Northeast Aquatic Research

North and South Riga Ponds 2024 Monitoring Report

Prepared for the Riga Environmental Stewardship Committee

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INTRODUCTION AND SYNOPSIS OF 2024 RESULTS

Volunteers from Mount Riga Inc. (MRI) continued to make water quality monitoring visits to the deep-water collection sites in North & South Riga lakes during 2024. This is the 7th year that the monitoring program has been collecting critical data from both lakes. NEAR staff conducted water quality monitoring in September on both lakes. Both lakes were visited for a total of eight occasions between late April and November. The monitoring data is generally collected at the site of deepest water in both lakes, although there are a few instances where the deepest depth is not reached, particularly in North Riga. During these visits, water temperature and dissolved oxygen are measured in profile, the water clarity is measured, and water samples are collected for laboratory analysis of nutrient levels.

MRI deployed HOBO temperature data loggers at the deep station in both lakes in late April. One logger was placed at each meter from the surface to the bottom. The loggers were removed in mid-November. The data retrieved from the HOBOs allowed for the construction of highly detailed heat maps of water temperatures in each lake and compensates for gaps in profile data. The distribution of heat in lakes is central to the functioning of lake ecosystems.

NEAR conducted aquatic plant surveys of North Riga Lake on August 15th and South Riga Lake on August 16th. NEAR conducted follow-up searches for Hydrilla at North Riga Lake on September 17th and at South Riga Lake on September 25th. <u>No invasive species were observed at either lake in 2024</u>.

General Findings

<u>Water Clarity</u>: The clarity in both lakes in 2024 was generally better than clarity observed in 2023. North Riga clarity only improved from April to November, while South Riga clarity fluctuated slightly. The clarity in South Riga was to the bottom of the lake from August to November.

<u>Dissolved Oxygen and Water Temperature</u>: This was the first full year of temperature logger data at both lakes. The lakes warmed until mid-July and remained warm until mid-late September. Dissolved oxygen concentrations were poor at the bottom of North Riga Lake in June and July, and in July and August at South Riga Lake.

<u>Nutrients</u>: Total nitrogen and total phosphorus were generally equal to or below their respective oligotrophic thresholds in select samples in both lakes. Inlet concentrations were elevated on multiple occasions.

<u>Aquatic Plants</u>: Eastern Purple Bladderwort (*Utricularia purpurea*) was dominant in both lakes. North Riga contained the Connecticut Endangered species Tuckerman's Pondweed (*Potamogeton confervoides*). No Endangered species were documented in South Riga. <u>No invasive species were found in either of the lakes.</u>

MONITORING RESULTS

Water quality monitoring consists of measuring in-situ the water temperature and dissolved oxygen in the water column, measuring the water clarity with a Secchi disk and view scope, and collecting water samples for analysis of the nutrients phosphorus and nitrogen. Water clarity is one of the most important parameters in lake health. High water clarity allows for fully saturated waters, preventing anoxia and anaerobic respiration. Poor water clarity causes poor circulation, leading to stagnation of bottom water and anoxia. The water temperature measurements show depths of thermal boundaries and zones of mixing and stagnation. Dissolved oxygen is critical to lake health and dissolved oxygen profiles show where the lake is well saturated and where the water is stagnant.

Water Clarity / Secchi Disk Depth

The April and May water clarity readings in both North Riga and South Riga were the poorest spring clarity readings on record.

In North Riga, the clarity steadily improved over the season, with the best reading of 8.3 meters occurring in November. Despite the improving seasonal clarity, all readings were lower than almost all prior reading (**Figure 1**). This trend was nearly the opposite of the clarity trend in 2023, when clarity was better earlier in the season and generally declined through the season to the all-time poorest reading at North Riga of 1.5 meters on Oct 1st, 2023.

The long-term record of Secchi disk depths at North Riga are shown in **Figure 2**. Initial readings, 2007-2008, ranged between 7.5 and 10 meters. Between the years 2010 and 2015, Secchi disk depth ranged between 7 and 8 meters. Beginning in 2016, Secchi disk depth has become much more variable, with measurements between 5 and 9 meters. The middle and end of the 2023 season and the beginning of 2024 have had unprecedented poor clarity.

The clarity in South Riga was very poor in April, May, and early July (2.1 – 2.8 meters) (**Figure 3, Table 1**). Clarity improved drastically in August. The Secchi disk reached the bottom of South Riga Pond from August to November.

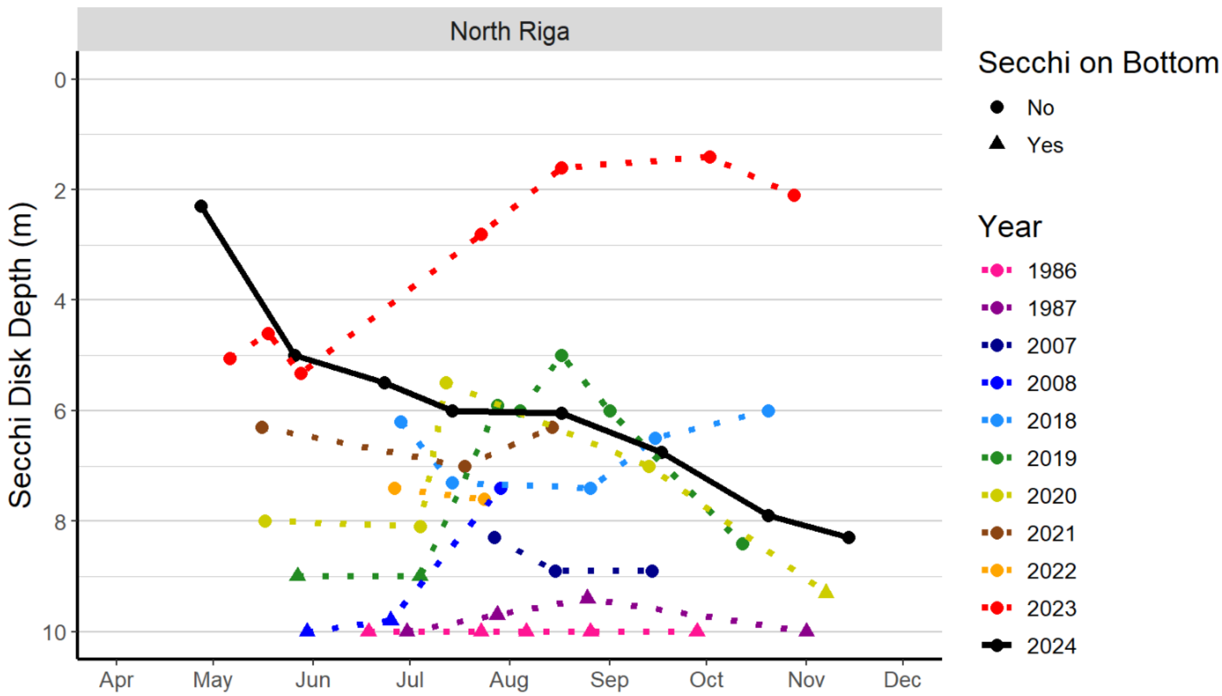


Figure 1. Historical and 2024 Secchi disk depth measurements at North Riga.

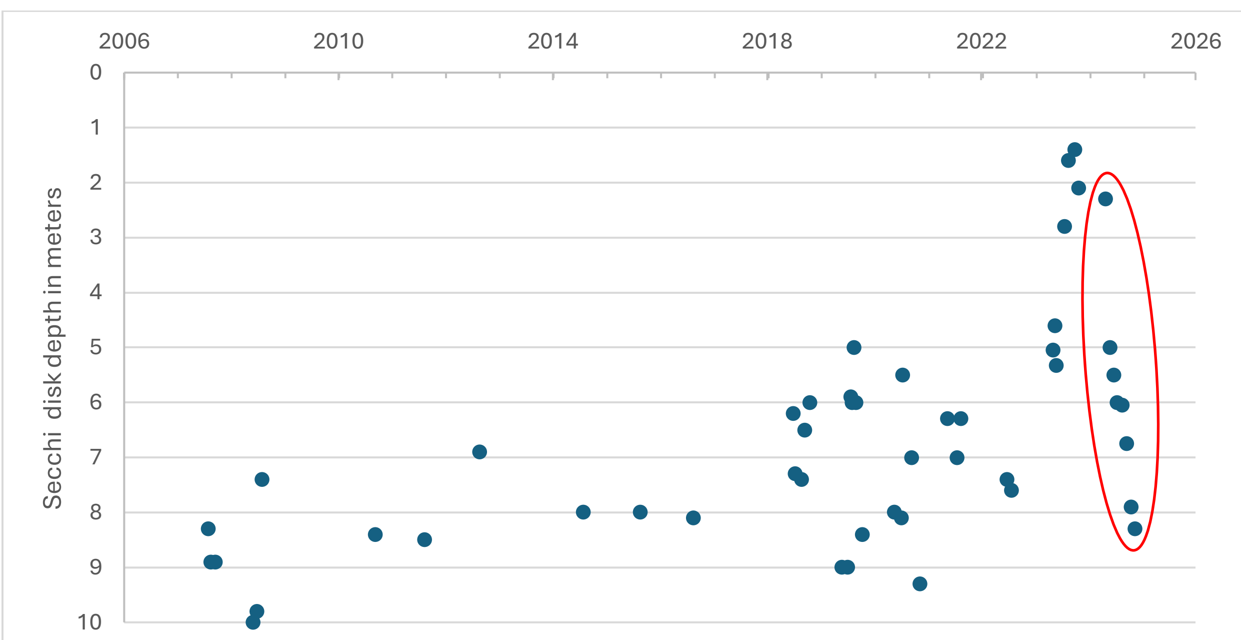


Figure 2. Long-term trend in Secchi disk depth measurements at North Riga, with 2024 measurements circled.

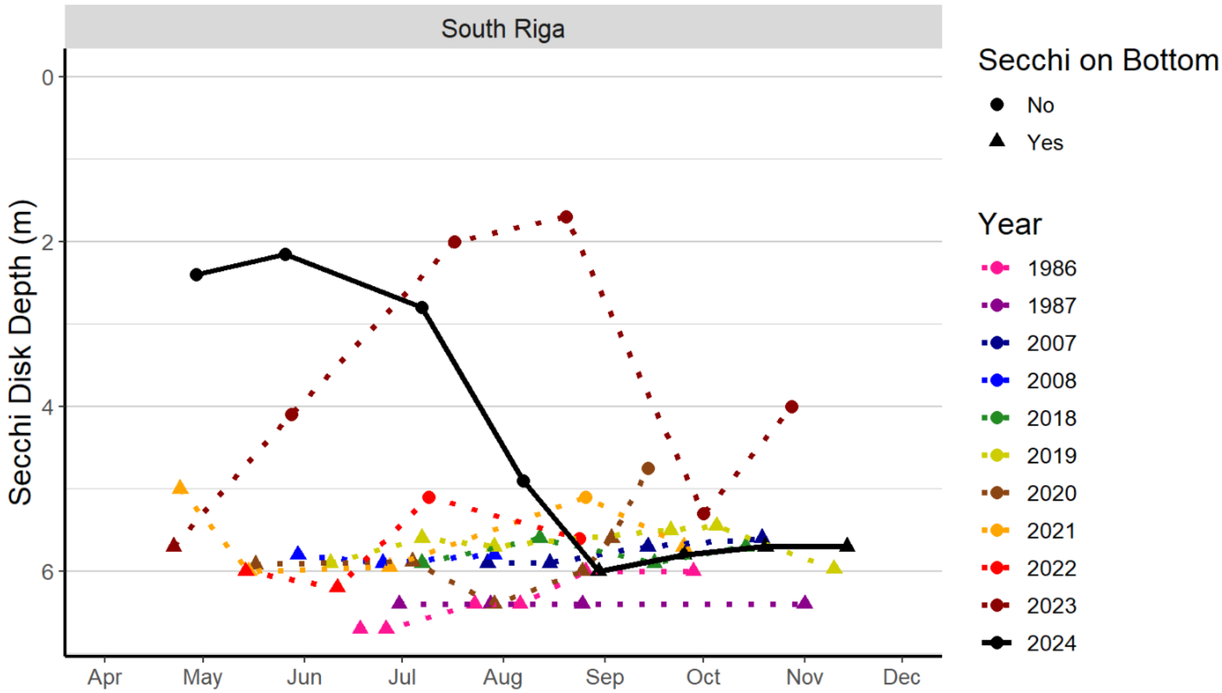


Figure 3. Historical and 2024 Secchi disk depth measurements at South Riga.

