Cupsaw Environmental Committee

2-5 Year Plan for Continuous Improvement of Cupsaw Lake Health

Purpose of this Document

The following document details some of the problems Cupsaw Lake faces from a Lake Health standpoint and some actions that can be taken to continue to keep Cupsaw Lake amazing.

Identified Issues

- Lyngbya growth
- Excess sediment/muck
- Total phosphorus numbers higher than State Standards
- HAB Threat – Harmful Algae Bloom
- Kendell Drain phosphorus levels
- P load from septic systems
- Lake-entry settling ponds (and P- reduction treatment) for all major brooks.
- Lack of native Aquatic Plants
- Goose Poop
- Cattails – only excessive growth – well maintained cattails are not an issue
- Curly-leaf pondweed (not as prevalent in 2024 but we had more Lyngbya this year)
- Turtle Island's eroding shoreline

Mitigation Strategies

The following is an initial list of ideas that have been suggested by various members of the Environmental Committee and CLIA. It is not an exhaustive list and we are not suggesting all be done withing the next 5 years, only that they should be considered.

- Increase number of water movers
    - Add one to Beach Swim area
    - Add strategically placed ones in North End to move the water
- Continued investigation into de-mucking Catch Basins between Cupsaw and Kraft
- When the lake is lowered remove lyngbya from the lake bed
- Northern Lights Lyngbya removal
- Hydro-Raking to remove excess muck from lake bed
- NJIT Waste-Water Onsite Treatment System Study
- Bio-Char Logs
- Kendell Drain BMP
- Adding more NATIVE aquatic plants to help with nutrient absorption – both along lakefront shorelines and in the lake itself.

Water Movers

Strategically placed water movers can help prevent stagnant areas where algae can thrive.

Options:

- Dock Mounted - https://scottaerator.com/
- Otterbine 3hp Triton - https://www.otterbine.com/aerators-fountains/industrial-pond-aerators-circulator/

Costs and Considerations:

- These range in cost from 3k to upwards of 12k depending on the hp and company.
- Rules to avoid muck resuspension.
- Electricity costs are not insignificant

Sediment Catch Basins

Through the persistence of Suzanne Wiley, the town has graciously offered to empty the two catch basins between Cupsaw and Kraft by Duffy Rd.

Things to consider when it comes to catch basins and their impact on the lake:

1. Once these are emptied continued monitoring should be done to observe just how quickly they refil
    a. This could indicated we have been receiving a significant amount of 'muck' from the state park or maybe they fill very slowly and we learn that on this particular stream we had very little muck.
2. Should we explore adding new catch basins at every tributary inlet?
3. Do we need to work with the NJ State Park to suggest remediation of all State Park Settling Ponds?

Kendall Drain BMP

Discuss a stormwater management facility with the town for the Kendall Drain to address the phosphorus coming from the lady street wetlands. P Removal Installation at this sewer outlet.

Hydro-Raking

Two quotes have been obtained for 2024

Service Provided	Aquclear, LLC	Lake Management Services, LLC
Minimum 20 hours	185	207
Transportation/setup/breakdown	695	793
Skid steer and operator per diem	665	635
Launch per vessel		385
*Mini Shoreline excavator		265 per hour
Disposal of Muck	NOT PROVIDED	NOT PROVIDED*

*LMS mentioned they would assist in obtaining a disposal vendor

Some major things to consider with Hydro-Raking:

- Where will the machines enter the water?
    - They need easy access to the water – going around Turtle Island is not cost effective
- Where will the material get put?
    - Even before material is carted away there needs to be a staging area for it to begin to dry some, where will that be?
    - Will lake front home owners be willing to let material stay on their property during the duration of the hydro-raking process?
        - Both quotes say home owners would be responsible for any landscaping/lawn damage
    - Some properties may wish to elevate their shoreline with raised sea-wall and muck fill???.
    - We will attempt to begin discussions with the state park on possibly using their property for disposal

- What are the long term benefits of hydro-raking?
    - Will this need to be repeated every 5 years to maintain the north cove? Is there another approach we can include to reduce what flows into the lake?

Possible Alternatives

- Paragon Environmental – if we could work with the town and other lakes for a larger initiative this might be feasible. As a standalone lake we likely could not afford Paragon.

NJIT Project

The Environmental Committee has partnered with NJIT to begin studying the impacts of aged and poorly performing septic systems and their contribution to the increase in phosphorus in our lake.

- Identify "problem" properties using hydrology modeling by Dr. Qiu.
- Gain community buy-in via education and inclusion.
- Procure funding for possible onsite treatment system for septics
- NJIT and LHS collaboration will strengthen this initiative.
- We must get the ClickUp program working to stimulate the NJIT Team
- Prof. Qui needs to go back to the Provost with update and new request for support.

