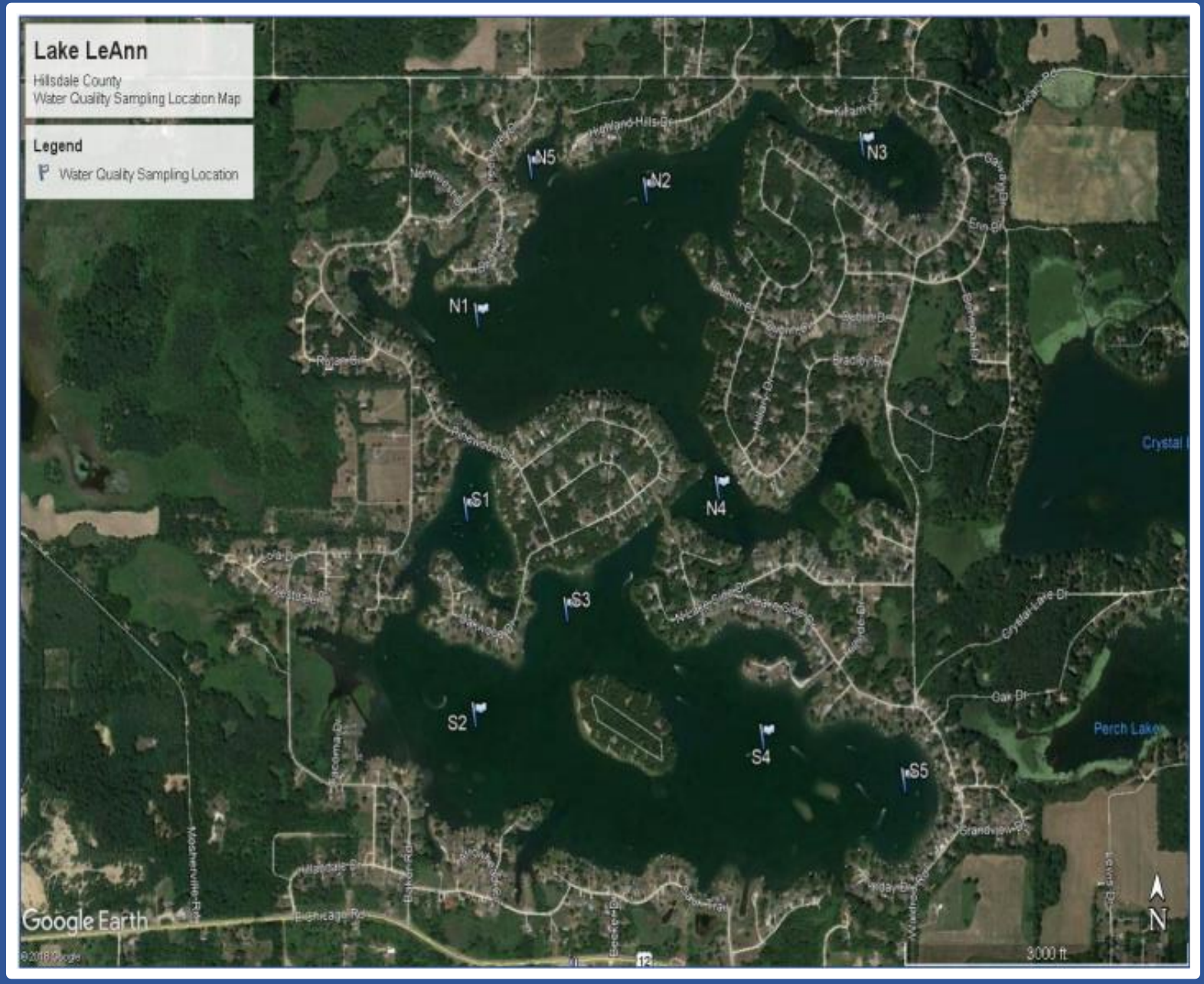
# 2023 LFA REPORT

UPDATED 2.22.24

# Year Three of Program

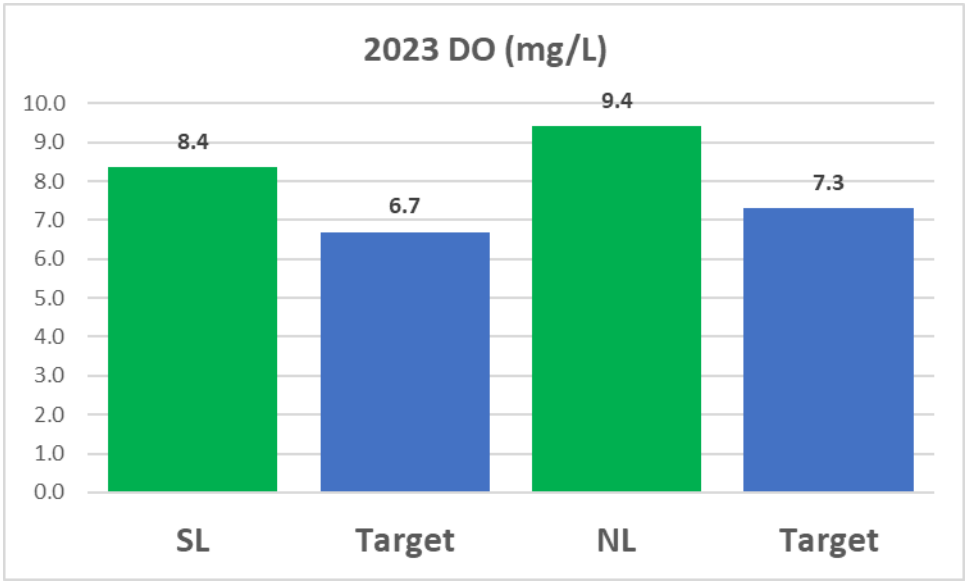
- Dissolved Oxygen (DO)
- Total Phosphorous (TP)
  - SL
  - NL
- Total Inorganic Nitrogen (TIN)
  - SL
  - NL
- Water Clarity (Secchi Disk)
- Cyanobacteria (Blue Green Algae)
- Muck Reduction


Lake LeAnn
Hillsdale County
Water Quality Sampling Location Map
Legend
Water Quality Sampling Location
N1
N2
N3
N4
N5
S1
S2
S3
S4
S5
Crystal L
Perch Lake
Google Earth
3000 ft
N

# 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 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 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.