Table 1. North Riga and South Riga Secchi disk depth measurements (m), 2024.

North Riga							
Apr 27th	May 26th	Jun 23rd	Jul 14th	Aug 17th	Sept 17th	Oct 20th	Nov 14th
2.3	5	5.5	6	6.05	6.75	7.9	8.3
South Riga							
Apr 29th	May 26th	Jul 7th	Aug 7th	Aug 30th	Sept 25th	Oct 20th	Nov 14th
2.4	2.15	2.8	4.9	6	5.8	5.7	5.7

Water Temperature

Resident volunteers collected water temperature profiles on seven occasions at North Riga (**Figure 4**). NEAR began collecting the water temperature profile in September, but unfortunately suffered an equipment malfunction and could not complete the profile.

The April profile is incomplete so it's unknown if the lake was isothermal on that date, but it probably was, with a relatively isothermal temperature of 10°C. There was a large increase in heat from April 27th to May 26th, with the water temperature increasing from 10°C to 20°C. However, only the upper couple of meters of the lake warmed from sunlight. Deeper waters, between 3 and 7 meters, warmed from internal mixing, and the bottom couple of meters showed little to no increase in water temperature. On that date, the lake had a moderately stratified water column, with a thermocline between 3 and 8 meters. The lake became strongly stratified in June and remained so into July (**Figure 5**). The warmest surface water temperature was 29°C, recorded on July 14th. October and November profiles showed isothermal, fully mixed, conditions.

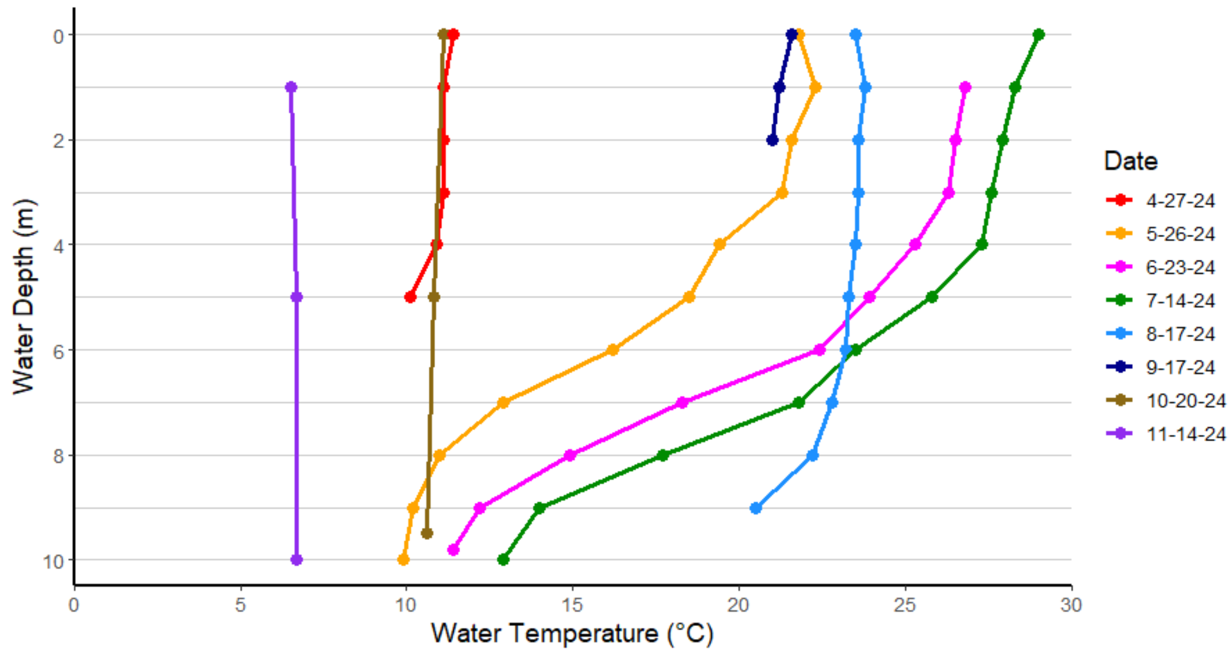


Figure 4. Water Temperature profiles in North Riga in 2024.

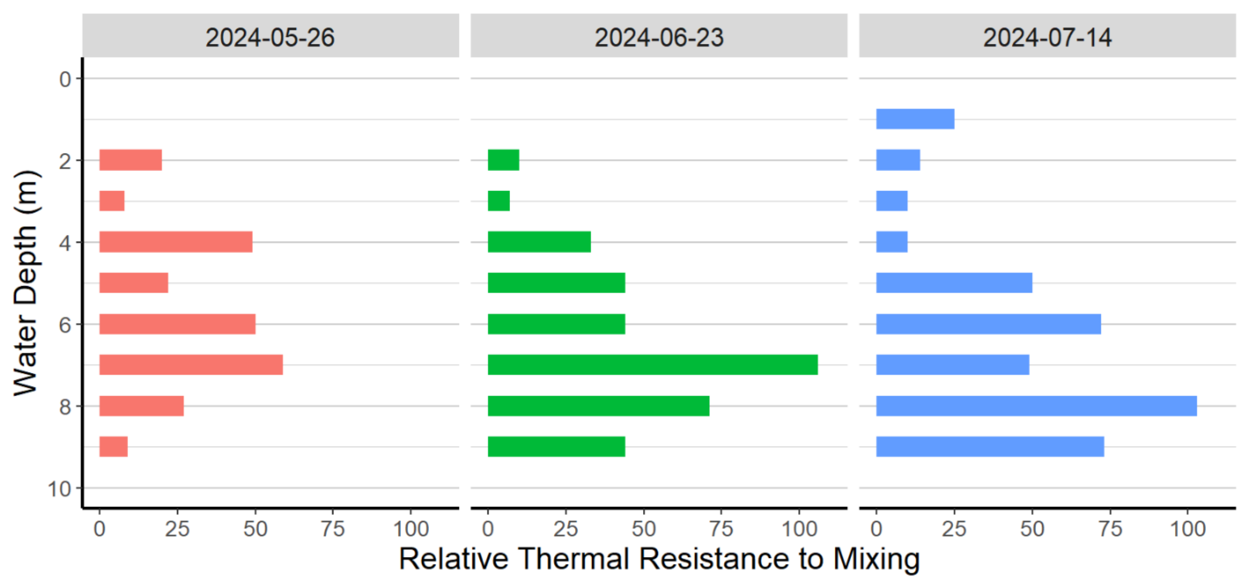


Figure 5. Thermal resistance values for select months in North Riga in 2024.

Volunteers measured seven water temperature profiles in South Riga in 2024 and NEAR collected one profile in September (**Figure 6**). April water temperature in South Riga was warmer than North Riga. The surface temperature in South Riga was 16.2°C, warmer than 11.4°C in North Riga just two days prior. The lake was moderately stratified in May and July, and mildly stratified near the bottom in August (**Figure 7**). The isopleth shows the lake fully mixed by mid-August. The warmest surface water temperature was 26.6°C on July 7th. South Riga was isothermal (similar water temperature from surface to bottom) in September, October, and November.

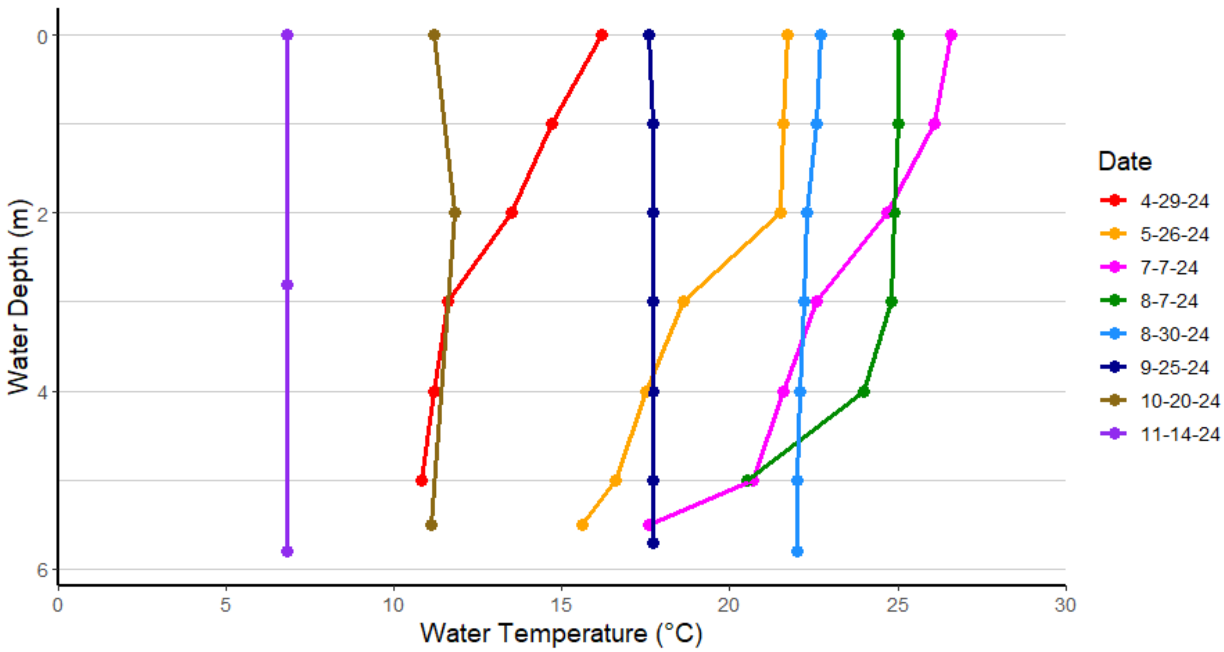


Figure 6. Temperature profiles at South Riga in 2024.