Show Me the Money $$$

The following are some ideas for funding the above ideas:

- Propose increase in Dues to allow more funds to be allocated to Lake Health initiatives
- Ask for contributions for specific initiatives from Lake Front owners who might directly benefit?
- Explore grant opportunities through the town (Paragon Environmental – similar to Mountain Lakes, NJ)
- Foundation for charitable donations (Cupsaw Foundation?)
- Work with the other lakes to hire a company annually for weed harvesting
- The NJDEP and the Wanaque Reservoir are involved parties in the P reduction along Cup saw Brook (including the lake). With NJIT's involvement in this development project we might qualify for either a NJDEP or USEPA grant to prove that this methodology of cost-effective remediation works.

How Much Do We Need?

- Weed Harvesting: $11k
- Hydro Raking (not including disposal): > $8k (LMS estimated over $20k to make any significant dent in the North End)
    - Disposal: ~ $1-2K per Day (conservative estimate based on conversations with LMS)
- Water Movers: $11k per Otterbine (large donut ones)
- Annual Contract with LMS: $12.3k
    - Copper Treatments: $825+$497 (497 for Chelated Captain XTR) per treatment
    - Blue Dye: $2,715 Per Treatment
    - PAC: $2,933 per treatment (investigation required 2025 and future with new DEP requirements)
    - EutroSORB: $95-$795 per treatment (depends on phosphorus levels in lake)
- Sonic Solutions: ~$12k (we own them now)
- Aeration: $5k
- *Goose Control: $7k (if we were not to continue our harassment program we currently use)*

The above is not the entire Environmental Committee budget, but it does include all the big ticket items we are considering or that we already have implemented.

Tentative Timeline

This is a rough outline of what the next Five years could look like depending on which initiatives we pursue.

Fall/Winter 2024

- Begin process to remove muck from catch basins – Underway!
- Remove surface lyngbya from North of the Buoy – Underway!
- Work with lake front owners for lygnbya removal for disposal the weekend of Nov 23rd/24th
- Work with NJIT to begin the Hydrology Study for identifying "problem" properties
- Research Native Aquatic plants to try to introduce as nutrient absorbers and competition for the Lyngbya
- Research Lyngbya disposal options (NJIT mentioned drying and pulverizing?)
- Get donation/contribution box added to Dues form for 2025 dues
- Work with CLIA board to update guidance on water movers. Additional research has been done and communications with experts have identified some 'issues' that need to be outlined in our guidance to all lake front members who use water movers.

Winter/Spring 2025

- Continuation of NJIT Hydrology Study for identifying "problem" properties
    - Once identified – Tracer?
- Spring Weed Harvesting – set up contract early in season to remove the lyngbya before it becomes a problem?
    - Remove weeds or Early Chelated Copper Treatment of Lyngbya?
- Catch Basin's Cleaned out
- Continued Research Native Aquatic plants to try to introduce as nutrient absorbers and competition for the Lyngbya – Once planting time is identified update plan
- Purchase additional water movers
- Purchase additional Sonic device
- Plan Aquatic plants along shorelines and work with homeowners to add native species to water fronts

Summer 2025

- Treatments as necessary
    - EutroSORB?
    - Chelated Copper for Lyngbya?
    - Herbicides or Harvesting – Analysis is needed to determine what makes the most sense for the long term plan health of Cupsaw
- Install additional Water Movers
- Shoreline Lyngbya removal system – RakeZillas loaned out to homeowners?
    - Where to dispose? – Recycling center is a no go, big time no go
- Connect with Septic companies to discuss nutrient inactivation of effluent system
    - They may have more connections when it comes to better being able to get this up and running.

Fall/Winter 2025

- Lake is lowered
    - Mechanical removal of muck from areas accessible during lake lowering
    - Focus on Coves
- Refurbish Turtle Island

    - More native plants along shoreline
    - Add Boat ramps between native plants to help with shoreline erosion
    - Work with Sherrif of Turtle Island to revamp boat storage to better help the lake
    - Installation of settling ponds in-lake at every tributary inlet.

2026

- Asses the added native plants vs algae
- Work with NJIT on continued nutrient reduction techniques from wastewater
- Explore any new options for treatments throughout the summer
- In the Fall, contract for hydro-raking areas not accessed during the previous years lake lowered mechanical removal

2027

- Continued treatments
- If NJIT project progresses as hoped, many homes in “high impact” areas will have been identified and we can hopefully introduce a nutrient reduction system in those homes for continued study and improvement
- If lake lowers again – additional mechanical removal of muck where accessible

2028

- If wastewater effluent treatment system is deemed a success:
    - Possibly work with town to discuss updating the requirements for NEW septic systems within x yards of a waterway to have the system install when getting a new septic system (this would NOT apply to existing septic systems for the time being)
- Continued treatments – while always investigating new products and continued discussions with lake professionals

2029

- Dare I mention the “D” word? Preceding years should have research into feasibility of this ever occurring. The DEP restrictions are significant and the cost is exorbitant.

2030

- We do not receive a single complaint and everyone lives happily ever after!