



2024 LFA Results

Year Four of Program

- Dissolved Oxygen (DO)
- Total Phosphorous (TP)
- Total Inorganic Nitrogen (TIN)
- Water Clarity (Secchi Disk)
- Cyanobacteria (Blue Green Algae)
- Muck Reduction




RLS Notes

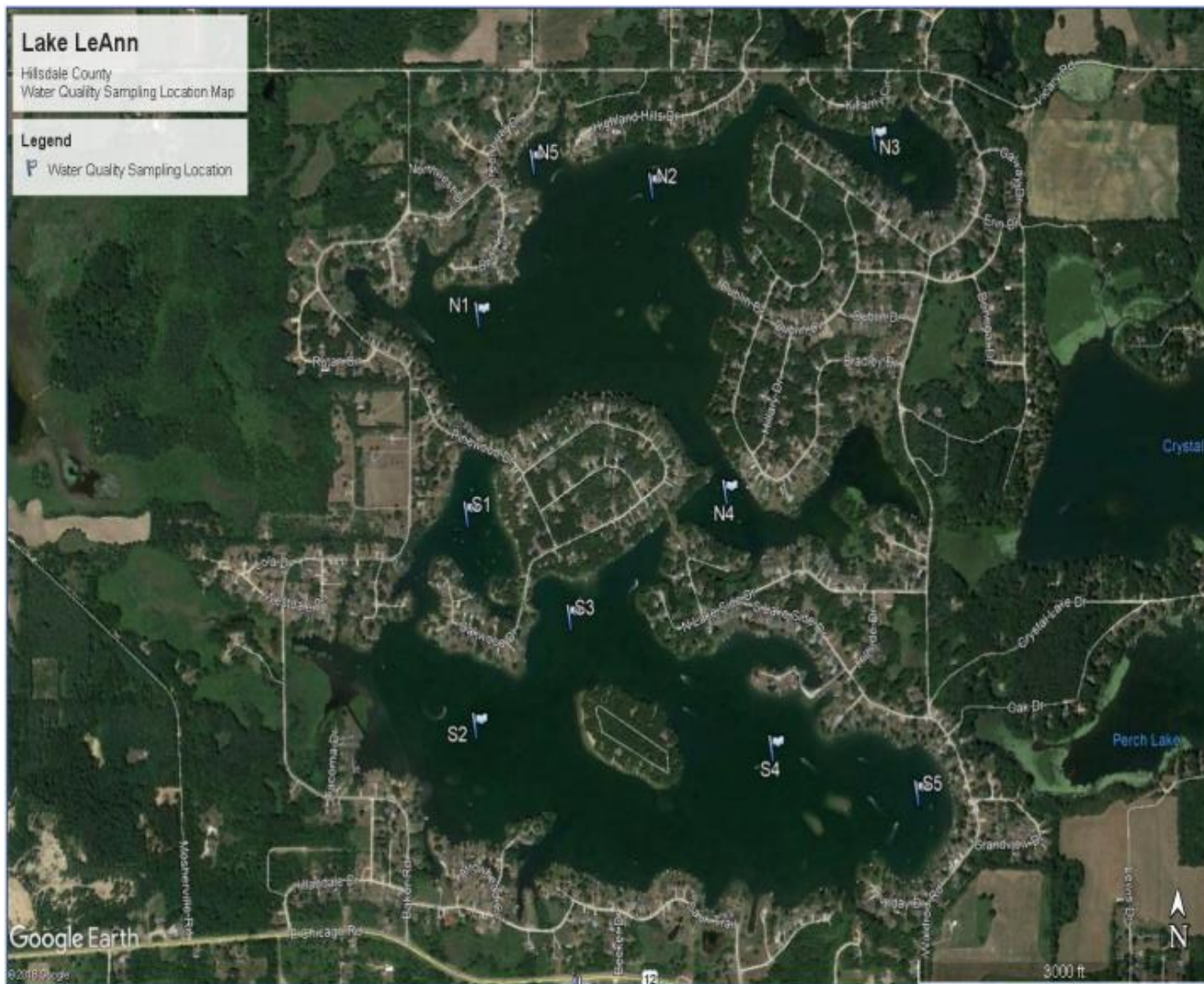
Nice work on the summary for EBL targets. I want to remind you that the water temperatures being higher in 2024 may have influenced some of the DO readings but they were indeed favorable. Also, we now have a confounding variable, being the biochar, so we cannot attribute these improvements solely to LFA. However, the combination of the technologies looks promising thus far.

Lake LeAnn

Hillsdale County
Water Quality Sampling Location Map

Legend

 Water Quality Sampling Location



Dissolved Oxygen (DO)

SL / Maintain a Dissolved Oxygen (DO) minimum level of 4 mg/L at depths within 3 feet of bottom of the deepest diffuser (SL 2, 4, & 5) and not less than 6mg/L in the first year and 6.7mg/L thereafter, at all other depths in waters at least 6 feet deep.

NL / Maintain a Dissolved Oxygen (DO) minimum level of 4 mg/L at depths within 3 feet of bottom of the deepest diffuser (NL 1 & 2) and not less than 6mg/L in the first year and 7.3mg/L thereafter, at all other depths in waters at least 6 feet deep.