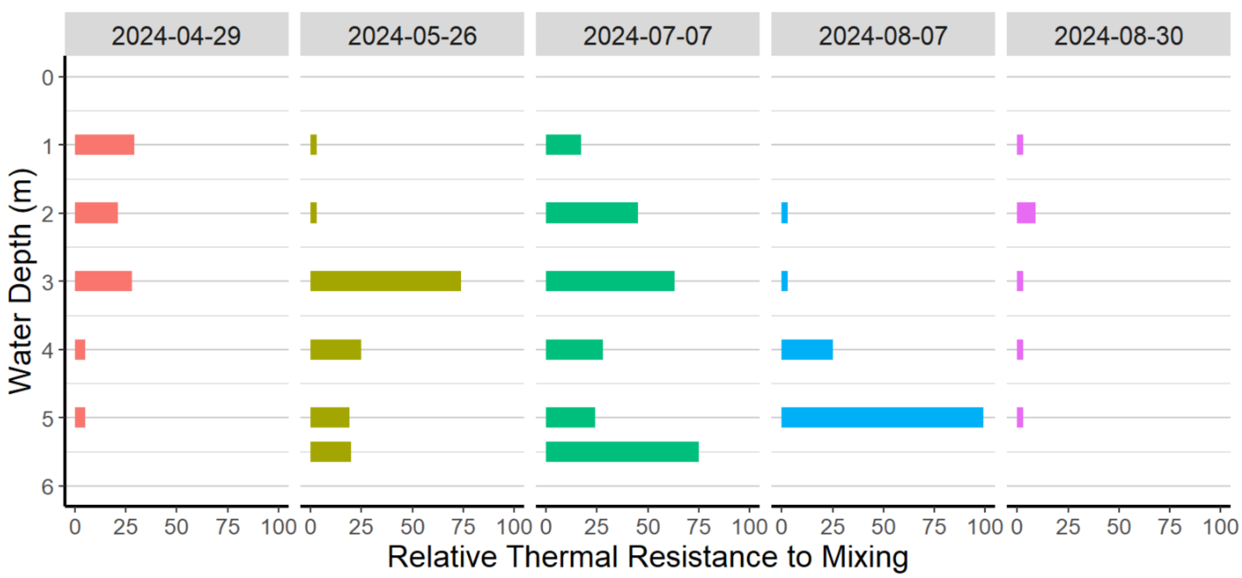


Figure 7. Thermal resistance values for select months in South Riga in 2024.

Temperature Data Loggers

In 2023, the Riga Environmental Stewardship Committee purchased HOBO data loggers and deployed them at both lakes in early September through November. In 2024, the data loggers were deployed on April 27th in North Riga and April 28th in South Riga, and removed from both lakes on November 14th, marking the first full season of data logger collection. The loggers were installed at each meter from the surface to the bottom of the lake at the deepest location in each lake, and recorded temperature every 30 minutes. High-frequency temperature data allows us to see small fluctuations and brief weather events that help us understand the duration of stratification and the seasonal warming and cooling of the lakes. Monthly sampling does not always capture these fluctuations.

North Riga experienced multiple water temperature fluctuations throughout the season (**Figure 8**). The top 2-3 meters of the lake were the warmest in July. The thermocline is clearly visible in the chart as the transition between red and blue. The thermocline began at about 5 meters in late May and migrated downward during the season until it disappeared into the bottom in mid-September. After that date, the lake was isothermal until the loggers were removed from the lake.

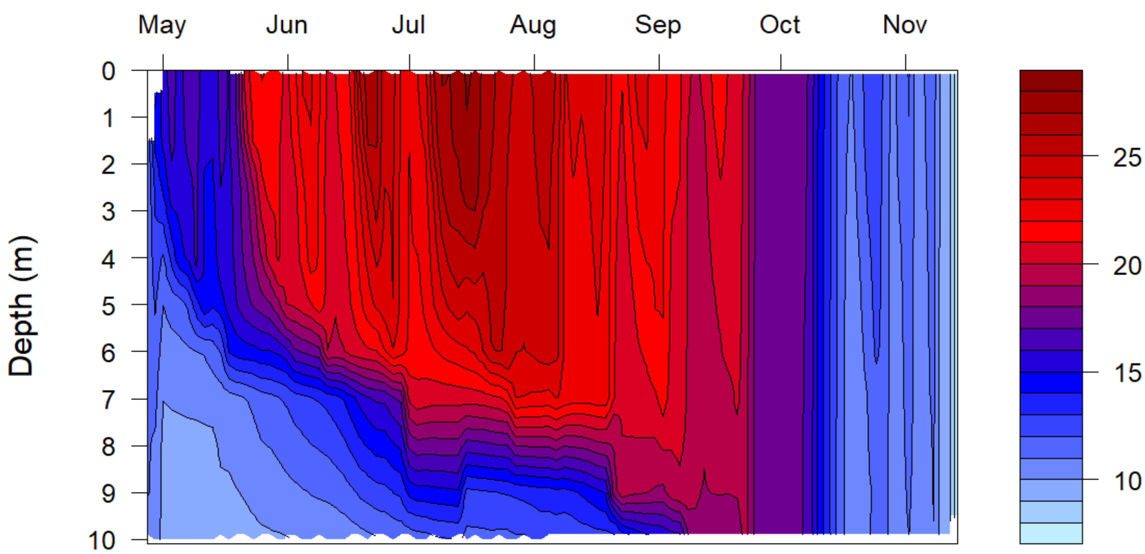


Figure 8. Water temperature isopleth for North Riga 2024.

The water temperature regime in South Riga followed a similar pattern to North Riga (**Figure 9**). The thermocline began in mid-May at ~3.5 meters and disappeared into the bottom by early August. The lake was isothermal by the end of September-early October. There were small fluctuations until the loggers were removed on November 14th, when the lake was isothermal again.

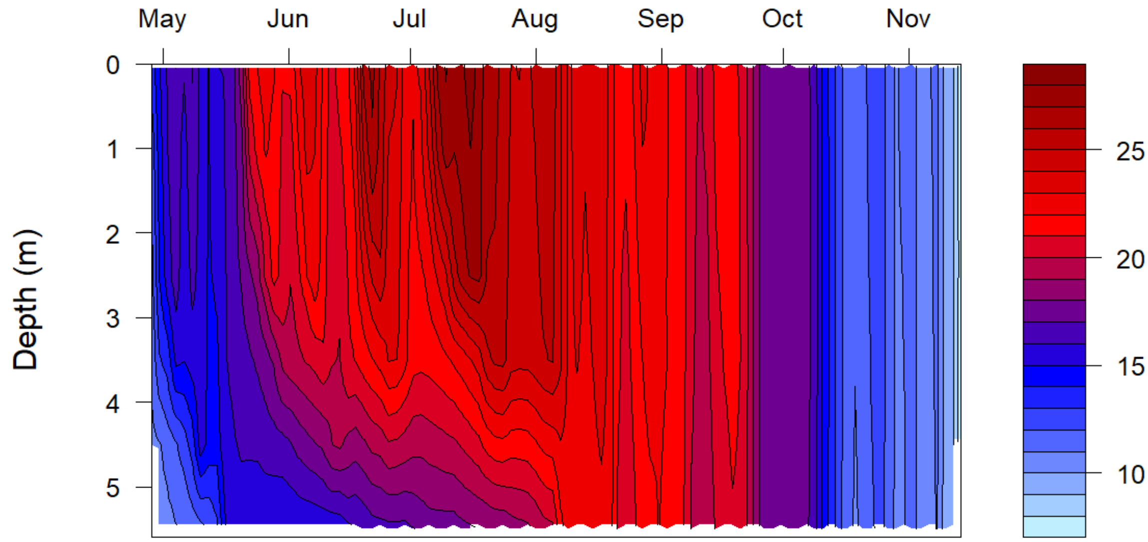


Figure 9. Water temperature isopleth for South Riga 2024.

Dissolved Oxygen

Dissolved oxygen was depleted in the bottom waters of North Riga by late June and fully exhausted in the bottom ~1 meter of water by September. The anoxic boundary, the depth in the lake where dissolved oxygen is reduced to 1mg/L, reached a maximum height of 9 meters in 2024. This is better than 2023, when the anoxic boundary reached 7 meters, which was the highest on record. There was a brief MoMax (Metalimnetic Oxygen Maximum) between 6m and 7m during the May and June sampling. The July profile showed odd abnormal fluctuations between 4m and 8m (**Figure 10)**. By October, DO was replenished throughout the water column.

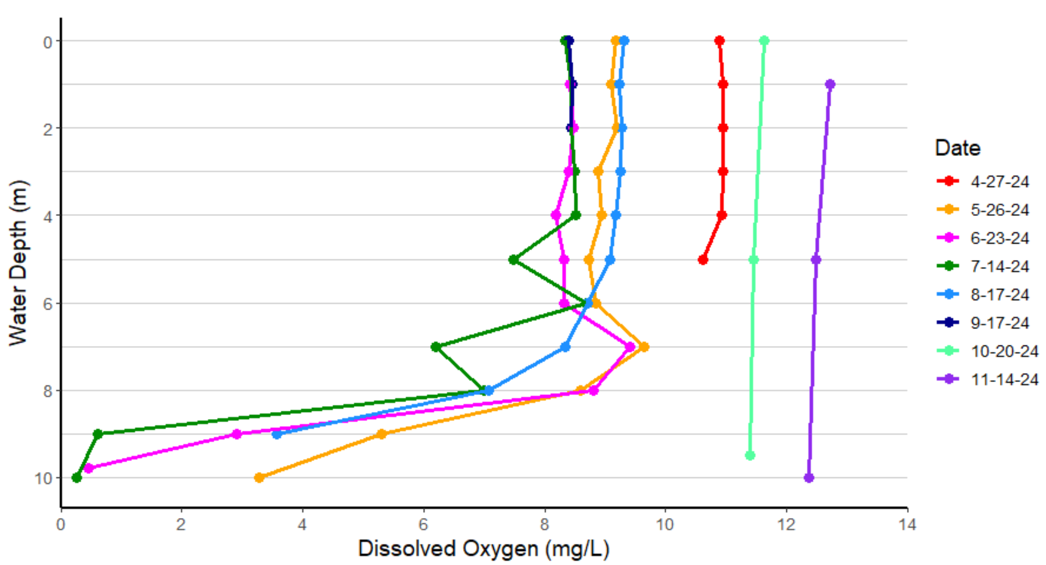


Figure 10. Dissolved oxygen profiles at North Riga in 2024.

DO decreased at the bottom of South Riga Pond during the June 23rd and July 7th sampling (**Figure 11**). A brief MoMax occurred between 2m and 3m on May 26th. By August, DO was replenished throughout the water column.

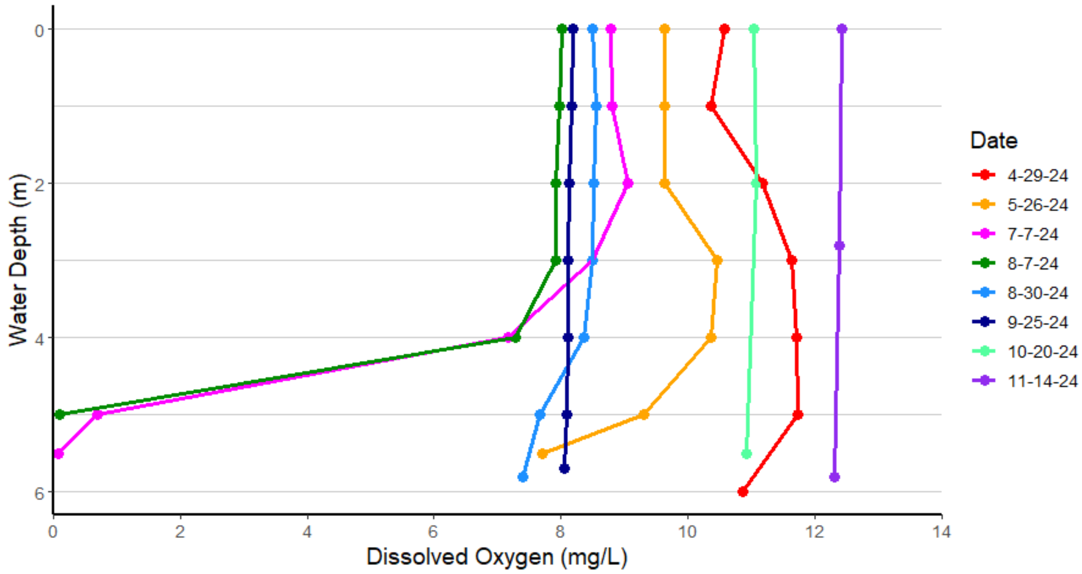


Figure 11. Dissolved oxygen profiles at South Riga in 2024.

