oligotrophic status

What happened to our lake?

Cyanobacteria Bloom History

- 2020 – August 14 days
  September 10 days
- 2021 – August 15 days
  September 7 days
- 2022 – July 13 days
  August 79 days
- 2023 – June 14 days
  August 24 days
  September 83 days
- Fall 2023 – bloom spilled over into Blackey Cove, Winnipesaukee

Photo courtesy of Jon Youtz

What happened to our lake?

Photo courtesy of John Stephens

- Extent of anoxia is worsening
- Indicated as Impaired for Primary Contact Recreation due to cyanobacteria (2023)
  - 303(d) NH List of Impaired Waterways
  - Dolichospermum, Microcystis, Woronichinia, Aphanizomenon, other cyanobacteria species
- “How did this happen so suddenly?”
  - Natural and climate impacts, combined with cultural eutrophication over 100+ years
  - Tipping point
  - “We love our lakes too much”

What did we do?

Collaboration, Action, and Advocacy

- From a small grass-roots association to a significant community-wide collaboration and effort

Involvement and Partnership

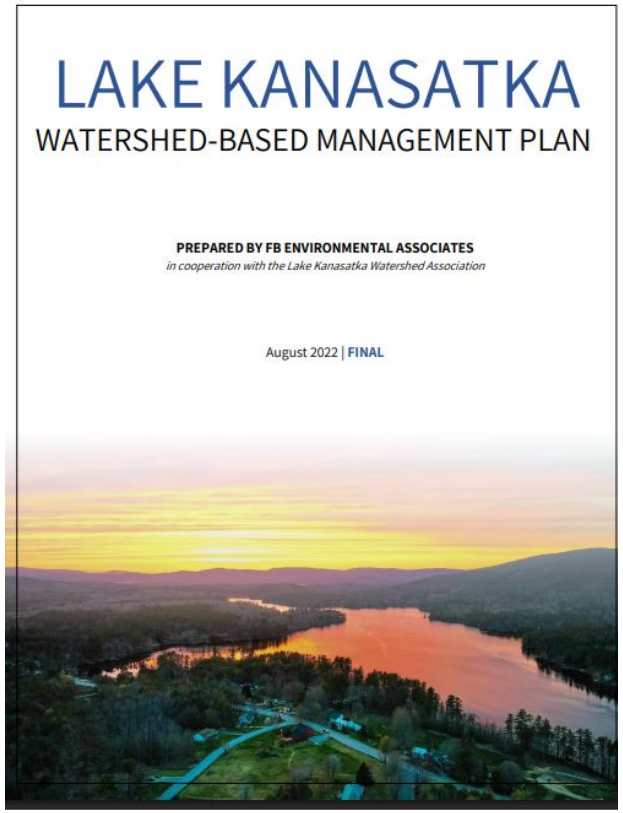
- Board expansion and new focused teams
- Land owners and neighbors
- Partners!

Watershed-based Management Plan

Grants

Alum Treatment

and multiple other activities



"Our strategy, and the key to our success to date, is getting as many community resources as possible engaged and involved as soon as possible on multiple fronts."

LKWA Taking Action on Multiple Fronts

Watershed-Based Management Plan

Critical element for identifying causes and remediation support

Community Involvement

It takes all of us, working together AND on our own properties

Expanded Testing and Monitoring

UNH, along with FBE and DES, were critical to meeting requirements

Watershed Remediation and SCMs

LakeSmart, Boots on the Ground, septic, and more

Communication

Numerous avenues to reach various constituencies

Fundraising

Needed to get creative

Grants

Multiple applications

In-lake Alum Treatment

3rd in New Hampshire. Wow! We actually accomplished this!

LKWA Taking Action on Multiple Fronts

"We are all in this together"

Community Involvement

It takes all of us!

All around the lake, the community of Lake Kanasatka is doing their part to restore lake health!

Carol Parker volunteered at the community's first barn sale, raising over $12,000 to help offer low or no-cost septic inspections to local residents.

Kevin Kelly runs the LKWA's Boots on the Ground Program, which helps implement lake-friendly changes on neighbors' properties at little or no cost.

Judy Stoessel uses her knowledge of native plants and best planting practices to write articles for the LKWA newsletter and Facebook page.

Colette Cooke helped raise funds for the very expensive aluminum treatment needed to set Lake Kanasatka on the path to a healthy future.