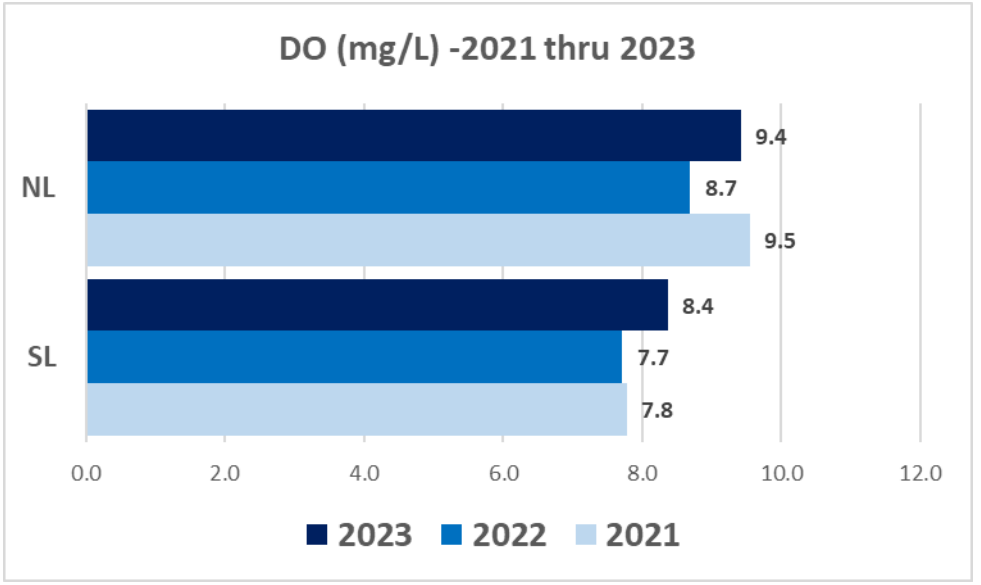

## 2023

We hit our DO goals.

## 2021 thru 2023

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

- 2023 reading were better than full year, 2022 results.

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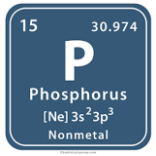
# Total Phosphorous (TP)

Total Phosphorous (TP) maintained at less than 40 ug/L in the first year and ≤30 ug/L thereafter.
30 ug/L = 0.030 mg/L

## 2023

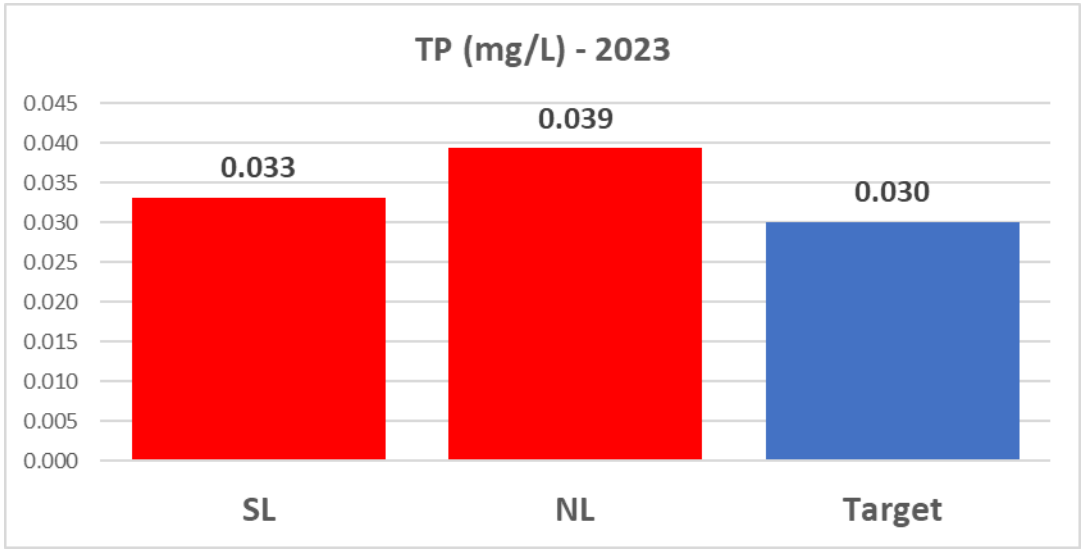
SL missed the target driven by higher reading in September
NL missed the target driven by higher readings in July

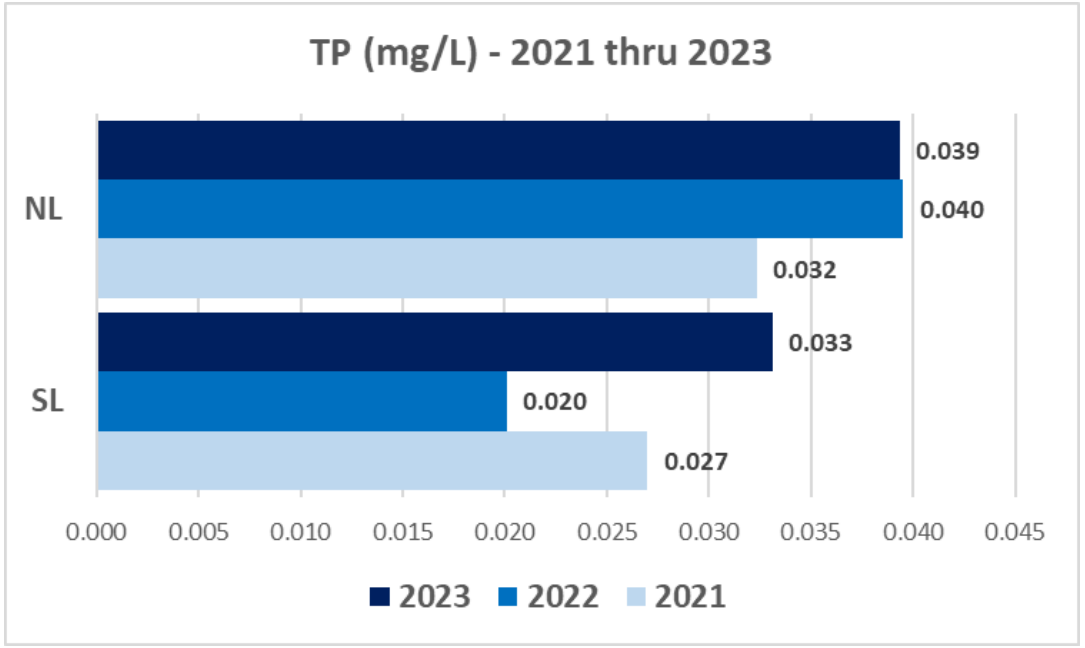



## 2021 thru 2023

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

- NL was flat to PY
- SL finished higher than 2022 and 2021

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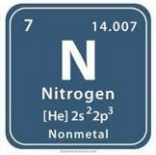
# Total Inorganic Nitrogen (TIN)