Total Phosphorus

Ideally, total phosphorus (TP) concentrations should remain below 10ppb in North Riga and South Riga, placing the lake in the oligotrophic category.

TP remained at or below 9ppb in the top and middle waters in North Riga in 2024. Phosphorus was depleted in the lake entirely in April and October (**Table 2**). TP was generally lower in 2024 than previous years (**Figure 12**). The highest concentration, 31ppb, was measured on July 14th in the bottom water. This was likely due to internal loading of nutrients from the anoxic sediments.

The TP concentrations in South Riga followed the same pattern as North Riga, with phosphorus depleted in the lake entirely in April and October. The highest concentration, 18ppb, was measured on July 7th at the bottom.

Table 2. Total phosphorus (ppb) concentrations at the top, middle and bottom depths at North Riga and South Riga, 2024. ND=Not Detected, sample below detection limit (1ppb). Red lettering indicates elevated concentrations.

North Riga								
	Apr 30th	**May 26th**	**Jun 23rd**	**Jul 14th**	**Aug 17th**	**Sept 17th**	**Oct 20th**	**Nov 14th**
Top	ND	9	ND	5	4	5	ND	4
Middle	ND	6	ND	6	4	4	ND	5
Bottom	ND	9	10	31	9	3	ND	4
South Riga								
	Apr 29th	**May 26th**		**Jul 7th**	**Aug 30th**	**Sept 25th**	**Oct 20th**	**Nov 14th**
Top	ND	7		4	5	4	ND	5
Middle	ND	2		9	6	4	ND	5
Bottom	ND	9		18	16	4	ND	5

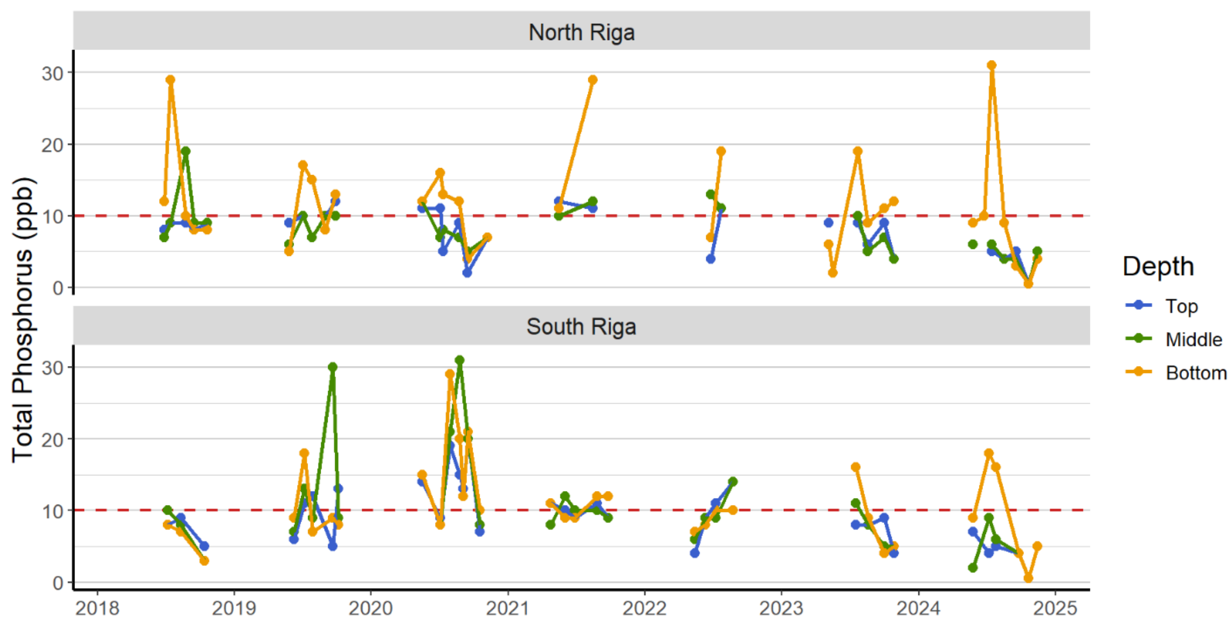


Figure 12. Total phosphorus concentrations (ppb) in North and South Riga, 2018-2024.

Total Nitrogen

Total nitrogen (TN) includes fractions of nitrate, ammonia, and organic components. Ideally, TN should remain below 200ppb, placing the lakes in the 'oligotrophic' category.

In North Riga, TN concentrations generally remained below 150ppb in the top and middle waters (**Table 3**). On June 23rd and September 15th, concentrations were 154ppb and 156ppb, respectively. TN was elevated in the bottom waters in June and July due to internal loading. On July 14th, the bottom water concentration of 734ppb was the highest since 2018 (**Figure 13**).

In South Riga, TN concentrations exceeded 150ppb on all occasions except for the middle and bottom water samples on November 14th. In May, July, and August, TN concentrations were elevated at the bottom of the lake. In November, concentrations were the highest at the top of the lake and lowest at the bottom of the lake.

Table 3. Total nitrogen (ppb) concentrations at the top, middle and bottom depths at North Riga and South Riga, 2024. Red lettering indicates elevated concentrations.

North Riga								
Sample Depth	**Apr 30th**	**May 26th**	**Jun 23rd**	**Jul 14th**	**Aug 17th**	**Sept 17th**	**Oct 20th**	**Nov 14th**
Top	127	117	128	114	119	136	116	130
Middle	124	116	154	128	135	156	115	146
Bottom	139	153	309	734	193	178	108	115
South Riga								
Sample Depth	**Apr 29th**	**May 26th**		**Jul 7th**	**Aug 30th**	**Sept 25th**	**Oct 20th**	**Nov 14th**
Top	155	181		154	176	177	162	162
Middle	192	183		177	163	187	156	146
Bottom	183	232		327	292	195	161	94

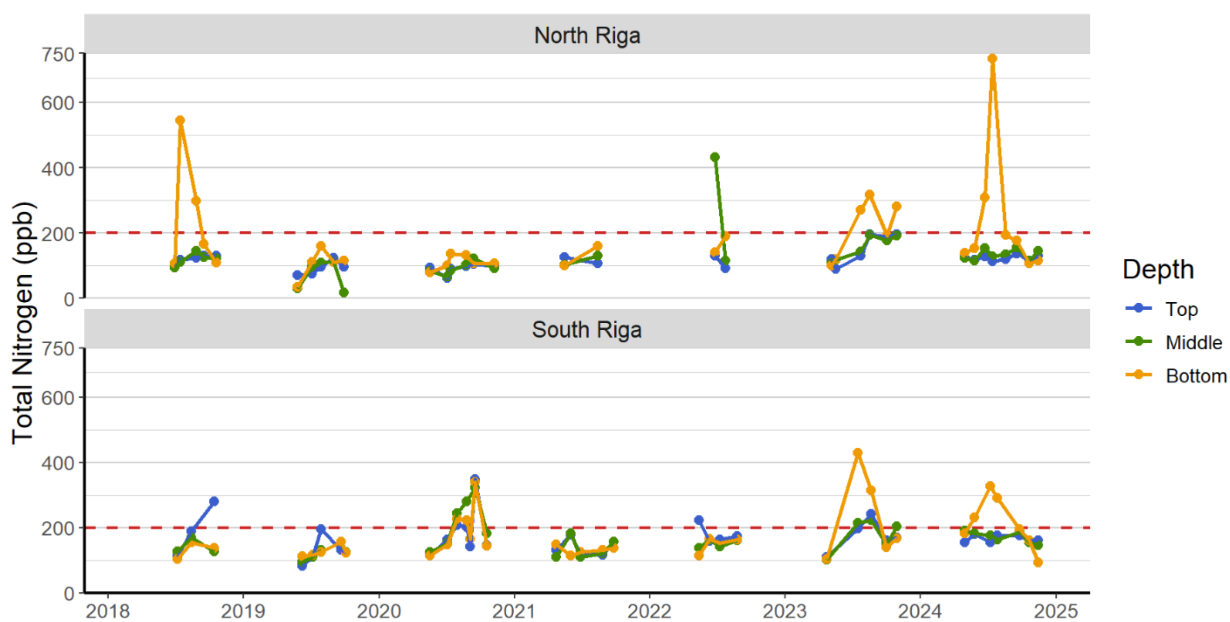


Figure 13. Total nitrogen concentrations in North and South Riga, 2018-2024.

In 2024, a second station (Station 2) was established in the eastern end of South Riga. The water depth at this station is 2.8m (9.2 ft) deep. Nutrients were collected from the top and bottom on five occasions (**Table 4**).

TP concentrations were entirely depleted at both the top and bottom in April and at the top in May. TP concentrations remained at or below 7ppb during the remaining sampling events.

TN at Station 2 reached a maximum concentration of 243ppb in the bottom water on May 26th. TN in the top waters at Station 2 were highest on July 26th and August 30th at 185ppb. This is a higher TN concentration than was observed at Station 1 on the same dates.

Table 4. South Riga Station 2 nutrients, 2024.

	Total Phosphorus (ppb)				
	Apr 29th	**May 26th**	**Jul 7th**	**Jul 26th**	**Aug 30th**
Top	ND	ND	4	5	5
Bottom	ND	5	7	5	5
	Total Nitrogen (ppb)				
	Apr 29th	**May 26th**	**Jul 7th**	**Jul 26th**	**Aug 30th**
Top	149	177	166	185	185
Bottom	143	243	186	177	177
	Ammonia (ppb)				
	Apr 29th				
Top	3				
Bottom	3				

Special Sampling

Water samples for nutrient analysis (TN & TP) were collected from: the northern bay where Monument Brook enters the lake (Monument Inlet), the forebay of North Riga dam (North Dam), the South Riga Dam (South Dam), Bingham Pond inlet, and Decker Brook inlet. Each site was sampled several times during the year.

Phosphorus concentrations were generally less than or equal to 10ppb, with the exception of Monument Brook on July 14th, which had a concentration of 12ppb (**Table 5**).

Total nitrogen concentrations were higher than 200ppb on four occasions (**Table 6**).

Table 5. Total phosphorus concentrations (ppb) in the Monument Bk, Bingham Pond inlet, Decker Brook, North Dam and South Dam in 2024. ND = Not Detected, sample below detection limit (1ppb).

Date	Monument	Bingham	Decker	North Dam	South Dam
4/27/2024	ND	2	ND	ND	
5/26/2024	8	10	ND	5	7
6/23/2024	ND	7		ND	
7/7/2024			10		8
7/14/2024	12				
7/26/2024					6
8/17/2024	3	7		5	
9/17/2024	3				
10/20/2024	ND			ND	ND
11/14/2024	7			10	5

Table 6. Total nitrogen concentrations (ppb), at Monument Bk, Riga, Bingham Pond inlet, Decker Brook, North Dam and South Dam in 2024.