2024

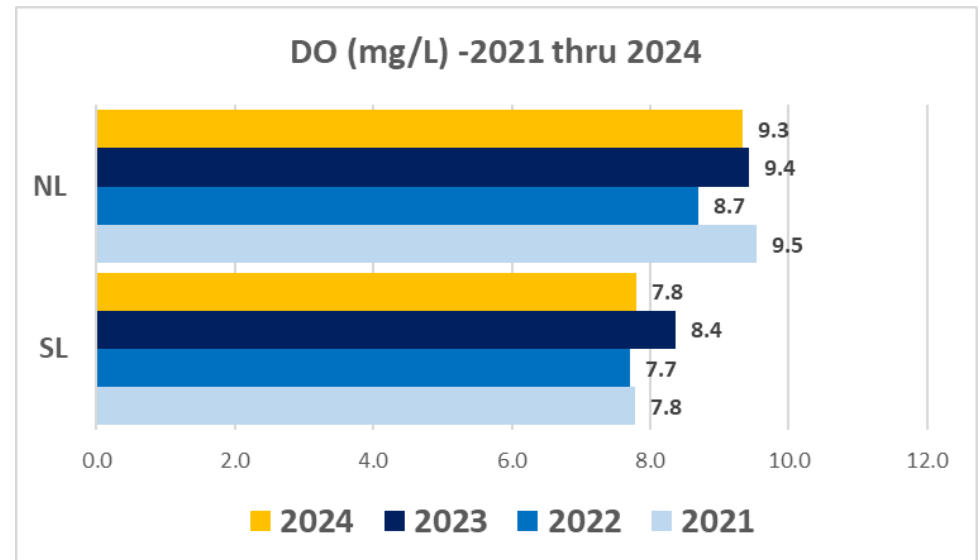
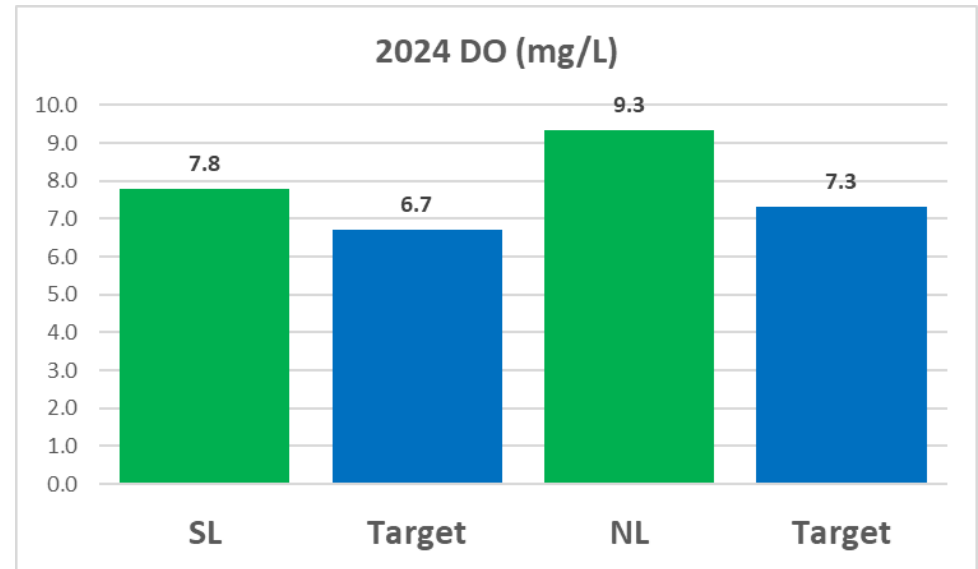
We hit the DO goals on both lakes.



2021 thru 2024

Higher numbers are what we're looking for with this measurement.

- 2024 reading are lagging prior year slightly.

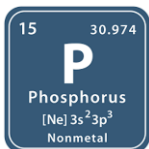


Total Phosphorous (TP)

Total Phosphorous (TP) maintained at less than 40 ug/L in the first year and ≤ 30 ug/L thereafter.