Lisa Hutchinson coordinates the water quality monitoring efforts along the lake, and encourages others to participate in the LakeSmart Lake-Friendly Living Program!

Kirk Meloney, Tim Baker, and Lisa Hutchinson worked with partner organizations to create a watershed management plan to protect the future of Lake Kanasatka.

Chris Wallace and Janna Hoiberg help write the association newsletter, which is critical to keeping the Lake Kanasatka community informed and engaged on the lake.

With over twenty percent of the lakeside community participating in the LakeSmart Lake-Friendly Living Program, Lake Kanasatka is on its way to a healthy future.

Source: NHLakes

2024 Alum Treatment

- WBMP identified two issues, both needed to be solved
  - External phosphorus sources – 22 watershed sites, 66% of shoreline sites, septic systems
  - Internal phosphorus loading – legacy nutrients released from lake bottom

- Major feat to pull any alum treatment in from 2026/2027 to May 2024
  - Completed all NHDES requirements for permit, grant, treatment by April 2024
    - Met SCMs and phosphorus reduction targets in 2023
    - Provided current monitoring data to support treatment
    - Completed data/financial/compliance/state processes/back-to-back contracts
  - Additional requirements
    - Pilot treatment
    - Public notifications and safety plans
    - Funding!!!

2024 Alum Treatment

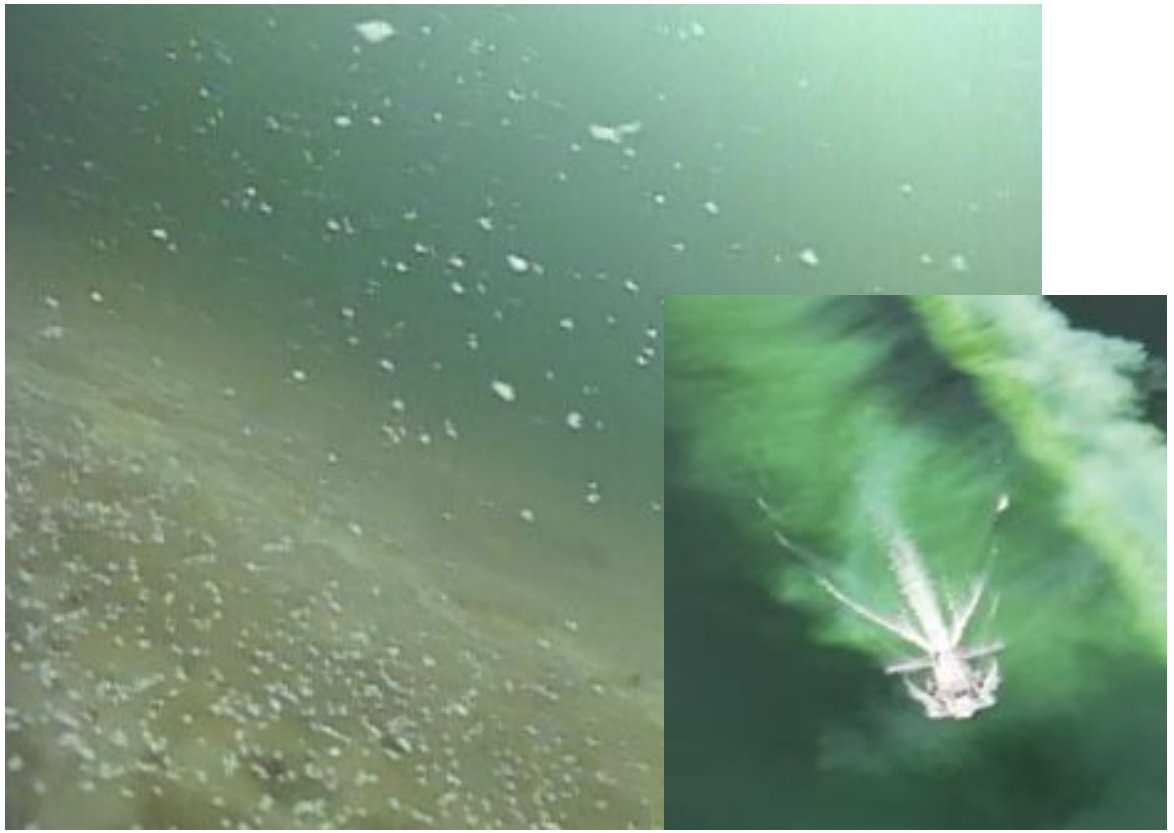
Source: NHDES

- Treatment devised specifically for Lake Kanasatka based on site-specific characteristics
- Aluminum Sulfate and Sodium Aluminate at 2:1 ratio
- 1 pilot treatment,
  3 zones treated over 3 days,
  3-day rest period,
  3 zones received second treatment over 3 days
- 20 monitoring days