**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.

## 2023

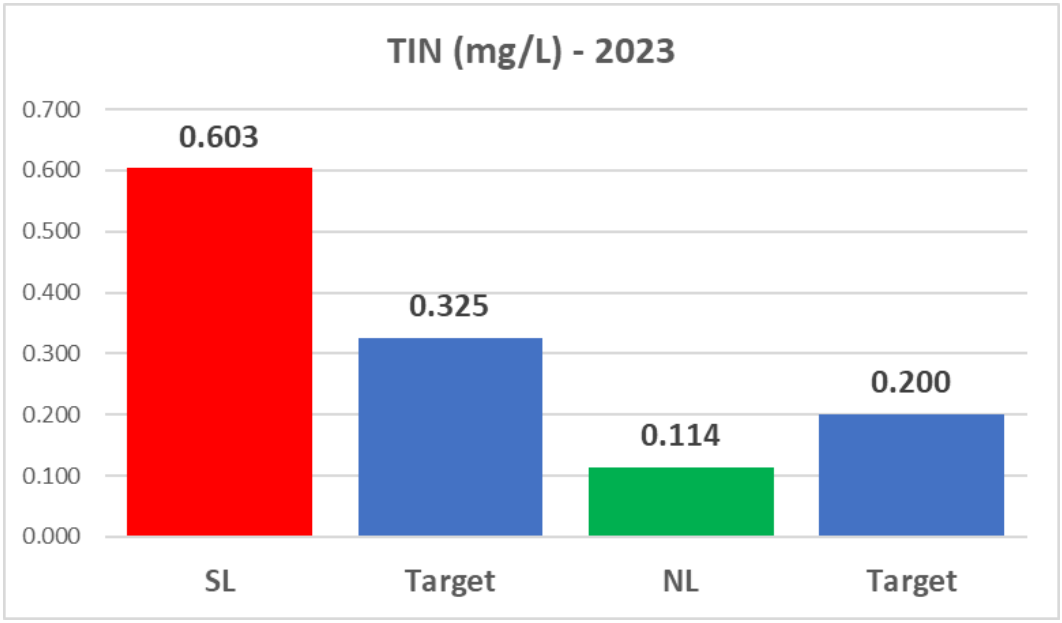
SL missed the target driven by high July & September readings
NL hit the target

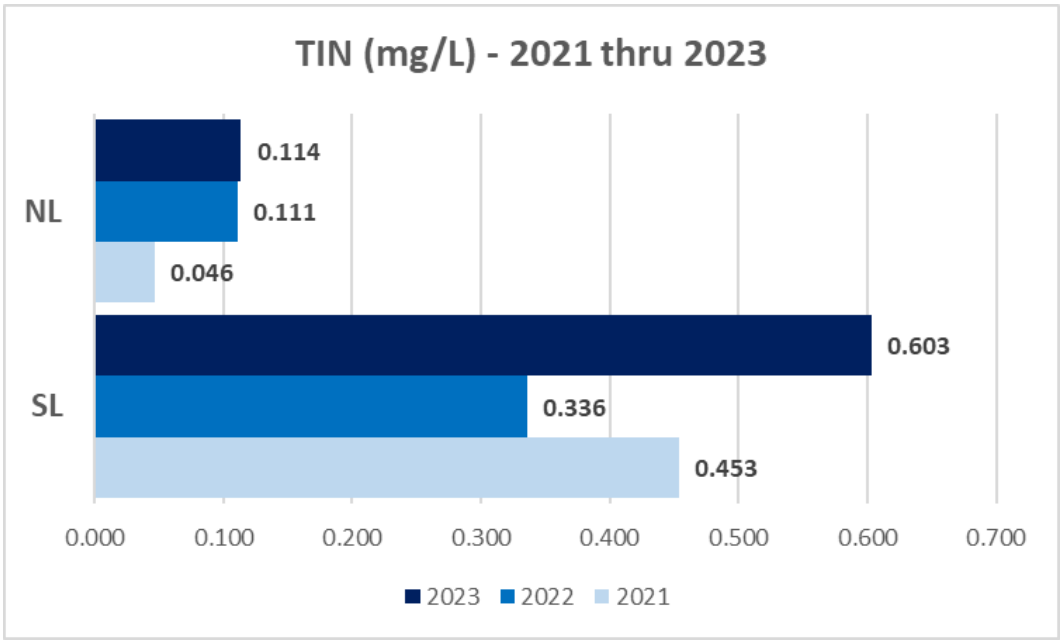



## 2021 thru 2023

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

- Both lakes came in higher than PY also exceeding the 2021 baseline numbers.

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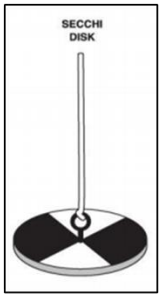
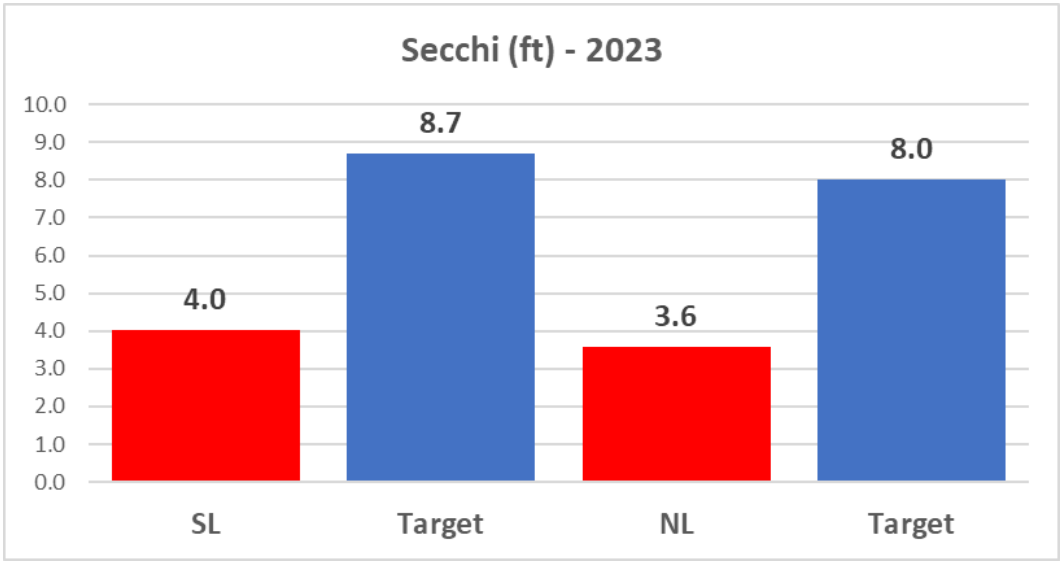
# Water Clarity (Secchi Disk)

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.

## 2023

Both SL & NL were below the 3rd year goals based off the 2019 baseline.