2024

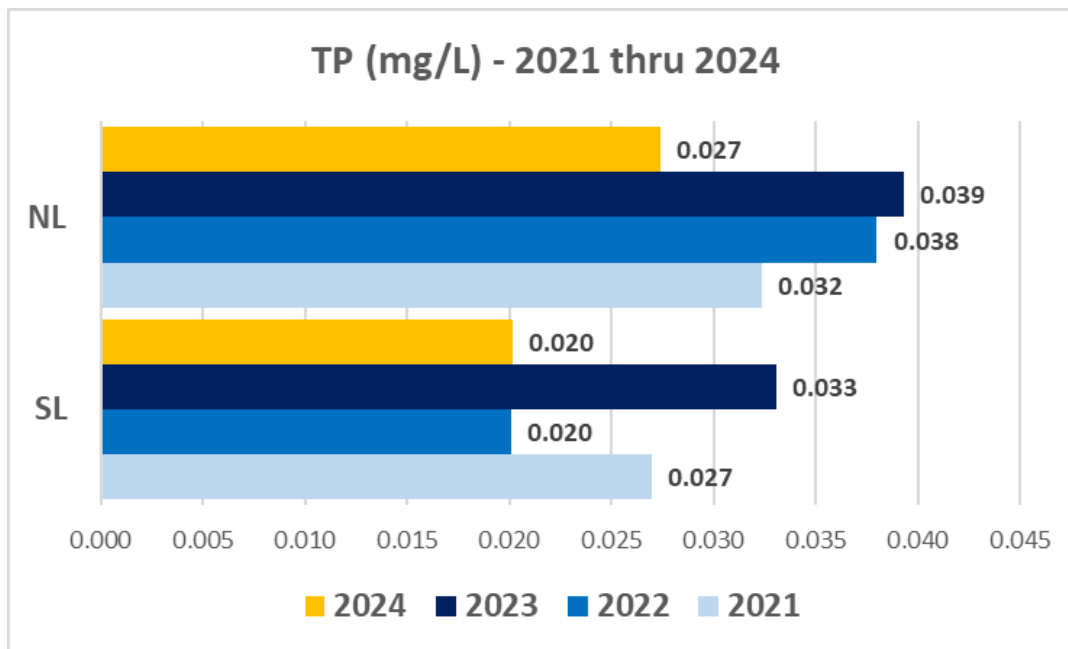
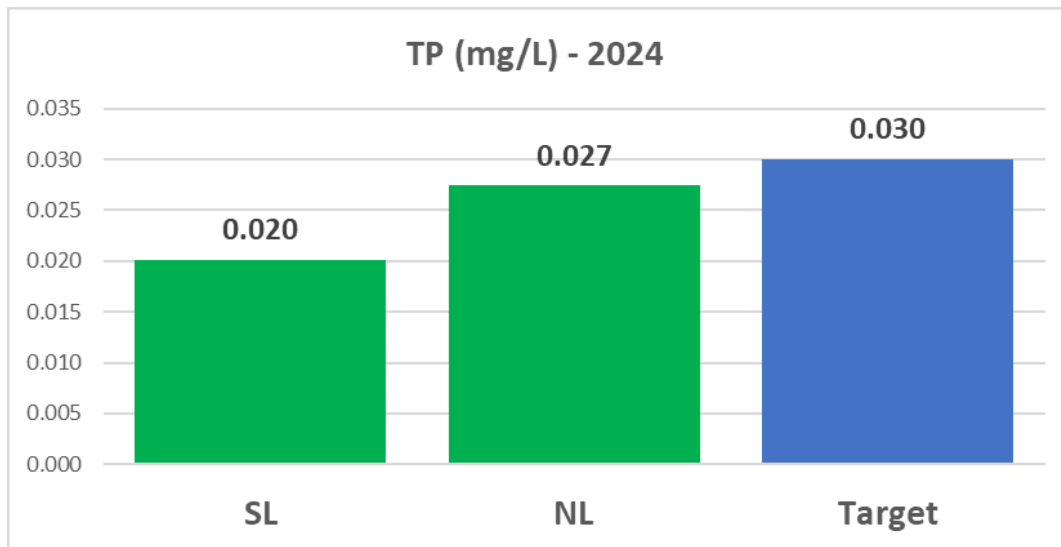
Both lakes achieved their TP target.



2021 thru 2024

Lower numbers are what we're looking for with this measurement.

Both lakes are below prior year numbers.



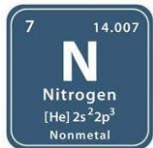
Total Inorganic Nitrogen (TIN)

SL/ Total Inorganic Nitrogen (TIN) maintained at <0.200-0.350mg/L in the first year and <0.180-0.325mg/L thereafter.

NL/ Total Inorganic Nitrogen (TIN) maintained at less than 0.057-0.220 mg/L in the first year and ≤ 0.050 -0.200 mg/L thereafter.

2024

Both lakes achieved their TIN target.

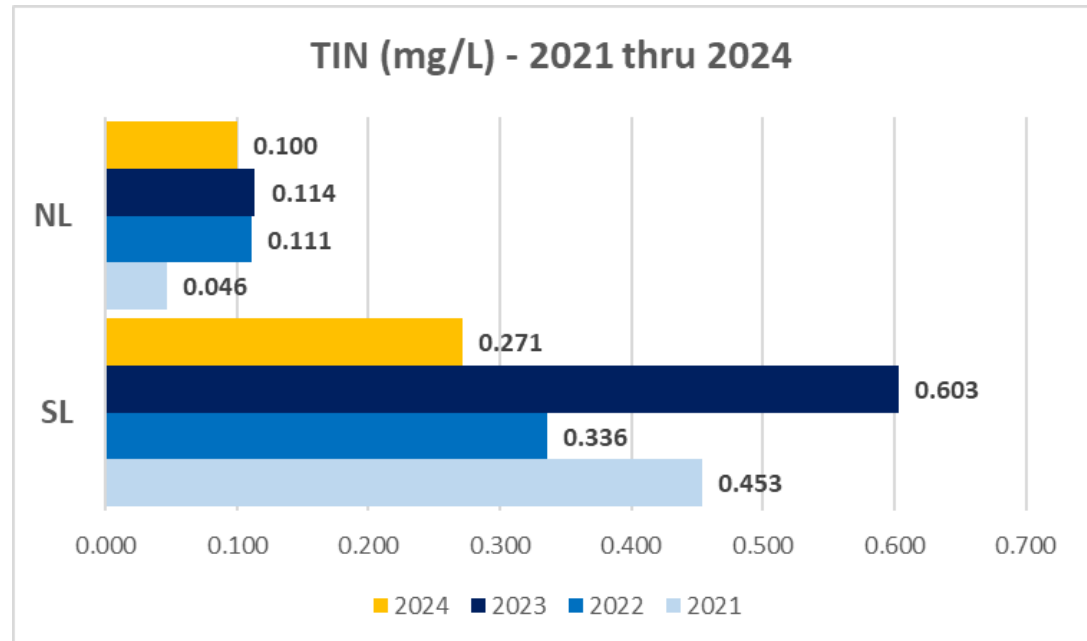
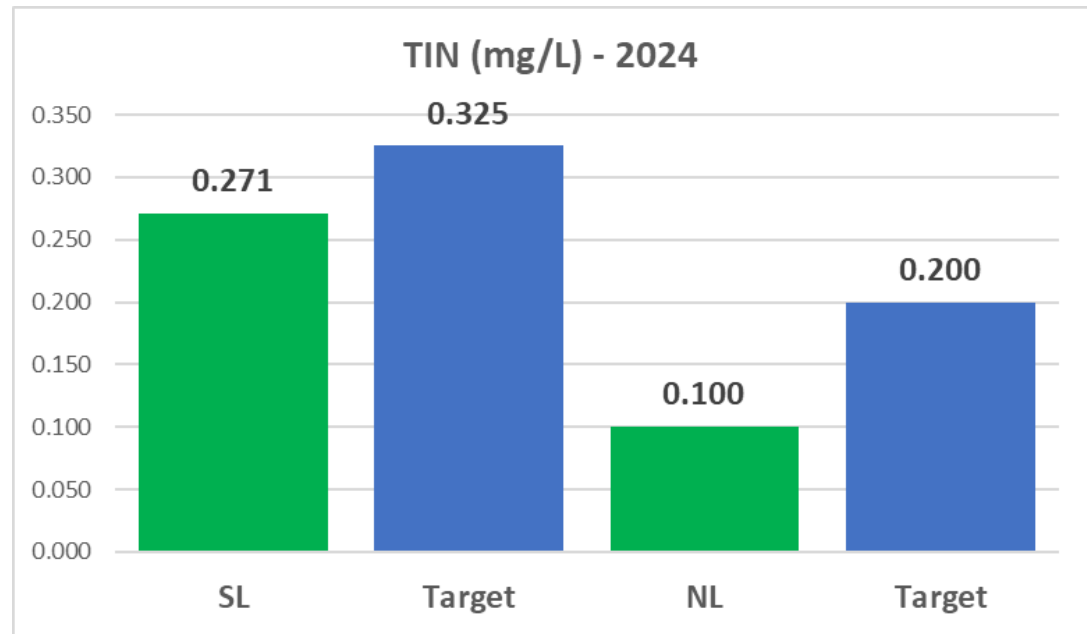