Date	Monument	Bingham	Decker	North Dam	South Dam
4/27/2024	87	129	92	133	
5/26/2024	93	139	122	101	218
6/23/2024	171	276		140	
7/7/2024			163		180
7/14/2024	207				
7/26/2024					188
8/17/2024	89	143		176	
9/17/2024	81				
10/20/2024	60			233	150
11/14/2024	47			312	96

Plankton

Plankton are freely suspended plants and animals that are less than 2 mm in length. Plankton are composed of two general groups: zooplankton, or animals known as water flies, and plants, which are referred to as algae. NEAR collected plankton samples from North Riga on September 17th and from South Riga on September 25th. The zooplankton samples were collected by towing an 80 microns net from bottom to top. The phytoplankton samples collected via a composite of the top 3 meters of the lake.

Phytoplankton

The North Riga sample contained nearly equal numbers of Greens and the Cyanobacteria-Planktothrix; numbers in either case were low (**Figure 14, Figure 15**). The South Riga sample contained only Green algae.

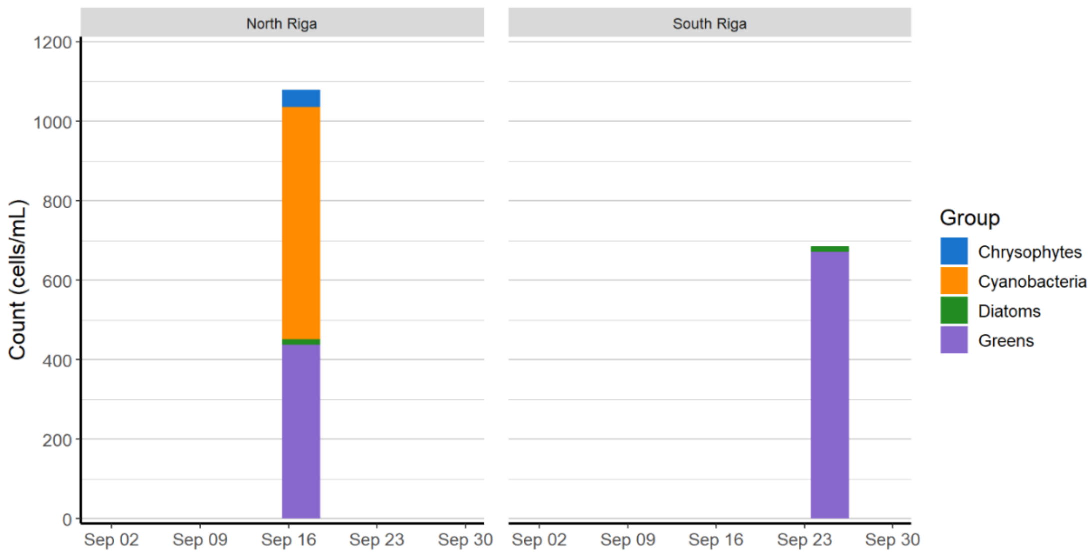


Figure 14. Phytoplankton group numbers by lake in 2024.

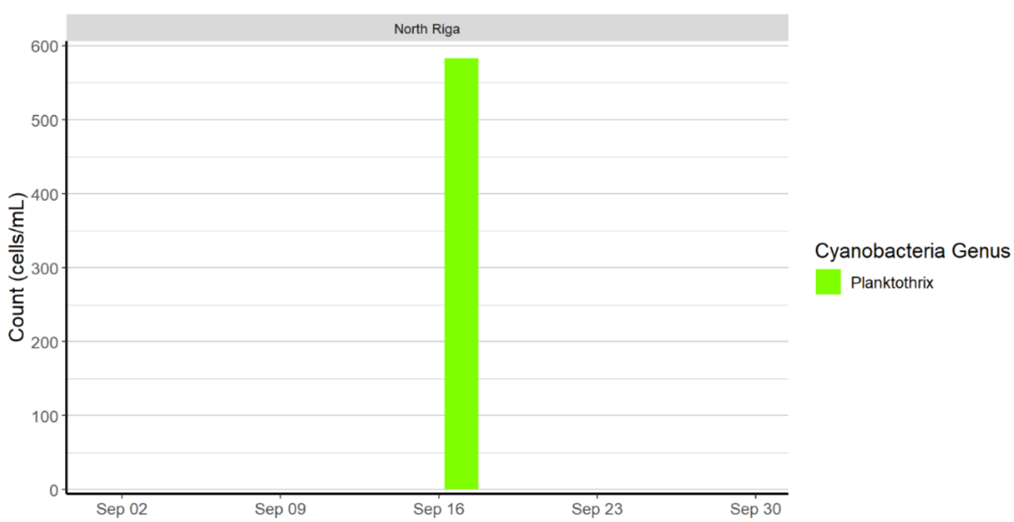


Figure 15. Cyanobacteria genus identified in North Riga in 2024.

Zooplankton

The only zooplankton found in North Riga were the tiny Rotifers, and these occurred at very low numbers (**Figure 16**). The lack of representatives of any of the other groups is of concern.

South Riga contained good numbers of all types of zooplankton, including high numbers of large-bodied Daphnia. Large Daphnia are the principal grazers on phytoplankton.

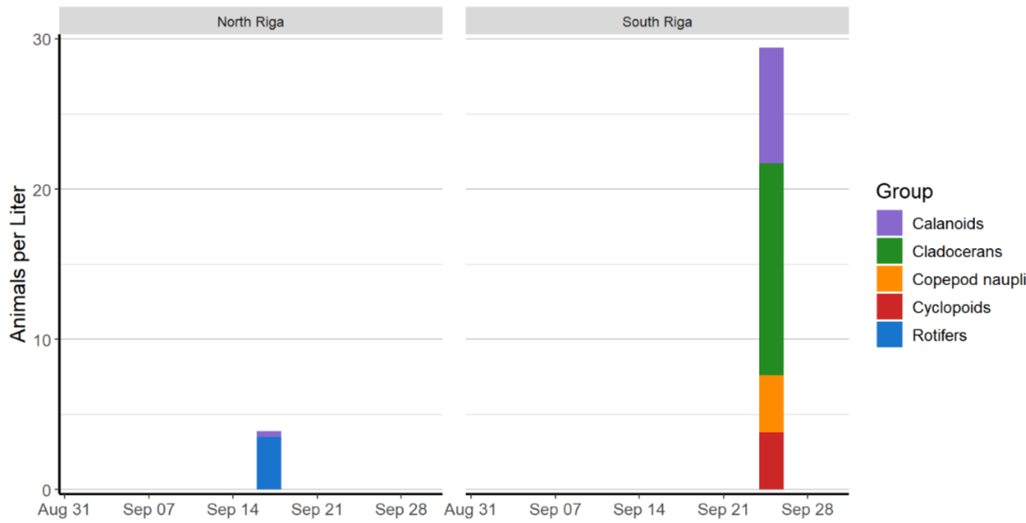


Figure 16. Zooplankton numbers by lake in 2024.

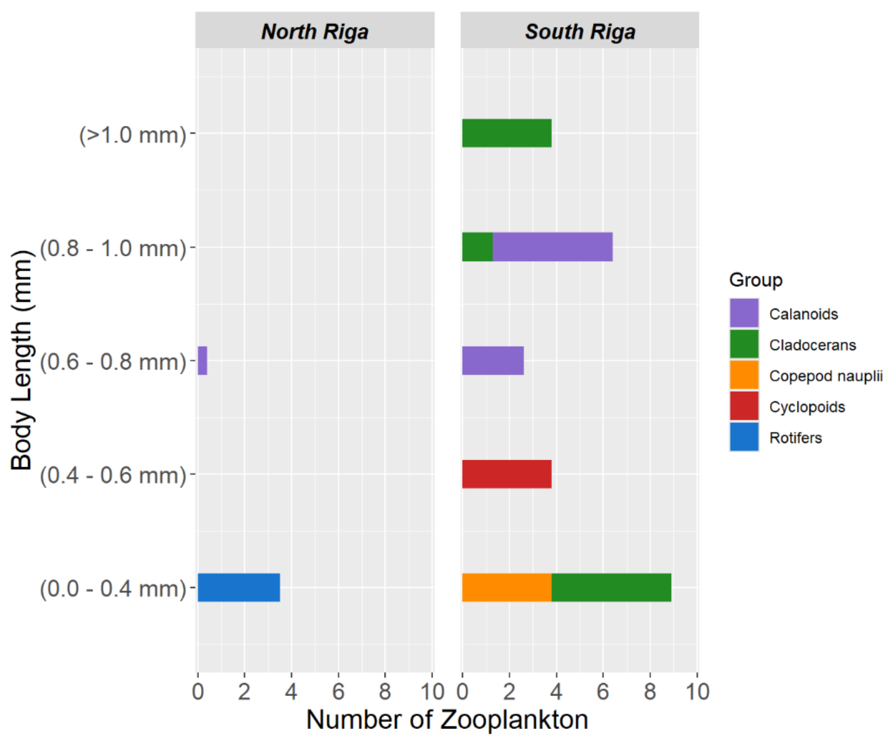


Figure 17. Zooplankton numbers by size classes in 2024.

Aquatic Plants

NEAR staff surveyed North and South Riga Lakes on August 15th and 16th, 2024. No invasive aquatic plant species were found in either lake in 2024.

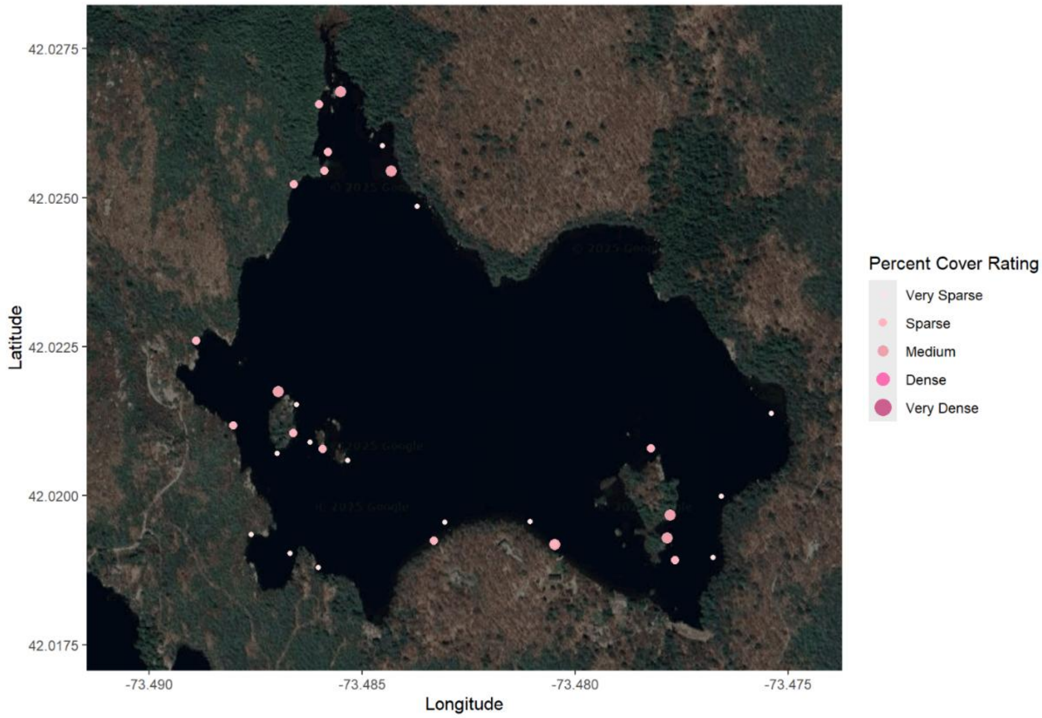
A total of 14 aquatic plant species were documented in North Riga (**Table 7**). The most dominant species (present at >20% frequency) were Dortmann's Cardinalflower (*Lobelia dortmanna*) (**Map 1**), Eastern Purple Bladderwort (*Utricularia purpurea*) (**Map 2**), Yellow Water Lily (*Nuphar variegata*) (**Map 3**), and Bur-Reed sp. (*Sparganium sp.*) (**Map 4**). One Connecticut State-Listed Endangered Species was documented in August and September: Tuckerman's Pondweed (*Potamogeton confervoides*) (**Map 5**).