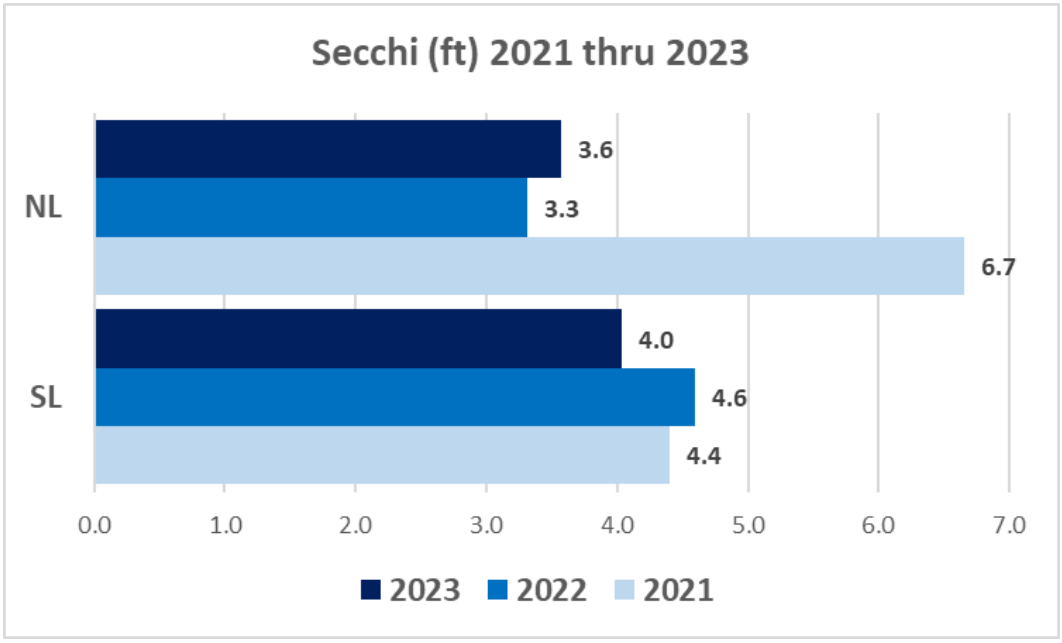



## 2021 thru 2023

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

- NL maintaining better than 2022 full year numbers
- SL slipped vs 2022 & 2021

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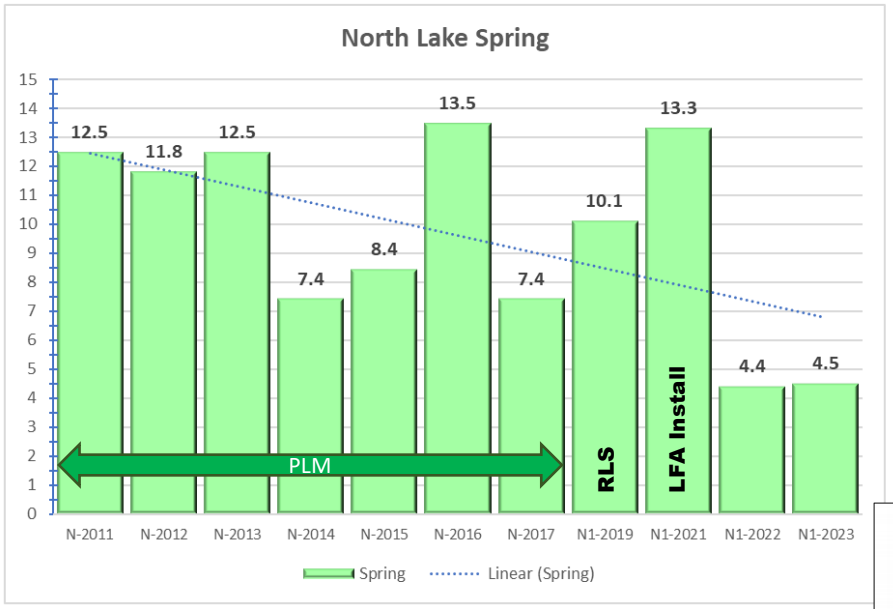
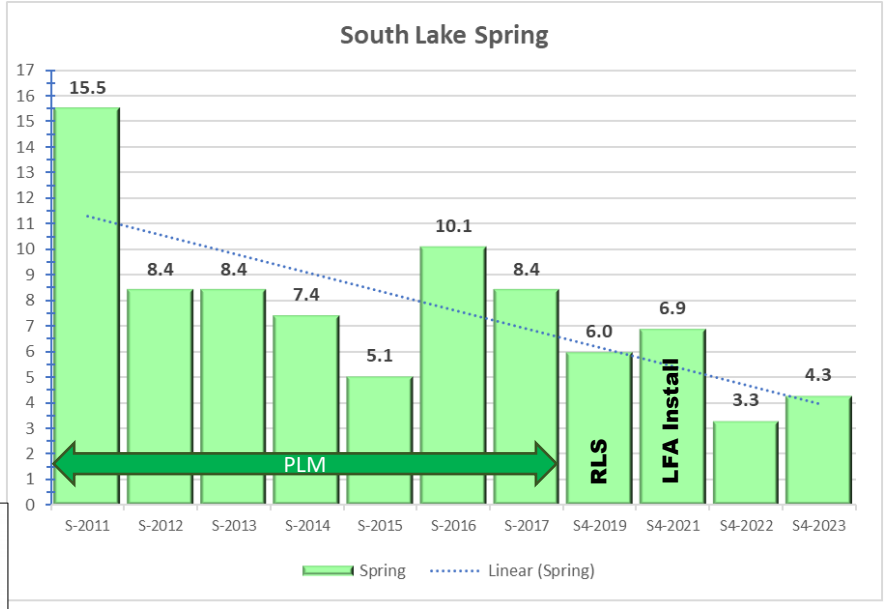
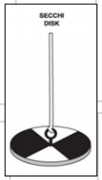
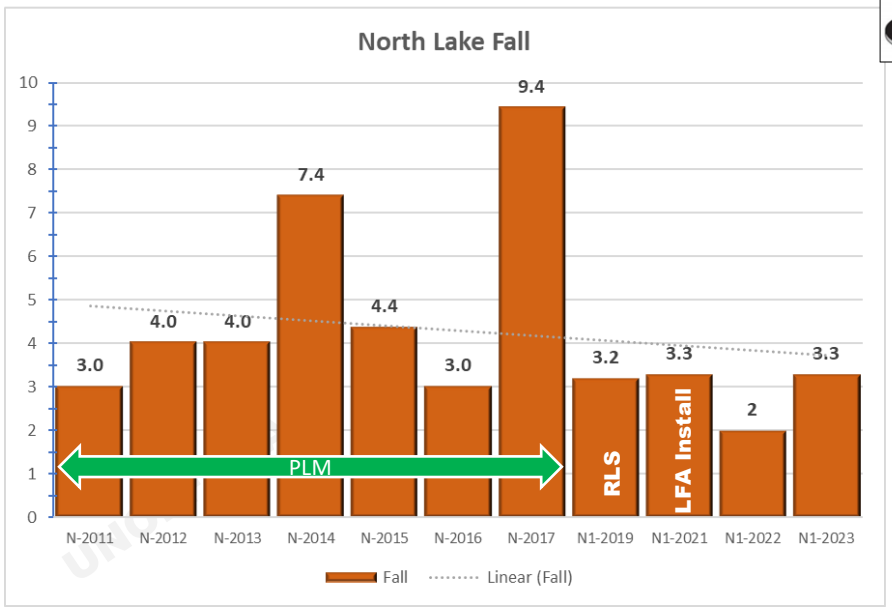
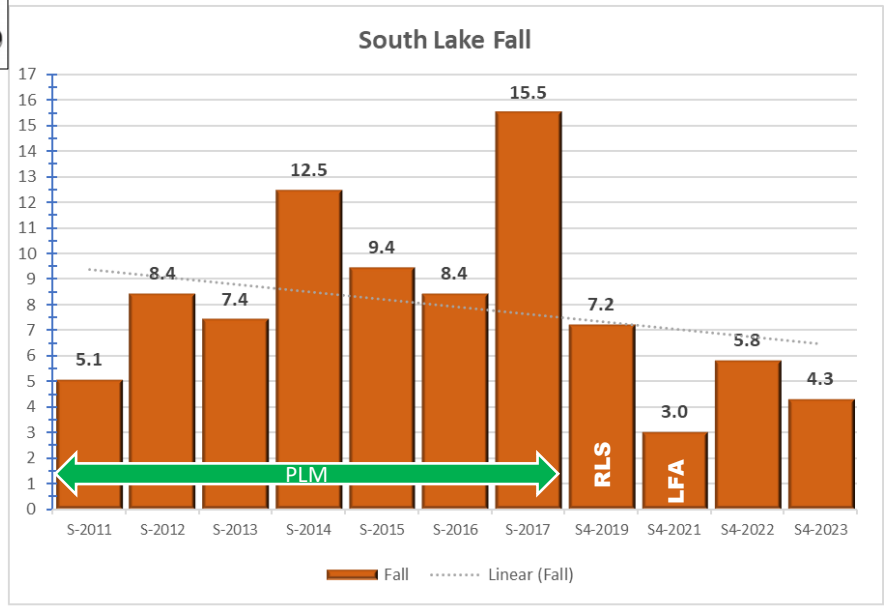
# Secchi Disk (ft) – Historical Data Deep Holes