2021 thru 2024

Lower numbers are what we're looking for with this measurement.

- Both lakes are below prior year numbers.
- Note: NL is at the non-detect number. Lower numbers will not appear on the report

CONFIDENTIAL

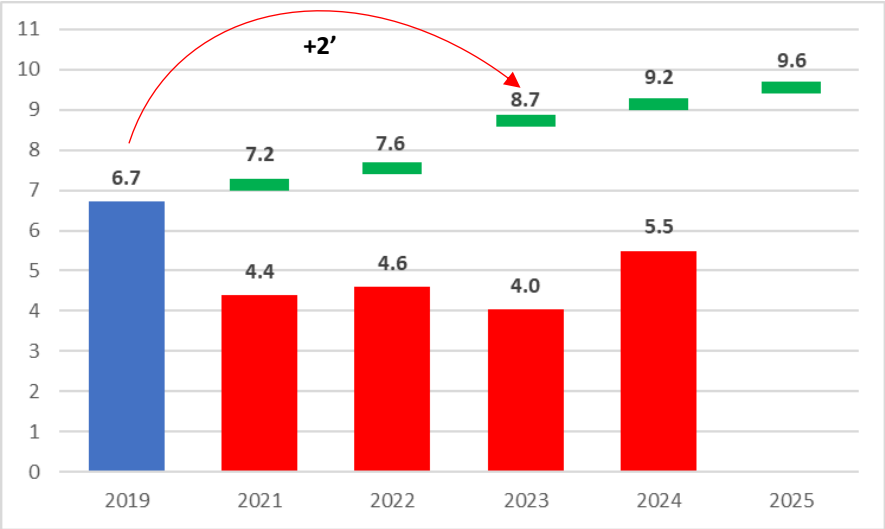


SECCHI DISK AGREEMENT TARGETS

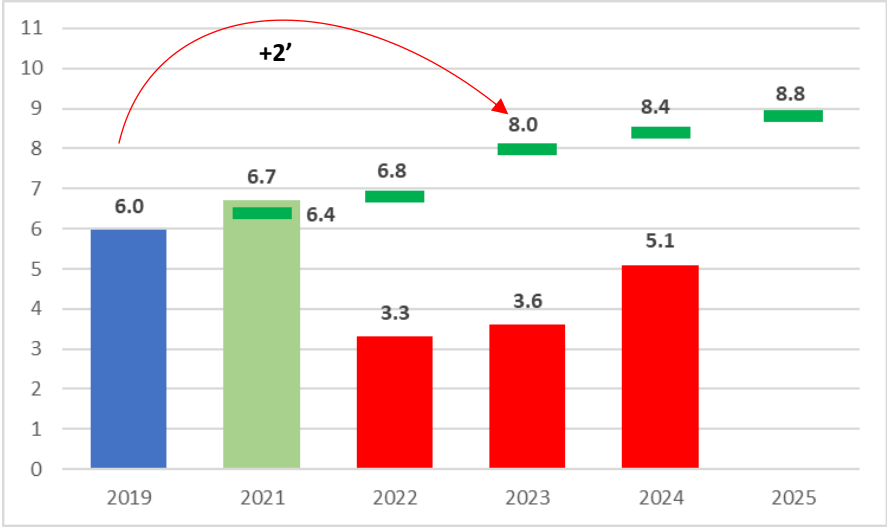
Performance Agreement:

Water clarity (Secchi Disk) will be an increase of at least 2 feet over baseline by the third year with a minimum of 5" increase per year.