2024 Alum Treatment

Importance of controlling pH, time of year, allowing refuge and rest for aquatic life

Source: NHDES/FBE



Source: NHDES

Photo courtesy of Bill Gassman

Results of 2024 Alum Treatment

- Target internal phosphorus load reduction achieved - 82-89%
- No wildlife distress linked to treatment
- Zooplankton populations recovered well and followed expected seasonal succession patterns
- Immediate water quality improvement
  - Record high water clarity – 9.4 meters
  - No/minimal cyanobacteria accumulations or blooms
  - Surpassed phosphorus concentration goals – 5.7 ppb
- Aesthetic improvements
- Joy and relief

Next steps

Alum treatments are measures to temporarily manage internal phosphorus loads

- Higher flushing rate and dominance of external load may reduce treatment longevity
- Remain vigilant and continue remediation work
  - Manage/maintain existing and new SCMs to reduce external load
  - More LakeSmart participation
- Monthly monitoring to continue data collection to access the efficacy of the treatment over time
- Complete 319 grant work underway
- Complete CDS grant secured by LWA on our behalf

Discussion

Backup Slides

LKWA Taking Action on Multiple Fronts

Watershed-Based Management Plan

- Fall 2020 – Contracted with FB Environmental to create a Watershed-Based Management Plan – spent 50% of LKWA funds to start work
- Winter 2020/2021 – General fundraising began, asked Town for financial help, Selectboard voted 5-0 not to support
- Spring 2021 – Grassroots effort to add petition to town warrant article, public meeting article unanimously approves, Selectboard reverses vote, approves $60k 5-0
- Summer 2021- Summer 2022 – WBMP development with FBE
- June 2022 – Public meeting to review WBMP and show work needed
- August 2022 - Plan finalized and approved by LKWA and NHDES
- Summer 2022 thru Fall 2023 – WBMP implementation with remediation, extensive water testing and monitoring; continued work with FBE, determined alum treatment was necessary
- Ongoing – continued implementation; our Roadmap forward

LKWA Taking Action on Multiple Fronts

Expanded Testing and Monitoring

The LKWA team partnered with UNH on extended additional testing to support plan development, plan implementation, and in-lake alum treatment parameters

40 Years with UNH LLMP	WBMP Development	Alum Treatment
Secchi disc/transparency	+ Conductivity profiles	+ Lake bottom sediment cores
Temperature profiles	+ Dissolved oxygen profiles	+ Plankton tows
Epilimnetic sampling	+ Phosphorus grab samples every 2m	+ pH profiles and continuous real-time monitoring
1 Annual full profile	Multiple full profiles (4, 13)	+ Turbidity
+ Cyanobacteria	+ Wakondah Pond	+ Kjeldahl nitrogen, nitrate-nitrite
	+ Increased frequency	+ Aquatic life surveys
	+ Stream sampling (flow rates and phosphorus)	+ Every 2m: Alkalinity, hardness, dissolved organic carbon, acid soluble and total aluminum, phosphorus
		+ Floc evaluation (camera)

LKWA Taking Action on Multiple Fronts

Watershed Remediation and SCMs

Source: Boots on the Ground

Significant Community Involvement and Communication were instrumental in achieving remarkable outcomes in:

- Boots on The Ground
  - 19 projects in 2023-2024
  - Phosphorus load reductions key to qualifying for alum treatment >10kg/yr
- LakeSmart
  - 29 properties achieved LakeSmart award, more in process
  - LKWA won LakeSmart Community Award in 2024
- Other property owner improvements
- Septic Inspection program, 10 upgrades/replacements
- Road management
- Partnering with Town, NHDES and NHDOT on Watershed Survey sites
- Assessing Streams

This work never ends…..no SCMs are maintenance free…..continued vigilance and maintenance and new sites to address

LKWA Taking Action on Multiple Fronts

Communication

Kanasatka Water Matters
News & Updates
April 2025, Issue # 17

Ongoing Stormwater Remediation Projects

Several stormwater remediation projects are underway around Lake Kanasatka, as part of our ongoing Watershed-Based Management Plan to help maintain a healthy lake for now and for generations to come.