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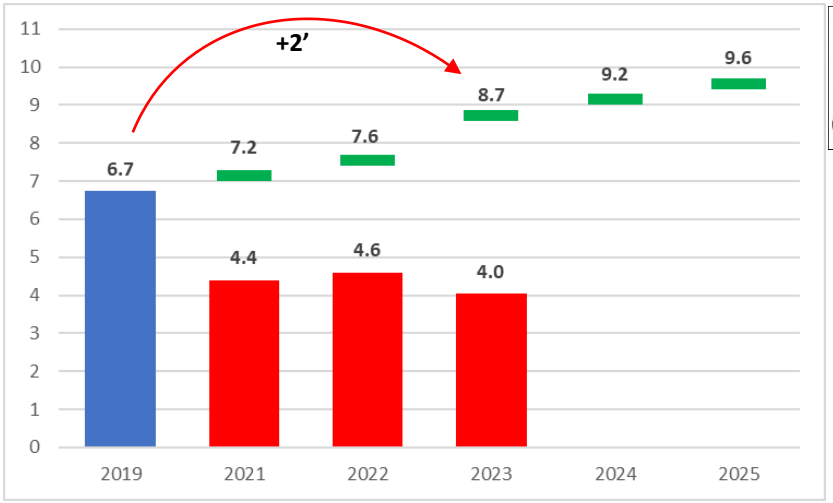
# SECCHI DISK AGREEMENT TARGETS

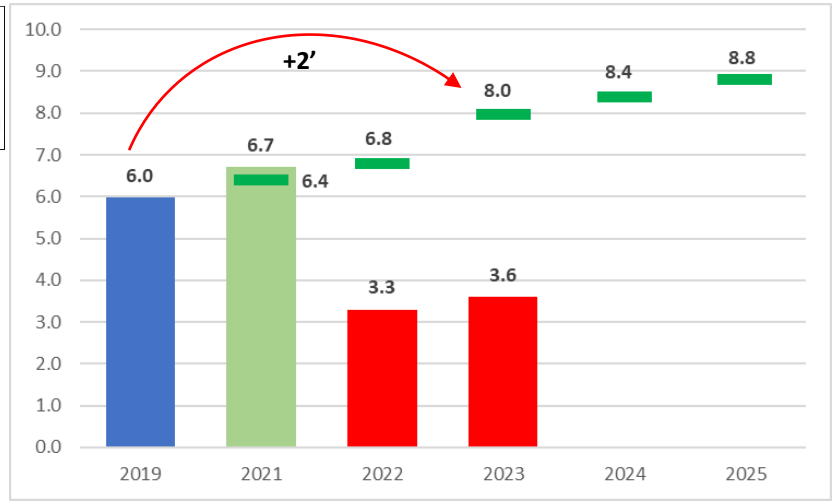
**Performance Agreement:**

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 three-year trend is falling short of the goal. The goal continues to rise, and our results are not keeping pace.

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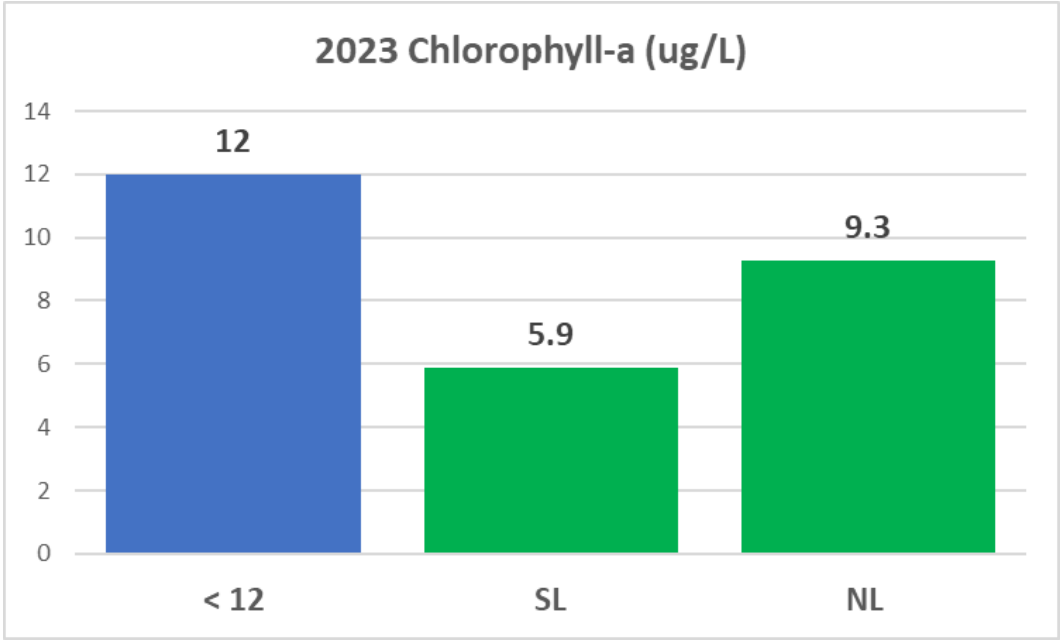
# Chlorophyll-a (ug/L) – Algae

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.