A total of 17 aquatic plant species, along with Filamentous Algae, were documented in South Riga. The most dominant species in South Riga were Eastern Purple Bladderwort (**Map 6**), Stonewort (*Nitella sp.*) (**Map 7**), Emergent Bur-reed (*Sparganium sp.*) (**Map 8**), Dortmann's Cardinalflower (**Map 9**), and Yellow Water Lily (**Map 10**). Maps of dominant and rare species in each lake are included below, with one additional species of interest for South Riga: Filamentous Algae (**Map 11**). The CT Endangered species Tuckerman's Pondweed was not observed in South Riga in 2024. Although this species had been previously documented in South Riga, it was also absent in 2023. NEAR conducted a Hydrilla search on North Riga on September 17th and South Riga on September 25th. No Hydrilla was found.

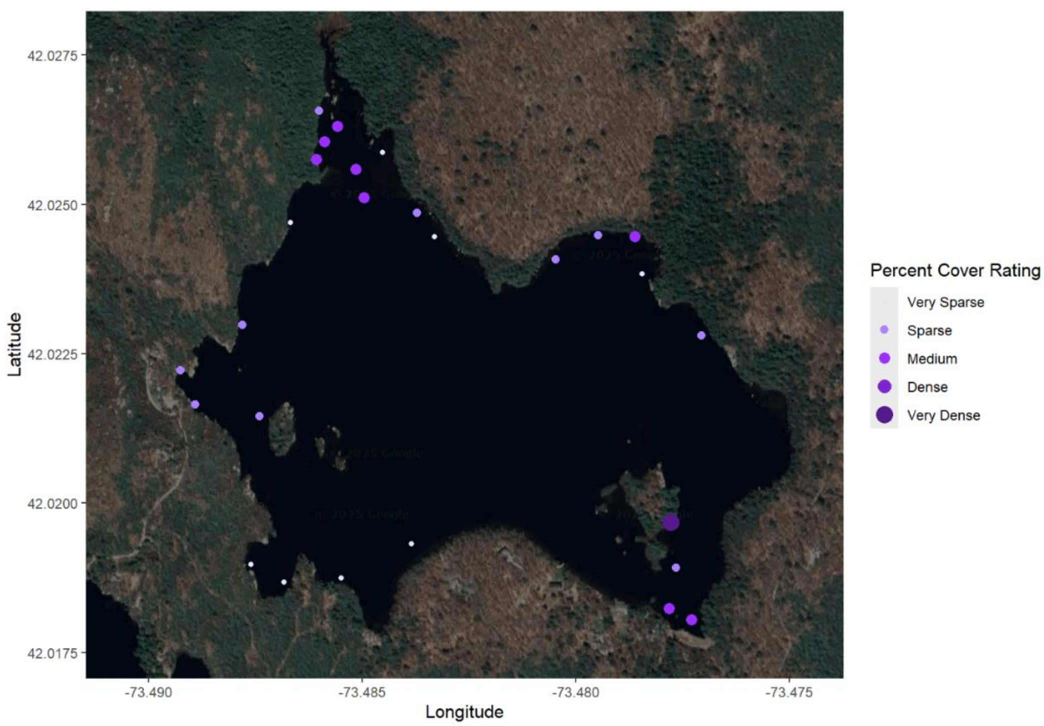
Table 7. Aquatic plants in North Riga and South Riga Lakes, August 15th and 16th 2024. Blue lettering indicates Connecticut State-Endangered Species.

		North Riga		South Riga	
Scientific Name	**Common Name**	**% Freq**	**Avg. Density**	**% Freq**	**Avg. Density**
Elatine sp.	Waterwort sp.	2	8	2	8
Eleocharis acicularis	Needle Spikerush	12	6	11	9
Eleocharis robbinsii	Robbins' Spikerush	2	55	18	31
Eriocaulon septangulare	Pipewort	18	14	14	9
-	Filamentous Algae	-	-	7	11
Fontinalis sp.	Aquatic Moss	-	-	2	10
Isoetes sp.	Quillwort	2	5	2	23
Lobelia dortmanna	Dortmann's Cardinalflower	32	12	38	15
Myriophyllum humile	Low Milfoil	6	50	7	29
Nitella sp.	Stonewort sp.	-	-	69	14
Nuphar variegata	Yellow Water Lily	25	14	28	12
Nymphaea odorata	White Water Lily	2	50	10	14
Potamogeton bicupulatus	Snail-seed Pondweed	-	-	2	10
Potamogeton confervoides	Tuckerman's Pondweed	2	15	-	-
Potamogeton epihydrus	Ribbon-leaf Pondweed	-	-	6	29
Potamogeton oakesianus	Oakes' Pondweed	3	22	-	-
Potamogeton natans	Floating Pondweed	-	-	8	24
Sparganium sp. (Emergent)	Emergent Bur-reed	1	5	55	19

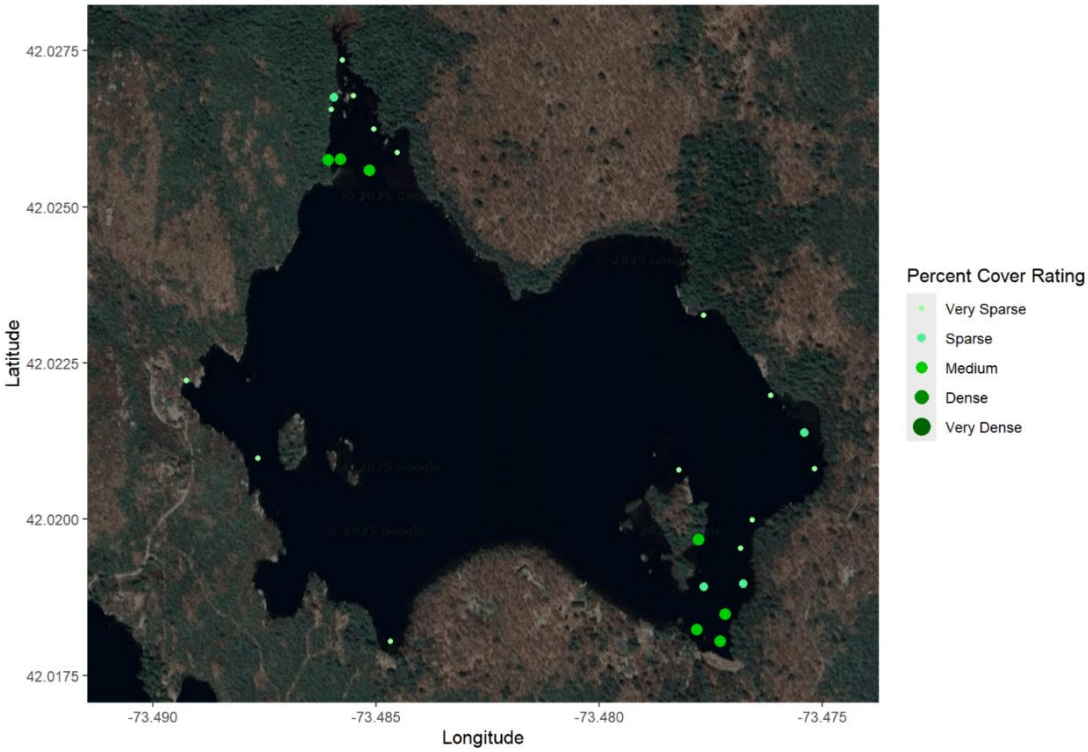
Sparganium sp.	Bur-reed	24	20	7	12
Utricularia purpurea	Eastern Purple Bladderwort	27	20	64	16



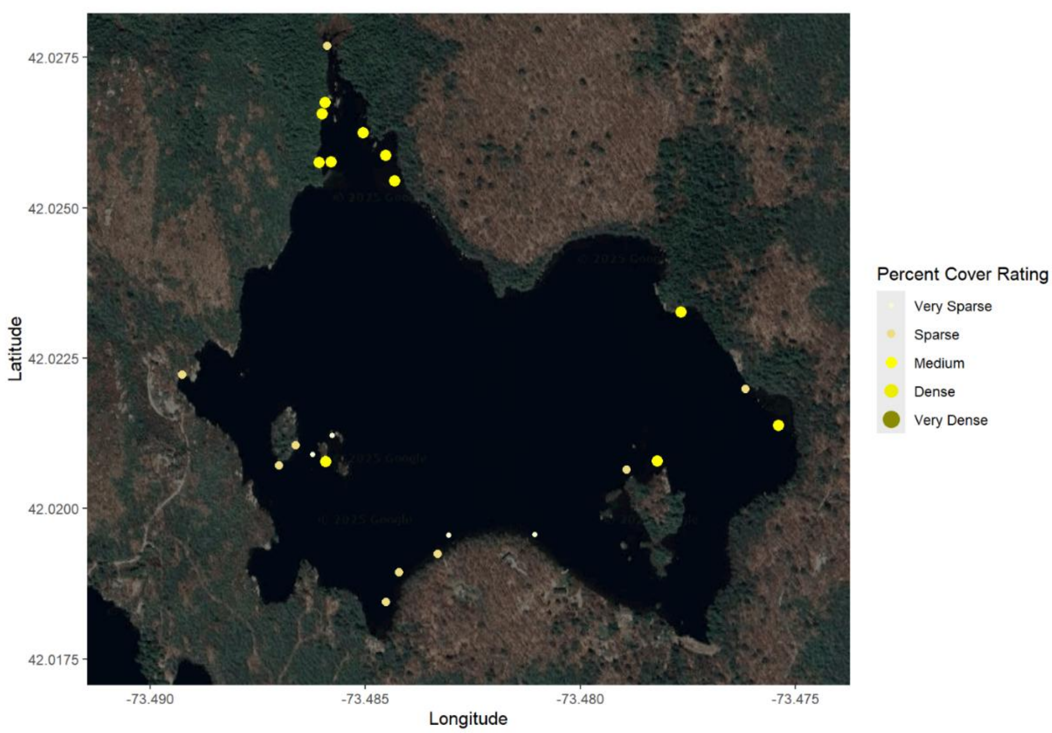
Map 1. Dortmann's Cardinalflower (*Lobelia dortmanna*) in North Riga on 8-15-2024.