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The 319 Grant team has been working over the winter months to prepare for the implementation of a major engineering project to address stormwater runoff issues on Burton Road and Foster Drive. Following a competitive bidding process, the Horsley Witten Group (HWG), was hired and a Site Specific Project Plan was submitted to NHDES for approval.

- Tri-fold brochure to gain funding for WBMP from town in Spring 2021
- Facebook regularly promotes lake-friendly actions, progress on projects around the lake, and community involvement and engagement
- Website gets extensive overhaul, with over 50 linkable resources, generating more traffic
- “Kanasatka Water Matters” newsletter replaces annual newsletter
  - 17 information-packed issues since October 2022
  - Plus 12 special-topic issues
  - Contributors include lake residents

LKWA Taking Action on Multiple Fronts

Fundraising

Source	Timing	Amount
Go Fund Me (Hilton)	Winter - Spring 2021	$ 23,000
Town of Moultonborough	Spring - Fall 2021	$ 60,000
NH Gives	June 2023 and 2024	$ 12,000
Matching Donor Challenges	Summer 2023	$ 26,000
Capital Campaign	Nov 2023 to June 2024	$ 401,000
Community Barn Sale	June 2024	$ 10,000

LKWA Taking Action on Multiple Fronts

Grants

Source of Funding	Timing	Amount	Match Requirement
Cyanobacteria Mitigation Fund	2024	$ 500,000	$ 0
319 Grant (Burton/Foster)	2025	$ 100,000	$ 67,000
Congressionally Directed Spending Grant (LWA)	2025	$ 110,000	$ 40,000 (LWA)

- First 319 grant application in 2023 unsuccessful
- Other local grant attempts also unsuccessful

NH Charitable Trust – LKWA registered and fulfilled all requirements, necessary to receive grant monies

LKWA Taking Action on Multiple Fronts

In-lake Alum Treatment

A major and fast-tracked undertaking!

- *Planning, permitting, approval process*
- *Treatment*
- *Post-treatment monitoring, analysis, and reporting*

- July 2023 – annual meeting presentation by NHDES outlining process and timeline for alum treatment (3 to 5 years)
- Fall 2023 – after private business owner reaches out to state contacts, LKWA meets with FBE and NHDES to discuss a potential 'fast-track' process, LKWA accepts the challenge
- Fall 2023 thru early Winter 2024 – put together information required to target Spring '24 treatment; LKWA capital campaign to support treatment, SCMs, monitoring, reporting
- Jan 2024 – Application for Treatment submitted, responses by LKWA and FBE to NHDES on 5 areas of concern
- Feb 2024 – Responses approved, Application complete, beginning of 60-day approval period
- Mar 2024 – Public hearing outlining treatment plan, comments solicited from public; Significant logistical work done to prepare for treatment, including meetings with vendor and town officials
- Mar 2024 - Application for CMF Funds submitted by LKWA and FBE, notified of $500,000 award requiring Governor and Council approval;
- April 2024 – contract with vendor Solitude signed; May treatment dates set; negotiation of pricing/contracts with FBE for additional services and testing vendors for required reports; all requirements in place for grant funds acceptance
- April 9 2024 – CMF grant amount and timing hits a snag, approved by Governor/Council May 1
- April 2024 – pilot treatment
- May 2024 – full alum treatment
- May thru Oct 2024 – continued monitoring
- May 2024 thru Mar 2025 – analysis, final report to fulfill NHDES requirements

LKWA Costs associated with Alum Treatment

Solitude – in-lake treatment vendor	$ 482,000
Preparatory costs – External Pollutant Load Reduction documentation, Alternatives Analysis, public hearing	$ 15,000
Professional Consultants – In-lake Treatment Plan, permit coordination	$ 26,000
2024 monitoring/3rd party fees (UNH, FBE, EAI, Univ of Wisconsin)	$ 64,000
2025 and 2026 monitoring	$ TBD
Capital Campaign costs – printing, mailing, state registrations and reporting	$ 3,000+
Professional Services – tax prep, audit	$ 7,000
Grant matches – required set-asides for existing 319 and CDS grants for SCM work	$ 107,000

June 4th, 2025 Sandy Cove area