South Lake



North Lake



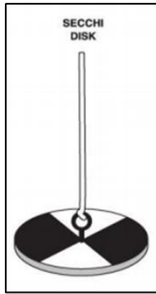
- ☐ We are struggling to meet our performance goals year-over-year with the Secchi Disk readings.
- ☐ As indicated by the data, our four-year trend is falling short of the goal. The goal continues to rise, and our results are not keeping pace with the targets.

Water Clarity (Secchi Disk)

Water clarity (Secchi Disk) will be an increase of at least 2 feet over baseline by the third year with a minimum of 5" increase per year.

2024

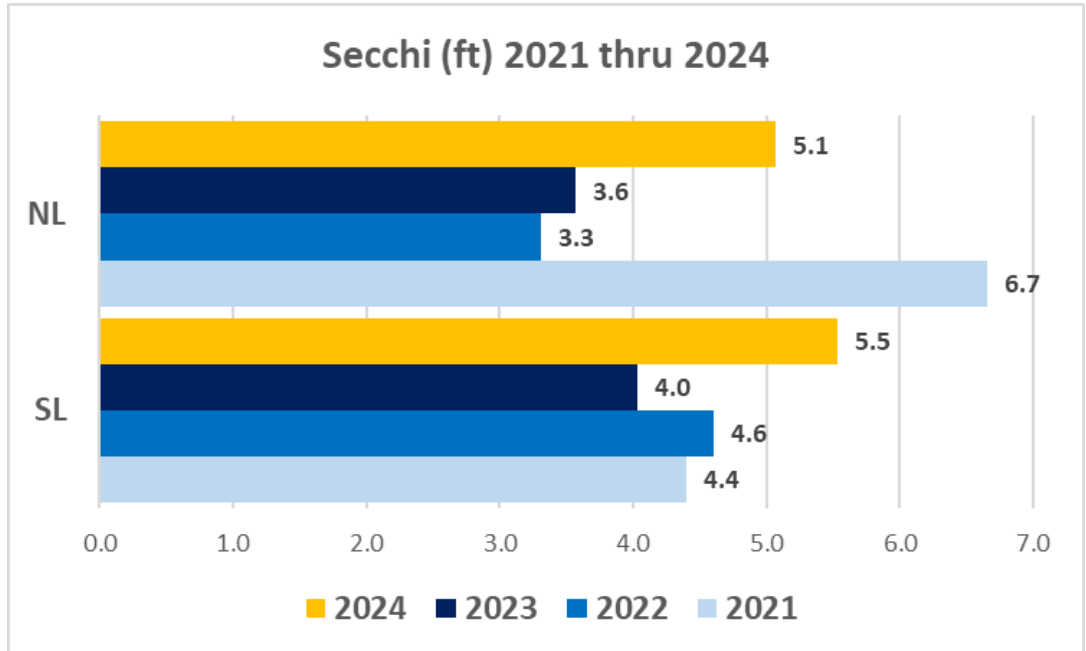
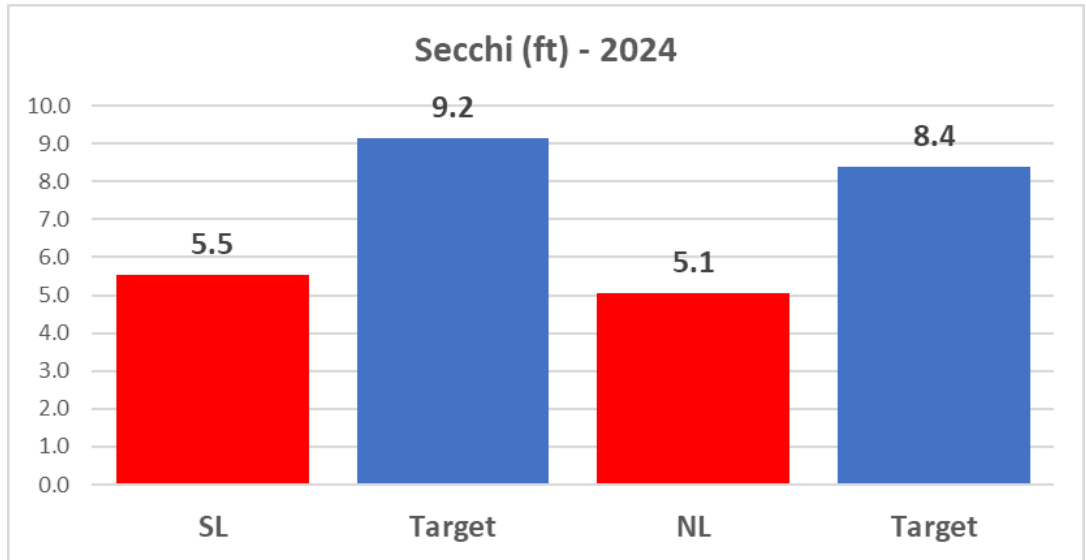
Both SL & NL are trending below the 4th year goals based of the 2019 baseline.



2021 thru 2024

Higher numbers are what we're looking for with this measurement.

- Both lakes finished better than prior year numbers



Cyanobacteria (ug/L) – Blue Green Algae

Cyanobacteria (Blue Green Algae) at a level, using a calibrated in situ fluorimeter, not to exceed 30 ug/L in the first year, 25 ug/L in the second year and below 12 ug/L thereafter.