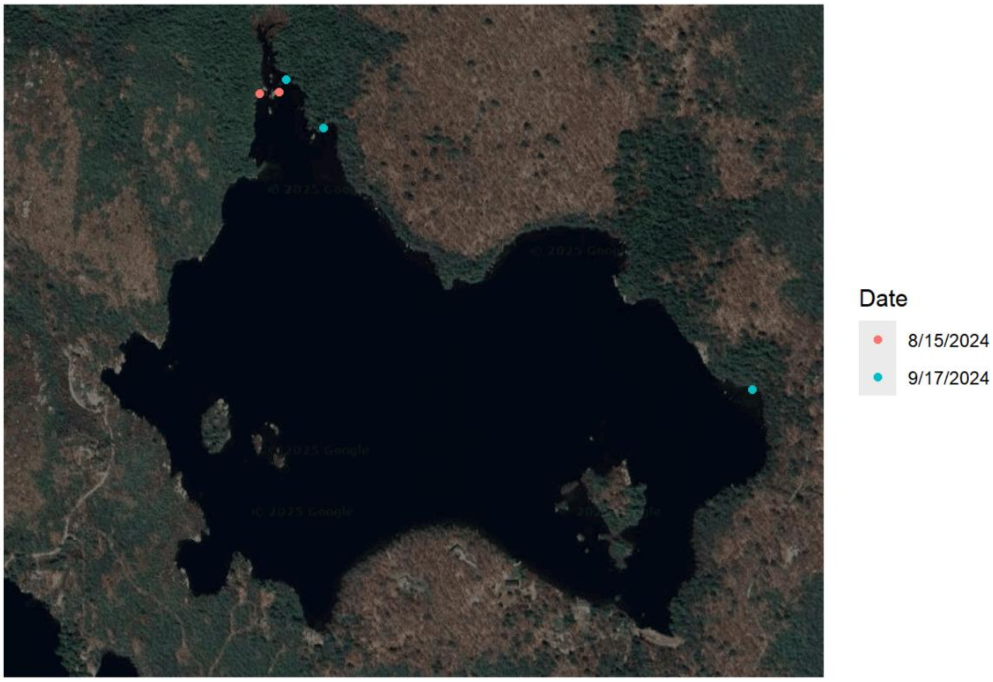
Map 2. Eastern Purple Bladderwort (*Utricularia purpurea*) in North Riga on 8-15-2024.



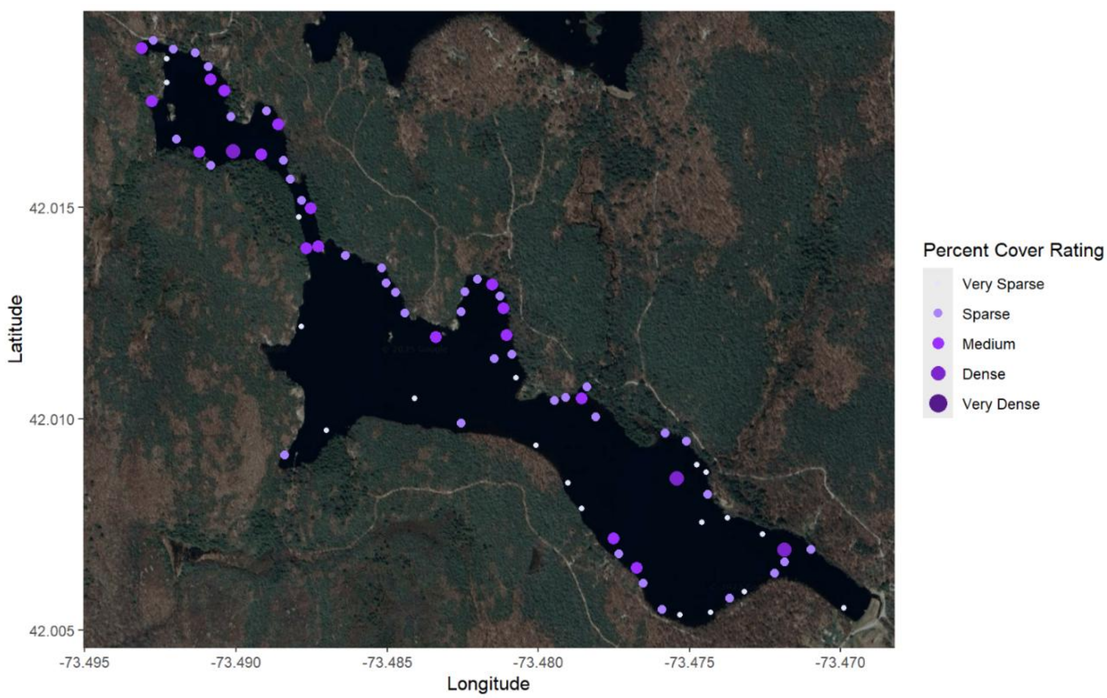
Map 3. Yellow Water Lily (*Nuphar variegata*) in North Riga on 8-15-2024.



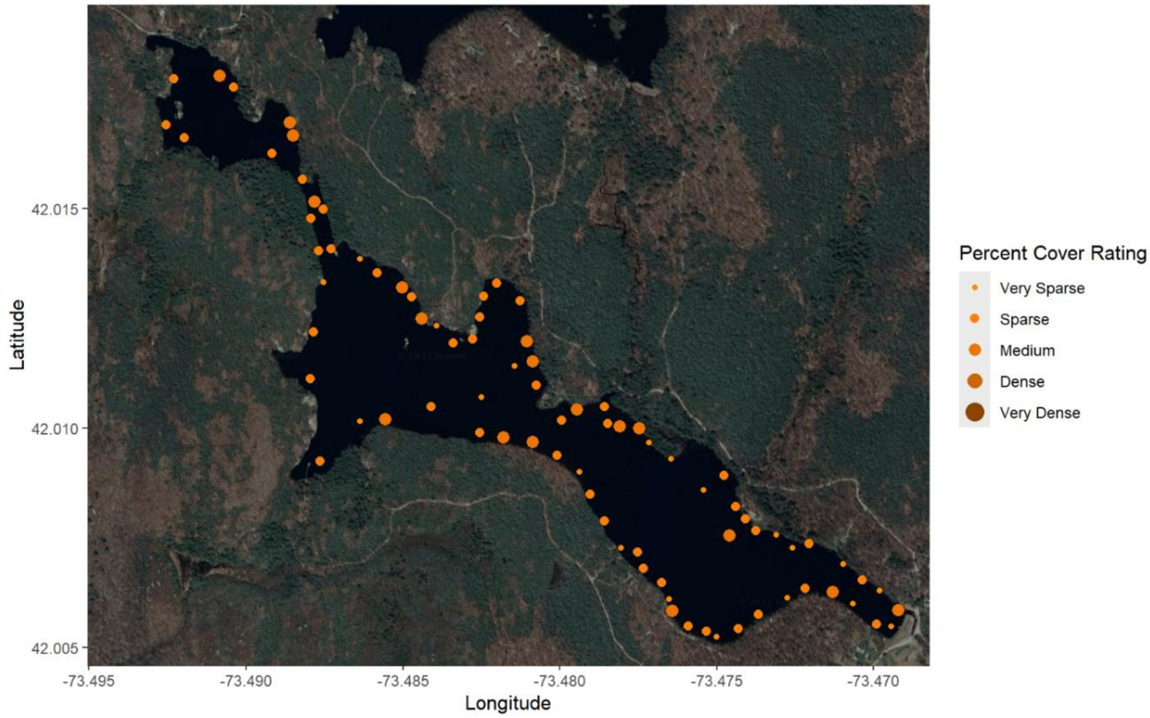
Map 4. Bur-Reed sp. (*Sparganium sp.*) in North Riga on 8-15-2024.



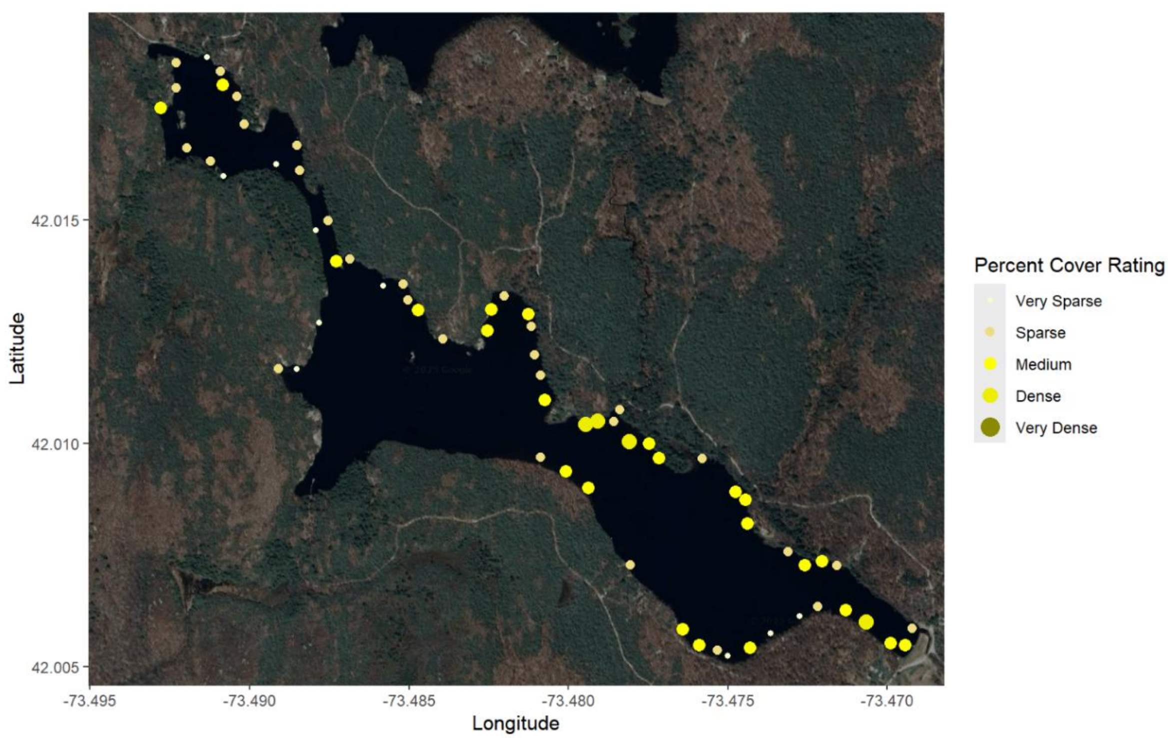
Map 5. Tuckerman's Pondweed (*Potamogeton confervoides*) in North Riga on 8-15-2024 & 9-17-2024.



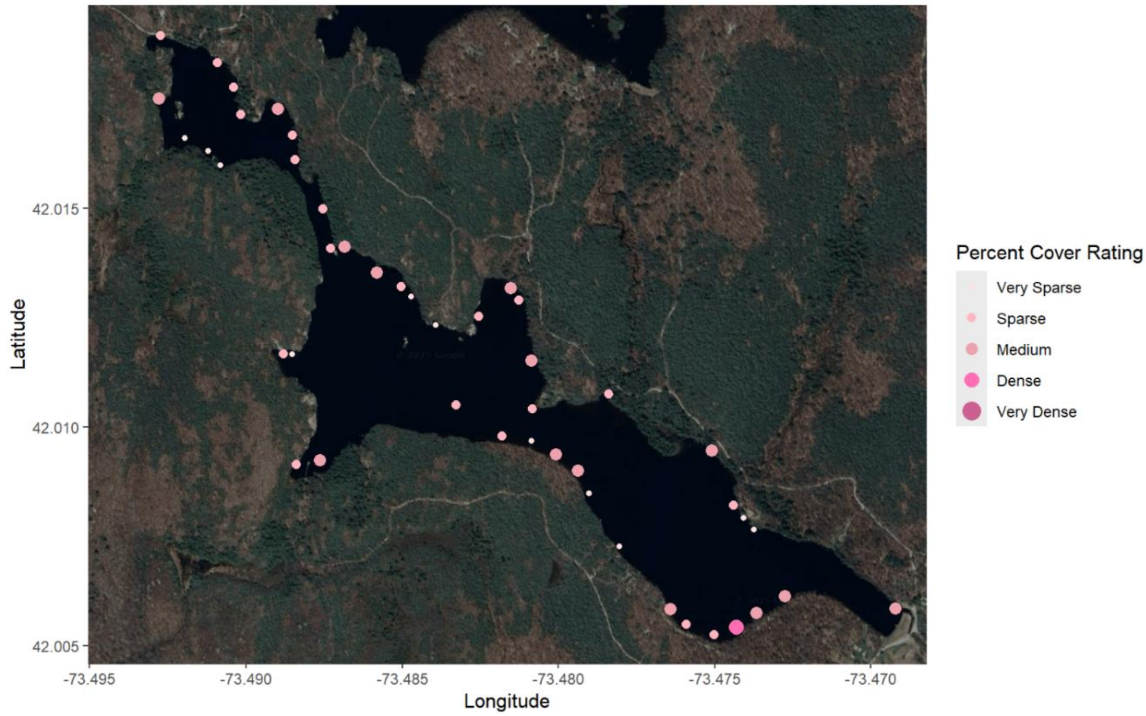
Map 6. Eastern Purple Bladderwort (*Utricularia purpurea*) in South Riga on 8-16-2024.