**2023**

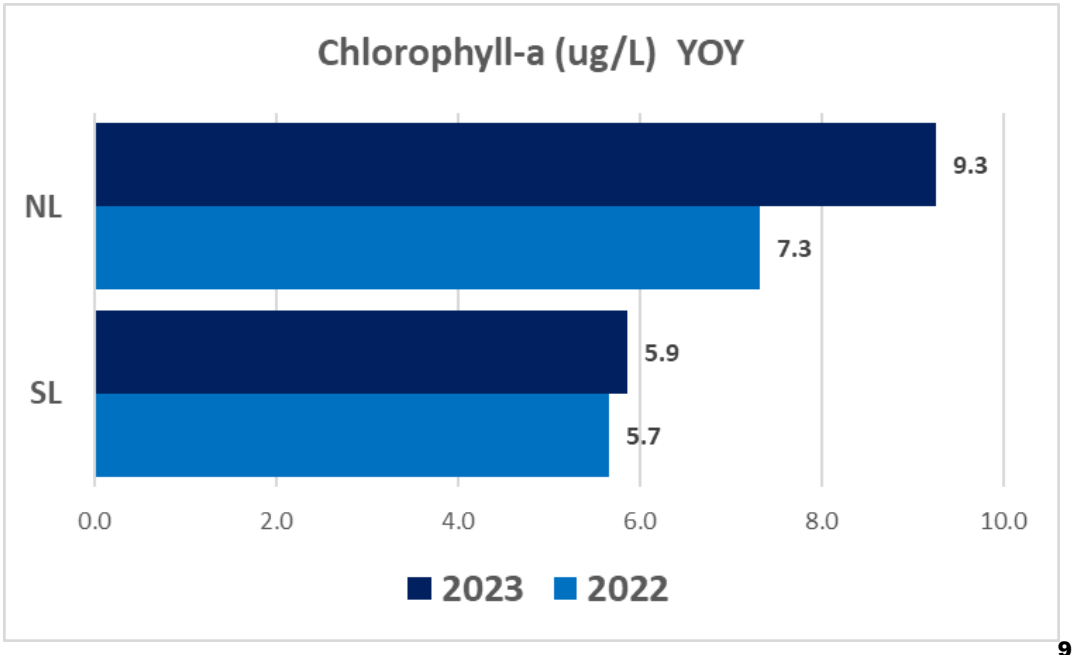
Both SL & NL were below the 3rd year goal.




**2022 vs 2023**

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

- NL & SL final reading came in higher then PY

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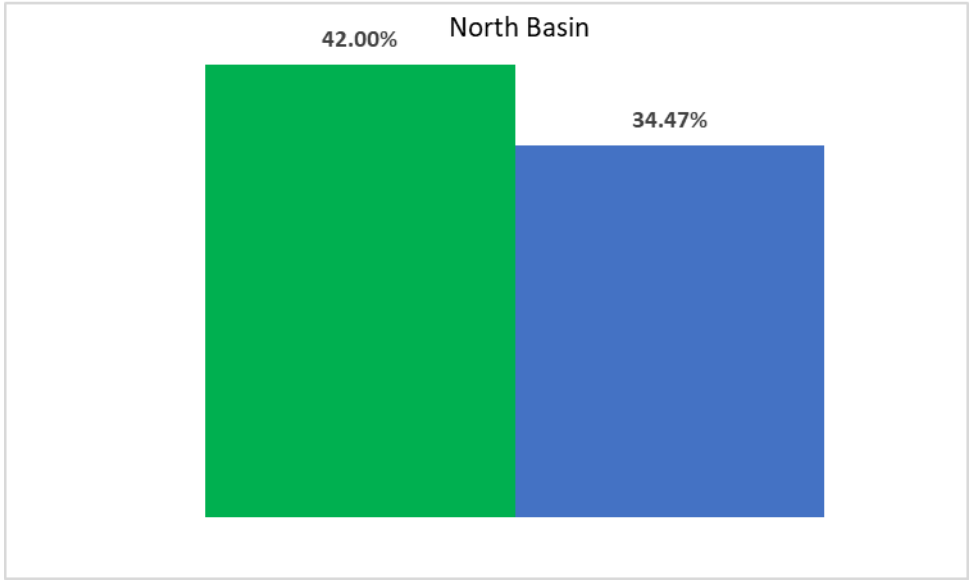
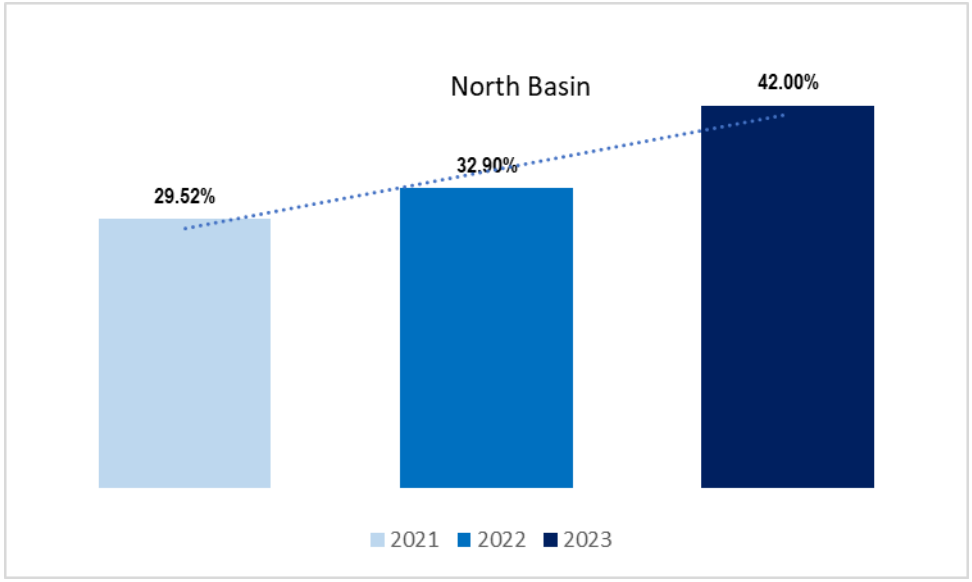
# Muck Reduction – North Basin

**TARGET:**
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%.

- The LFA System did achieve the North Basin Muck Reduction target outlined in our agreement.




- In our three-year trend we continue to improve against our bottom hardness target.