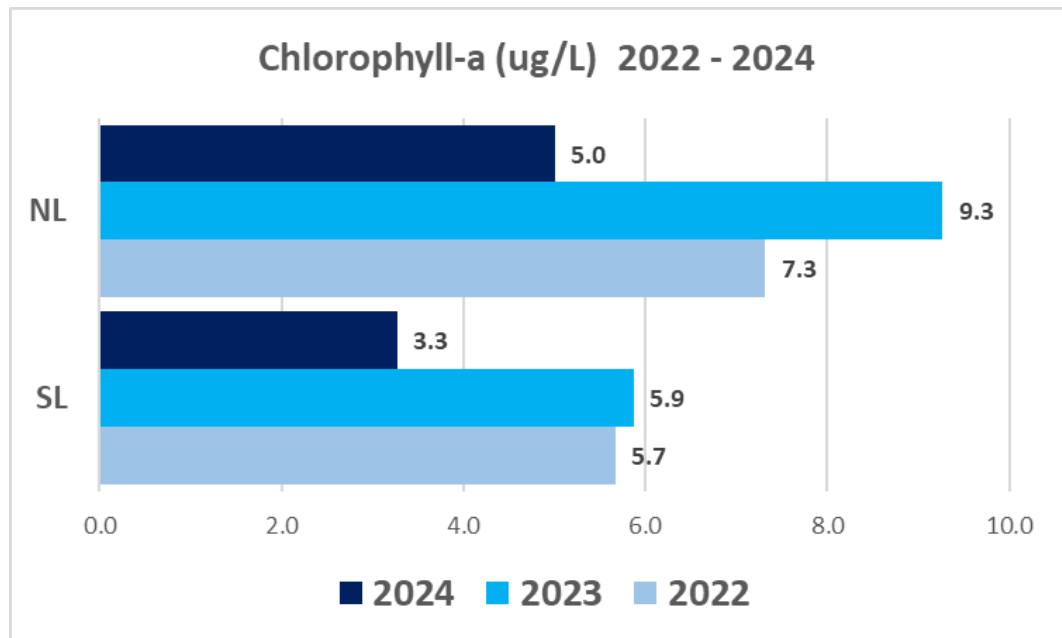
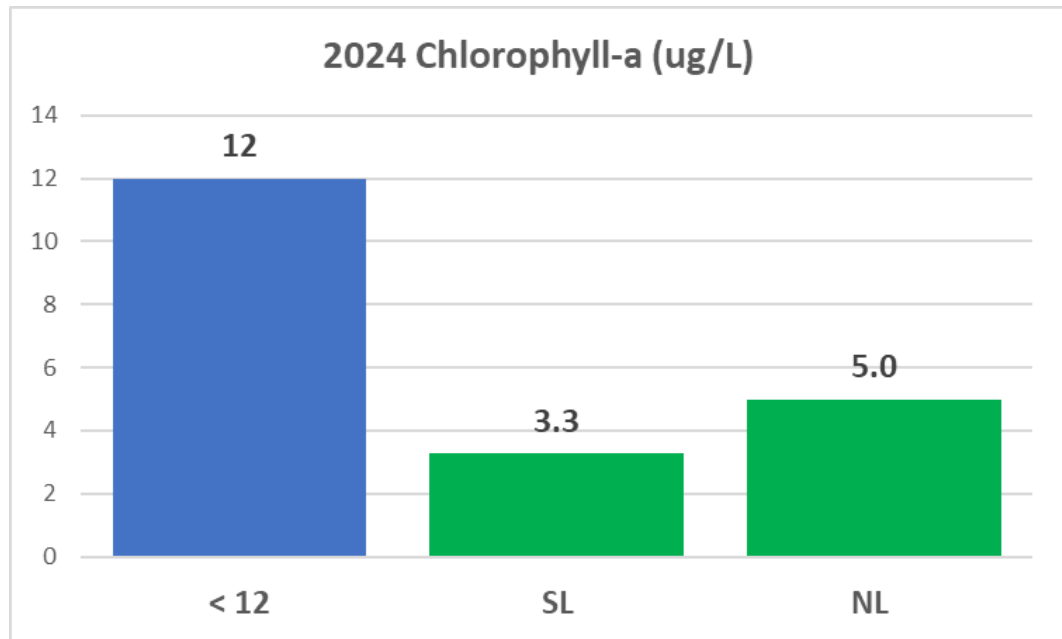
2024

Both SL & NL are trending below the 4th year goal.