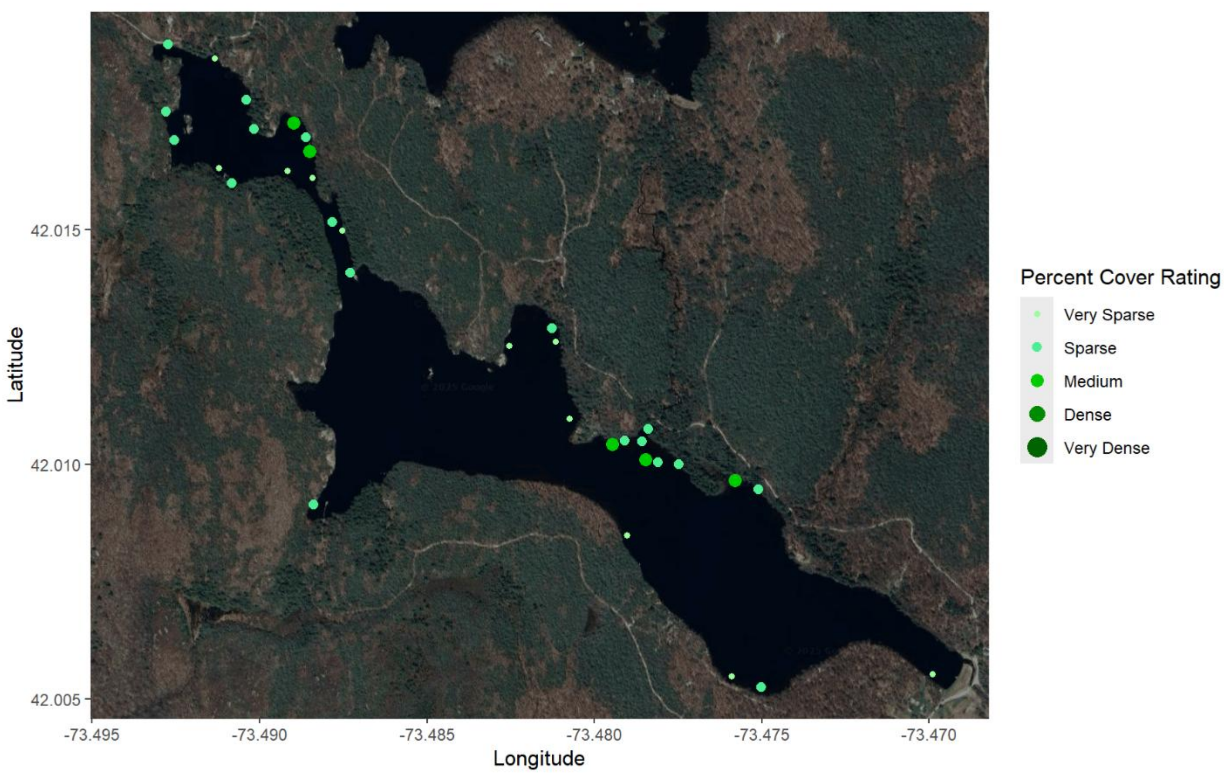
Map 7. Stonewort (*Nitella sp.*) in South Riga on 8-16-2024.



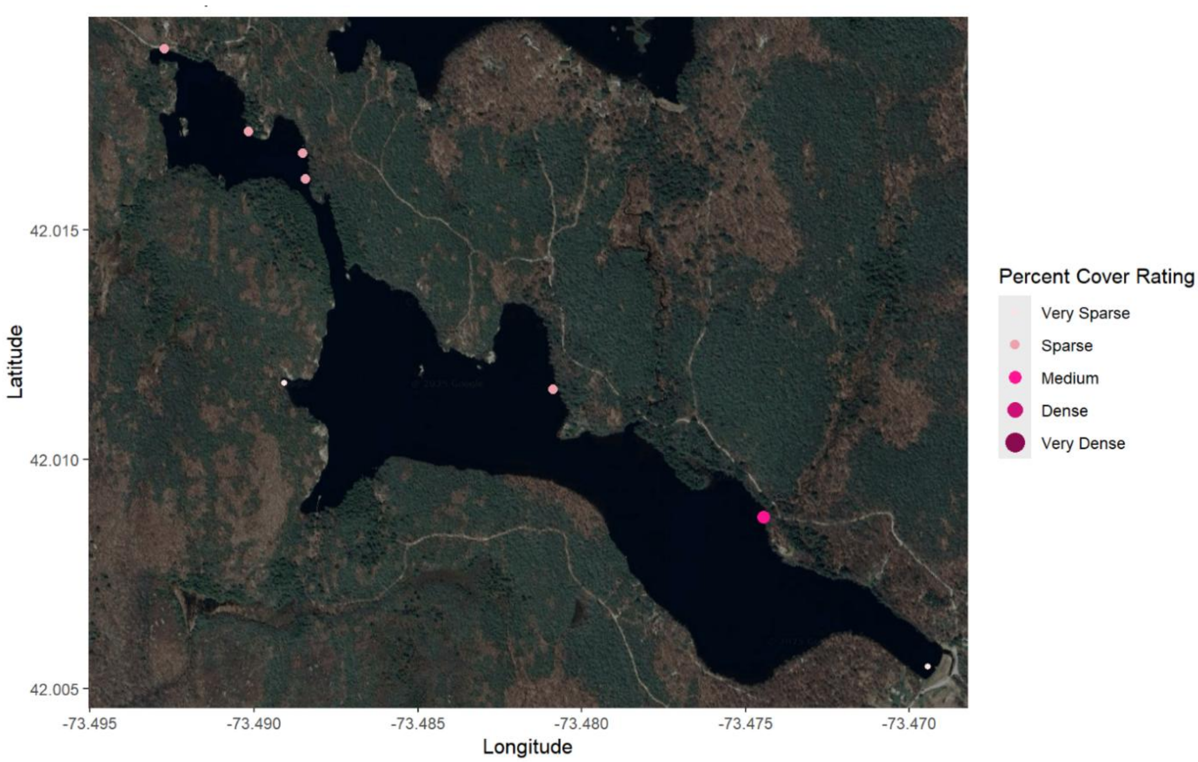
Map 8. Emergent Bur-reed (*Sparganium sp.*) in South Riga on 8-16-2024.



Map 9. Dortmann's Cardinalflower (*Lobelia dortmanna*) in South Riga on 8-16-2024.



Map 10. Yellow Water Lily (*Nuphar variegata*) in South Riga on 8-16-2024.



Map 11. Filamentous Algae in South Riga on 8-16-2024.

Conclusions & Recommendations

- Both lakes had much better clarity in 2024 than 2023, although both had poor clarity earlier in the season.
    - At North Riga, the water clarity improved during the season but was nearly always worse than prior readings.
    - At South Riga, the clarity was poor in the spring but improved to maximum possible readings after mid-August.
- Both lakes had a stratified water column for at least a month. North Riga's water column was stratified in May and strongly stratified in June and July. Stratified water columns cause stagnation of bottom water.
- Dissolved oxygen was completely depleted in the bottom waters of North Riga in June, July, and probably August of 2024.
    - We have reported bottom water anoxia (dissolved oxygen concentration less than 1 mg/L) in 2023, 2021, 2018, 2015, 2014, and 2011. There were no profiles collected in 2022. There was no detectable anoxia in 2020, 2019 or any year prior to 2011.

- Nutrient levels were generally fair, although concentrations of bottom phosphorus and nitrogen were elevated, indicating internal release during periods of anoxia. Inlet nutrients were generally low, although occasional samples showed higher than desirable concentrations of both phosphorus and nitrogen.

It is important to note that in 2007-2008, when NEAR first visited the lakes, neither lake had a stratified water column at any time during the summer. Each summer month had isothermal conditions, i.e. identical temperature from top to bottom. The water column was also completely saturated with dissolved oxygen during the months of May - September.

Recommendations for 2025:

- Continue monthly in-lake sampling on both lakes at the deep stations from April to November.
    - Temperature and oxygen profiles need to be collected at the surface of the water, 1m below the surface, and every meter to the bottom of the lake.
- Deploy HOBO temperature loggers in April and remove in November. If possible, deploy earlier and remove later, but this is dependent on ice coverage.
- Collect samples from Monument Brook and the brook from Bingham Pond as often as possible.
- Investigate Bingham Pond. Because the pond is in the watershed of North Riga, some attempt to gather information about the pond is warranted. From Google Earth, the pond looks completely inaccessible.
- If bottom water anoxia persists in North Riga, then the lake will become a candidate for some type of aeration/circulation system to subsidize the oxygen loss. NEAR is currently researching state-of-the-art methodologies to do this most effectively, as well as the possibility of using solar power to run the systems.
- Conduct one full-lake aquatic plant survey on each lake in August/early September.
    - Spread information about Hydrilla to all lake users.
    - Keep vigilant about plants floating in the lake, remove suspicious plants and seek professional identification.
    - Hold a workshop on identification of Hydrilla and other invasive plants so residents can tell the difference.
- Gather data on human use around both lakes, including locations and descriptions of all on-site waste-water systems and the appropriate per-capita use of each.

Appendix

The following section is from the 2023 report.

*The lake data is assessed using the CT DEEP categorization of lakes, which is primarily based on the amount of phosphorus present in surface waters during summer conditions (**Table 8**). A trophic category is a means to classify the degree of plant and algae growth that occurs in a lake, which increases with overall water quality decline. Very clear water with no weeds or algae results from very low nitrogen and phosphorus conditions. These clear-water and low-nutrient lakes are considered oligotrophic. Lakes with excessive amounts of weeds and very green water resulting from high nutrient concentrations are eutrophic. **Table 8** shows lake Trophic Status. Target criteria for Riga Lakes are highlighted in blue: TP <10ppb, TN <200ppb, and Secchi >6m.*

Table 8 - Lake trophic categories and ranges of indicator parameters.

Category	T. Phosphorus (ppb)	T. Nitrogen (ppb)	Secchi Depth (m)	Chlorophyll *a* (ppb)
Oligotrophic	0 – 10	0 – 200	6+	0 – 2
Oligo-mesotrophic	10 – 15	200- 300	4 – 6	2 – 5
Mesotrophic	15 – 25	300 - 500	3 – 4	5 – 10
Meso-eutrophic	25 – 30	500 - 600	2 – 3	10 – 15
Eutrophic	30 – 50	600 - 1000	1 – 2	15 – 30
Highly Eutrophic	50 +	1000 +	0 – 1	30 +

**Source = CT DEP 1982*

**Chlorophyll-a not included in testing because samples are very time-sensitive.*