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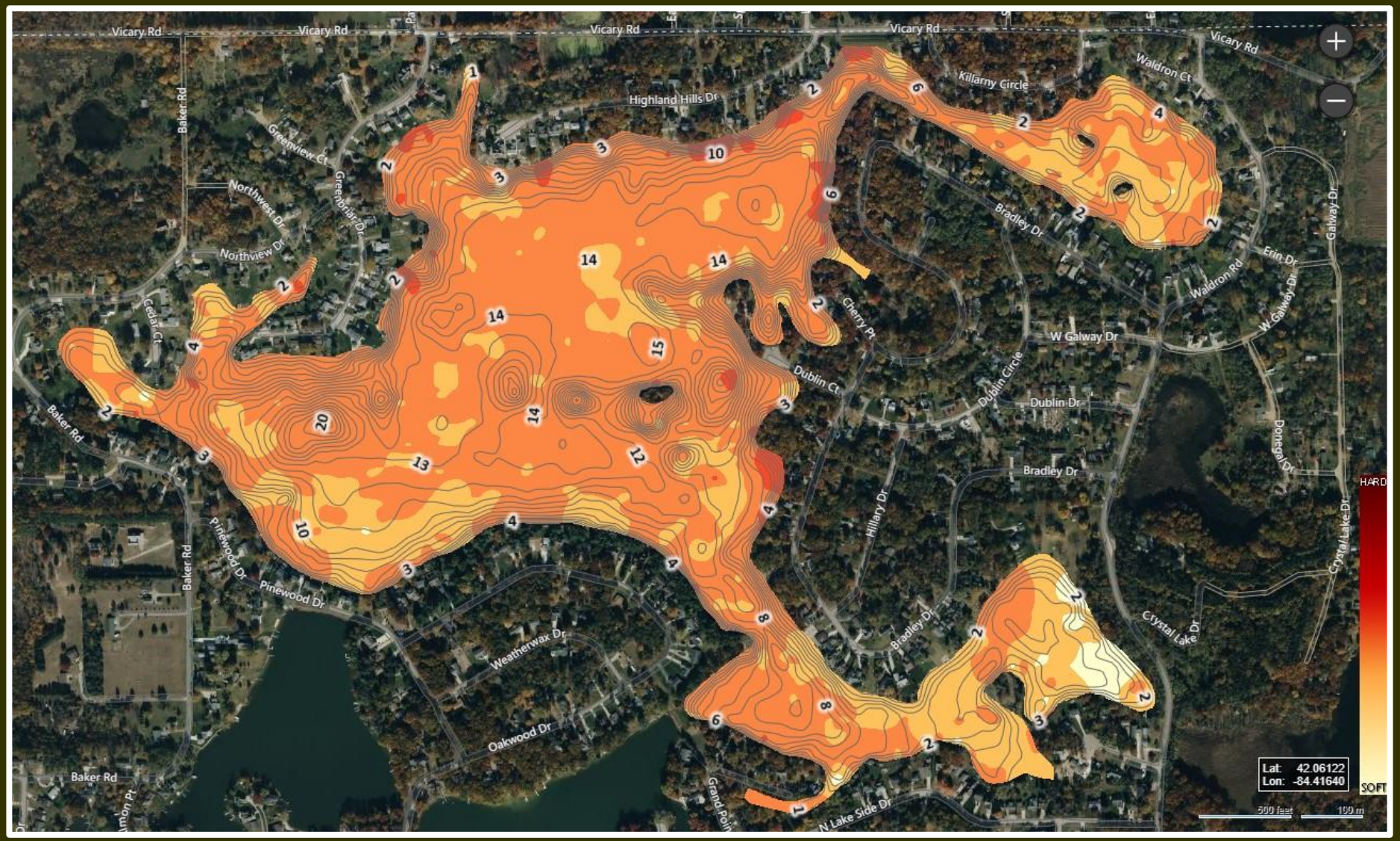
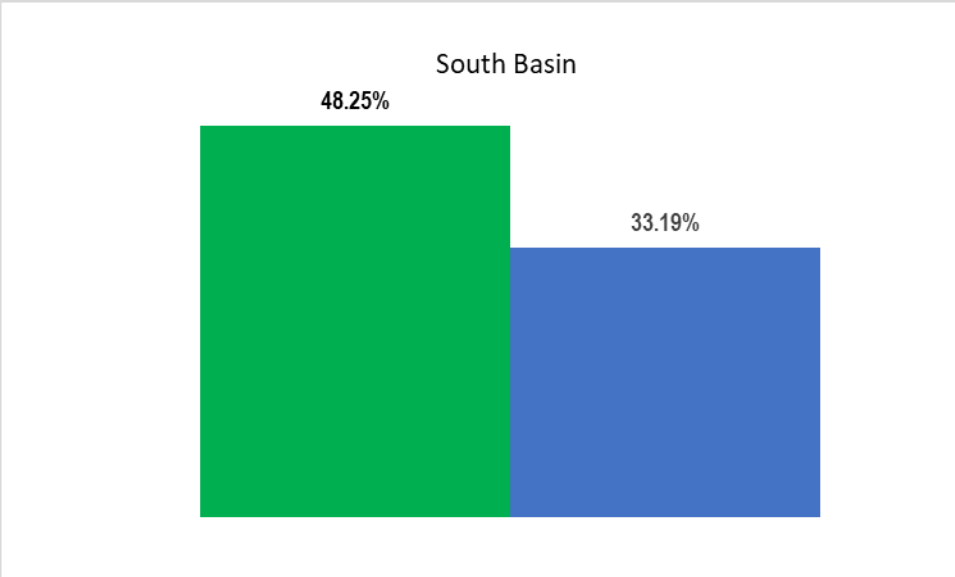
# North Lake


Vicary Rd
Highland Hills Dr
Killarny Circle
Waldron Ct
Baker Rd
Greenview Ct
Greenbriar Dr
Northwest Dr
Northview Dr
Cedar Ct
Bradley Dr
Erin Dr
Galway Dr
Waldron Rd
W Galway Dr
Cherry Pt
Dublin Ct
Dublin Circle
Dublin Dr
Donegal Dr
Hillary Dr
Crystal Lake Dr
Pinewood Dr
Weatherwax Dr
Oakwood Dr
Grand Point Dr
N Lake Side Dr
Lat: 42.06122
Lon: -84.41640
HARD
SOFT
500 feet
100 m

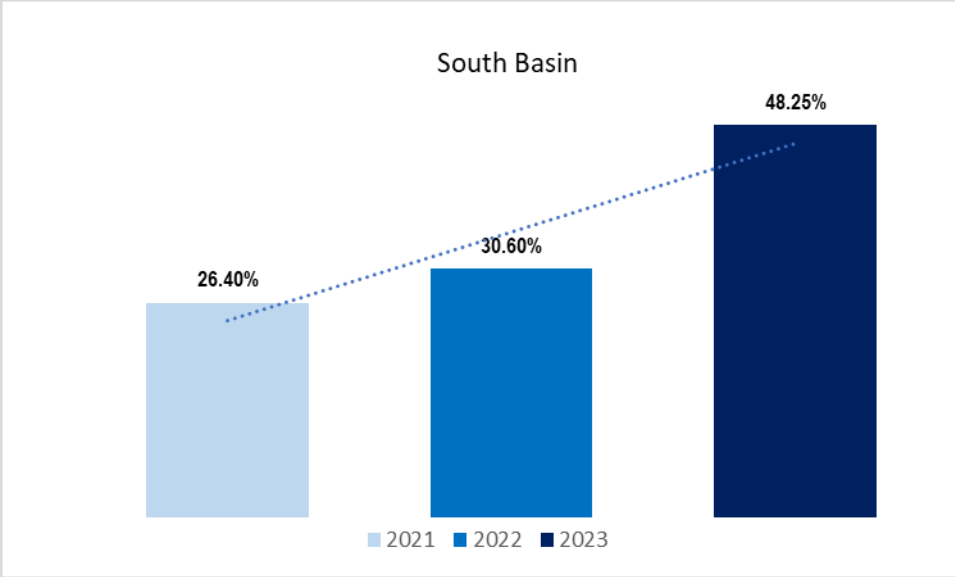
# Muck Reduction – South Basin

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

- The LFA System did achieve the South Basin Muck Reduction target outlined in our agreement.




- In our three-year trend we continue to improve against our bottom hardness target.