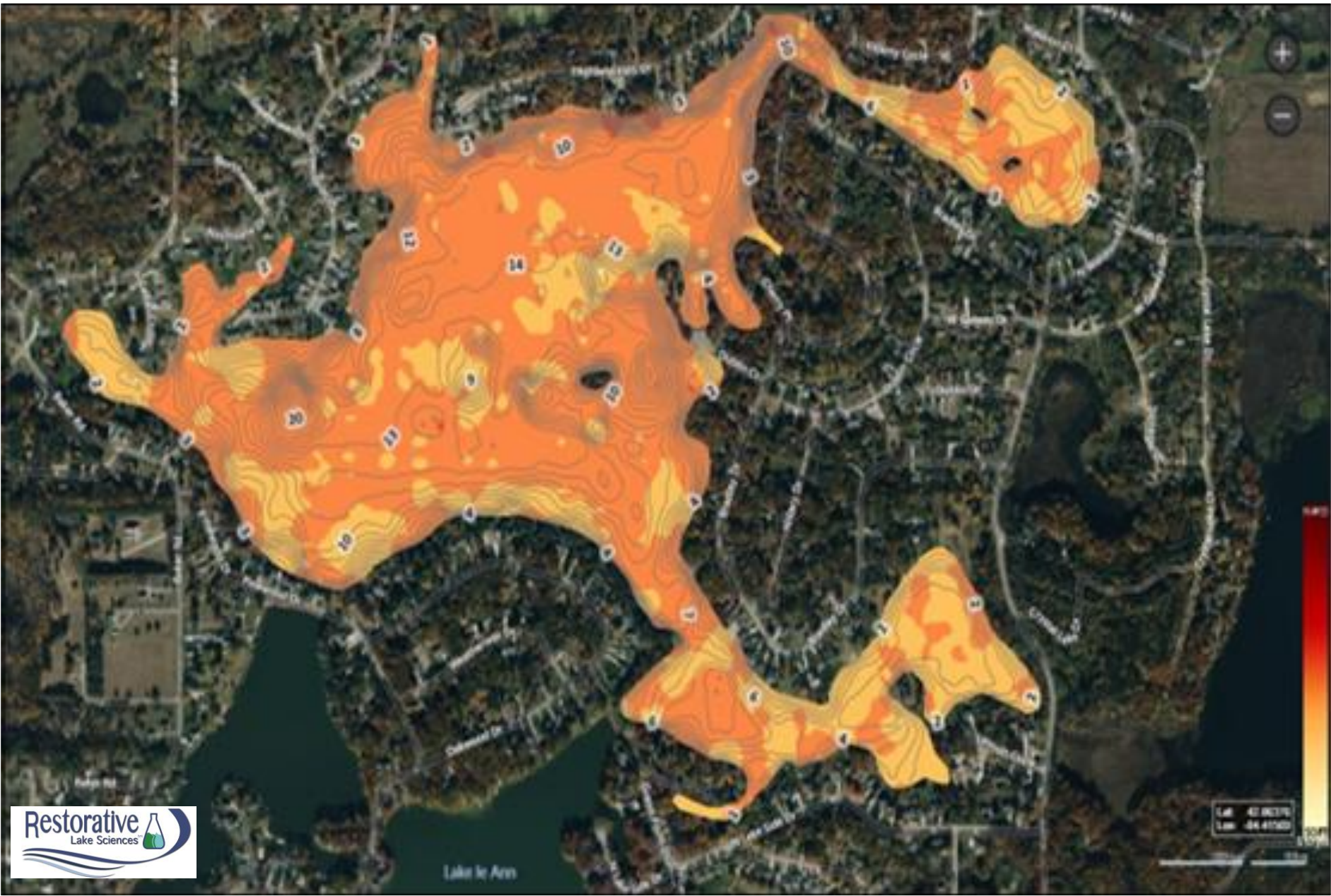
2022 vs 2024

Lower numbers are what we're looking for with this measurement.

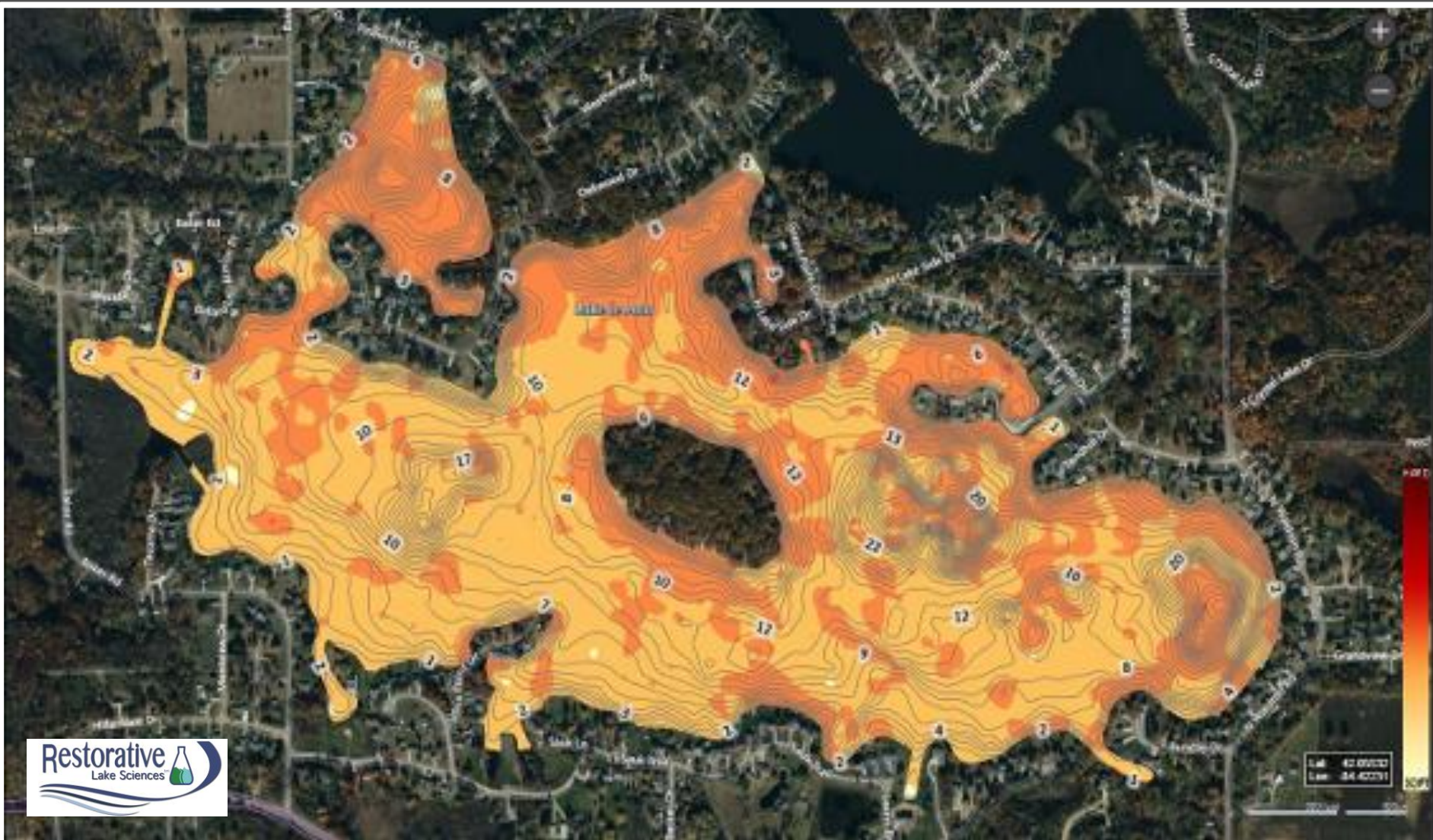
- Both Lakes are trending below the 2024 target
- Both Lakes show improvement vs 2023



2024 North Lake (Bathymetric Scan)



2024 South Lake (Bathymetric Scan)

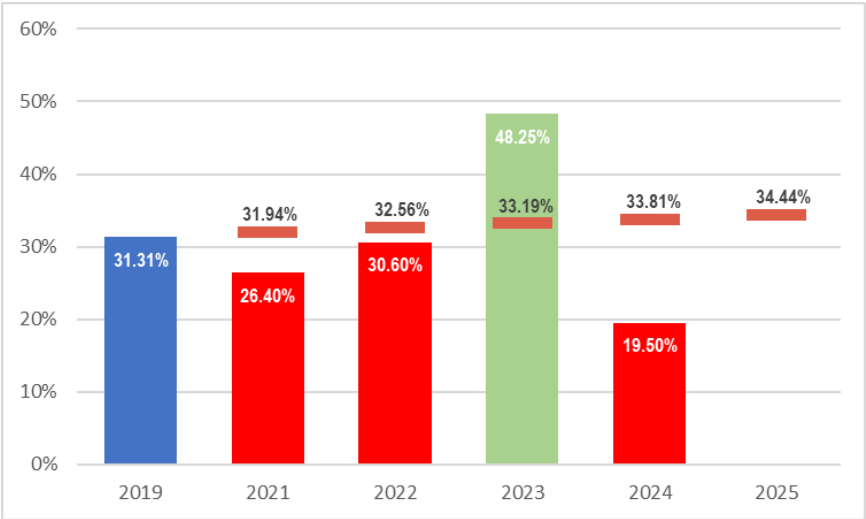


BOTTOM HARDNESS AGREEMENT TARGETS

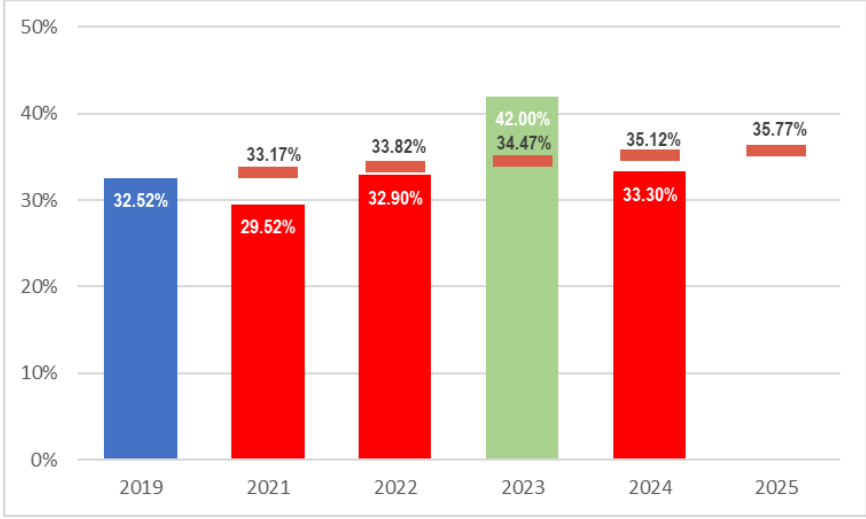
Performance Agreement:

Muck reduction in the first 3 years measured by BioBase scan in mid-September with an increase of 0.3-0.4 and >0.4 hardness categories by 2-5%.

South Lake



North Lake













































Hardness Range	Baseline %	2021	2022	2023	2024
0.0 - 0.1	0.54	0.02	0.1	0.01	0
0.1 - 0.2	18.23	8.7	6.1	0.48	1.1
0.2 - 0.3	49.91	64.88	63.2	51.23	79.4
0.3 - 0.4	31.25%	26%	31%	48%	19.5%
>0.4	0.06%	0.02%	0.10%	0.00%	0.00%

Hardness Range	Baseline %	2021	2022	2023	2024
0.0 - 0.1	0.69	0.34	0.2	0.07	0
0.1 - 0.2	18.39	6.5	5.4	1.7	0.5
0.2 - 0.3	48.4	63.65	61.5	56.2	66.2
0.3 - 0.4	32.50%	29%	33%	42%	33%
>0.4	0.02%	0.08%	0.20%	0.02%	0.00%

- ❑ Our LFA system is making progress in the right direction. The performance agreement targets were not met in 2024
- ❑ 2024 targets were not met but our hardness is trending in the right direction. We are increasing in the 0.2 – 0.3 hardness range

Years 1 - 4 Results

North Lake	2021	2022	2023	2024
Maintain a Dissolved Oxygen (DO)				
Total Phosphorous (TP)				
Total Inorganic Nitrogen (TIN)				
Water Clarity (Secchi Disk)				
Cyanobacteria (Blue Green Algae)				
Muck Reduction				

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