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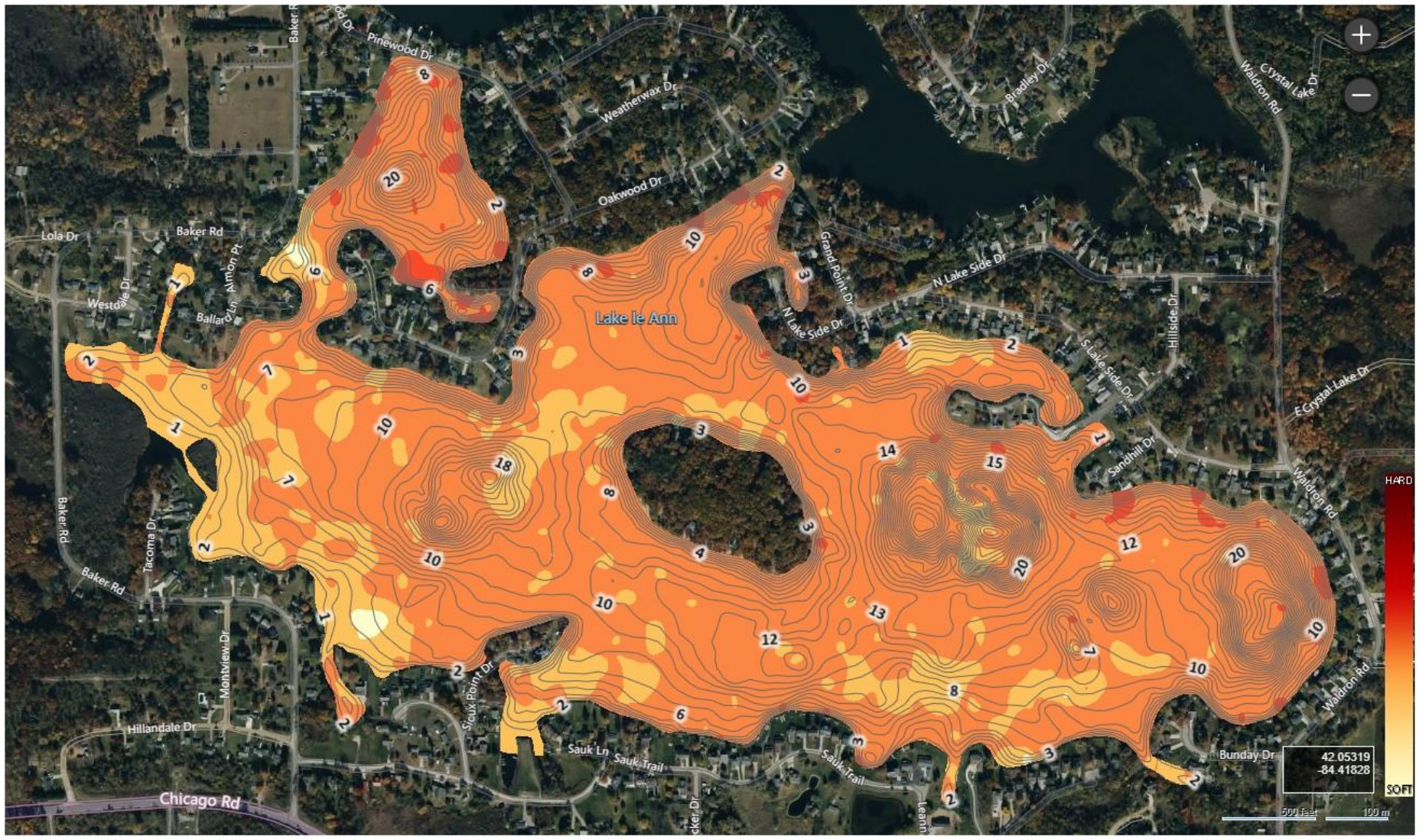
# South Lake

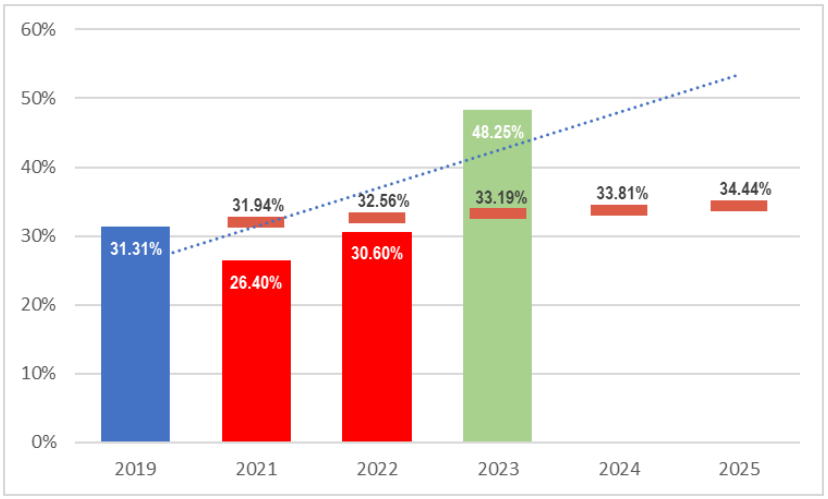

Lake le Ann
Pinewood Dr
Weatherwax Dr
Oakwood Dr
Bradley Dr
Crystal Lake Dr
Waldron Rd
Grand Point Dr
N Lake Side Dr
S Lake Side Dr
Hillside Dr
E Crystal Lake Dr
Sandhill Dr
Waldron Rd
Lola Dr
Baker Rd
Westdale Dr
Ballard Ln
Almon Pl
Tacoma Dr
Montview Dr
Hillandale Dr
Sioux Point Dr
Sauk Ln
Sauk Trail
Leann
Bunday Dr
Chicago Rd
HARD
SOFT
42.05319
-84.41828
500 feet
100 m

# BOTTOM HARDNESS AGREEMENT TARGETS

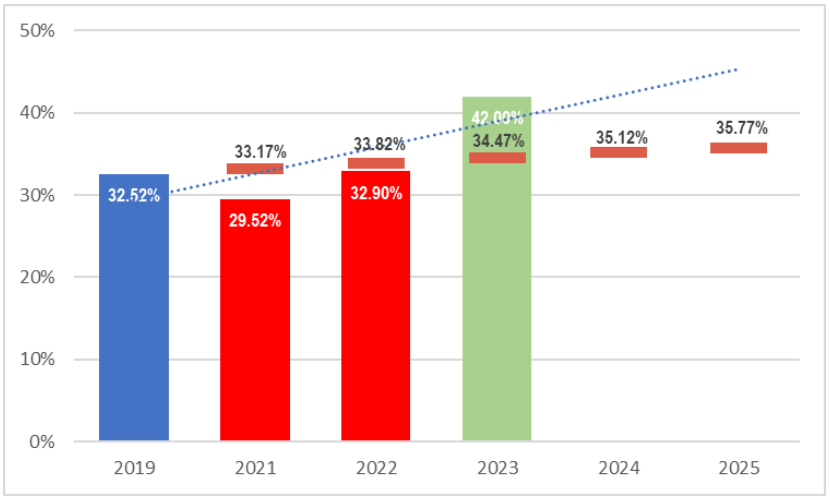
**Performance Agreement:**

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




- ❑ Our LFA system is making progress in the right direction. The performance agreement targets were met and exceeded in 2023
- ❑ Trend line indicators are showing progress year-over-year. This is a pass or fail grading system and we struggled hitting our target the first two years but were making progress in the right direction

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# 3-Year Results

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

| South Lake | 2021 | 2022 | 2023 |
|---|---|---|---|
| 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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