

2021 Water Quality Sampling Results

SHLPOA Volunteers



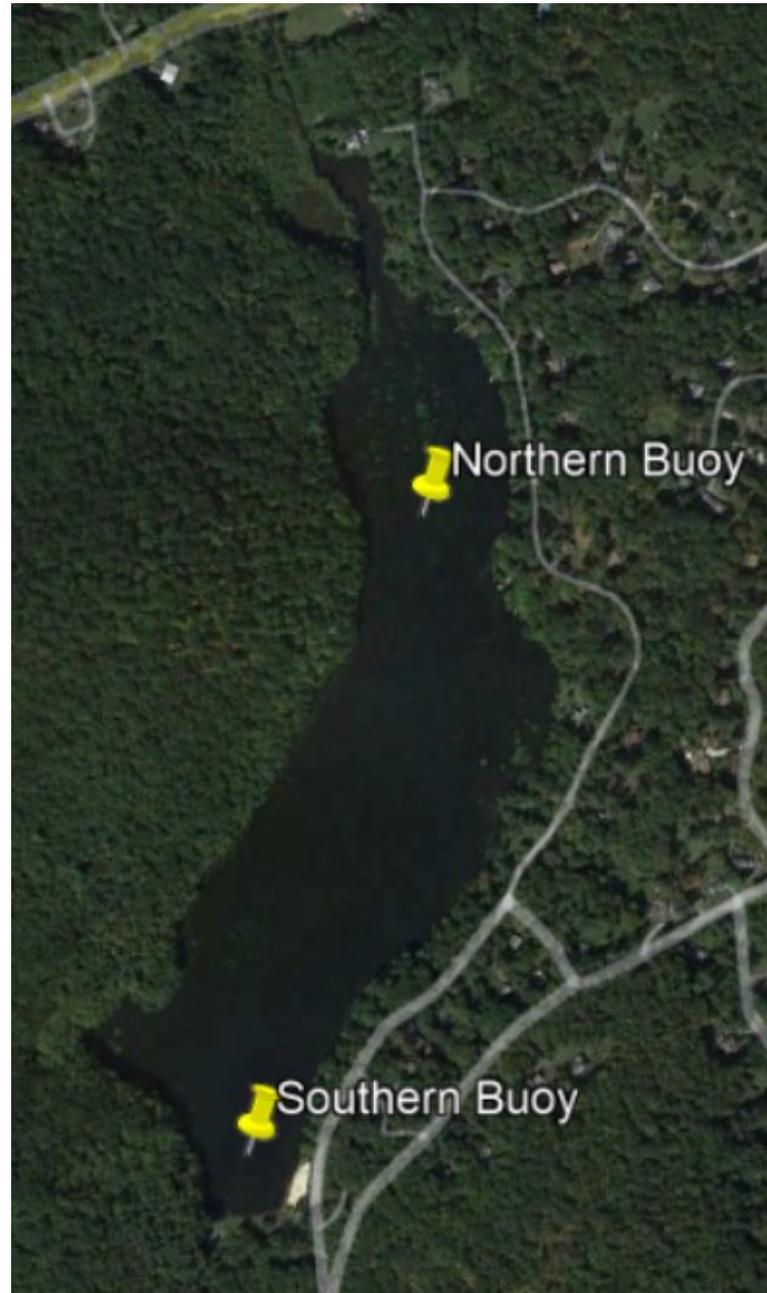
NORTHEAST AQUATIC RESEARCH, LLC

Sampling Details

Two water quality stations were established; northern Buoy with 6.5 ft water depth and southern buoy with 9.0 ft water depth

HLPOA volunteers visited each station in mid-April and then weekly from June to October.

Water clarity measurements were made with a Secchi disk and a view scope. Water temperature and dissolved oxygen measurements were made at one-meter intervals using a Hach LDO 101 probe.



Water Clarity (Transparency)

Water clarity is measured using a Secchi Disk

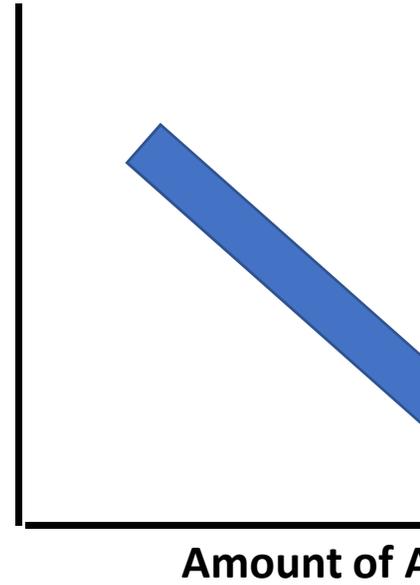
In simplest terms: Distance you can see into the water

Deeper (deeper) reading = fewer particulates in water column

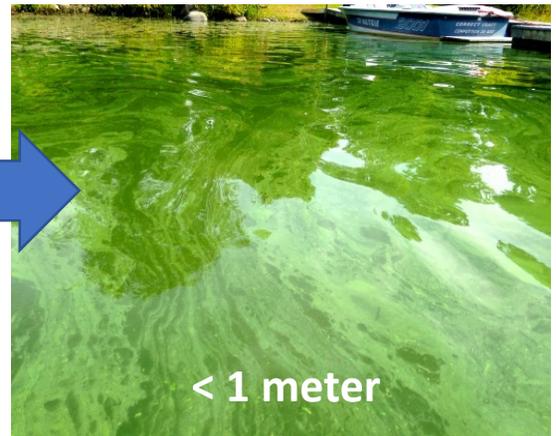
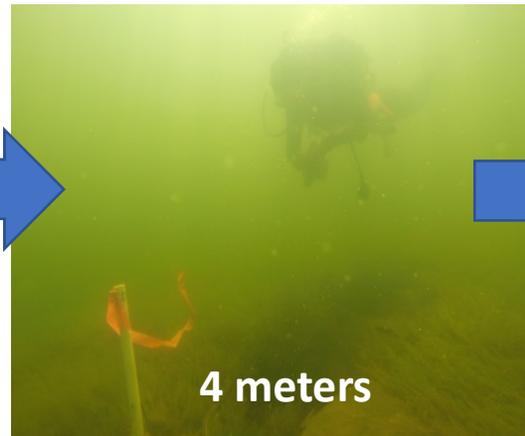
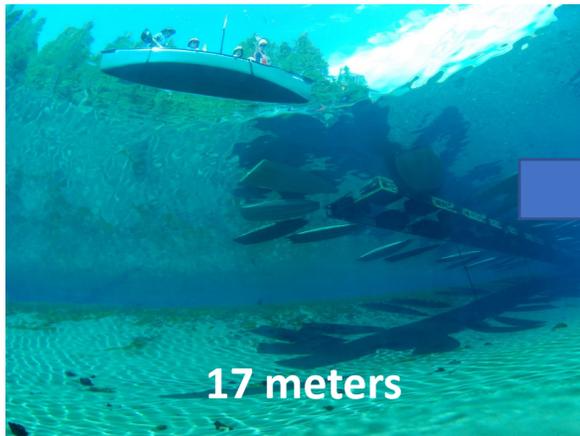
Particulates are mostly algae for northeastern lakes



Water Clarity



Examples of decreasing Secchi Disk Transparency (water clarity)

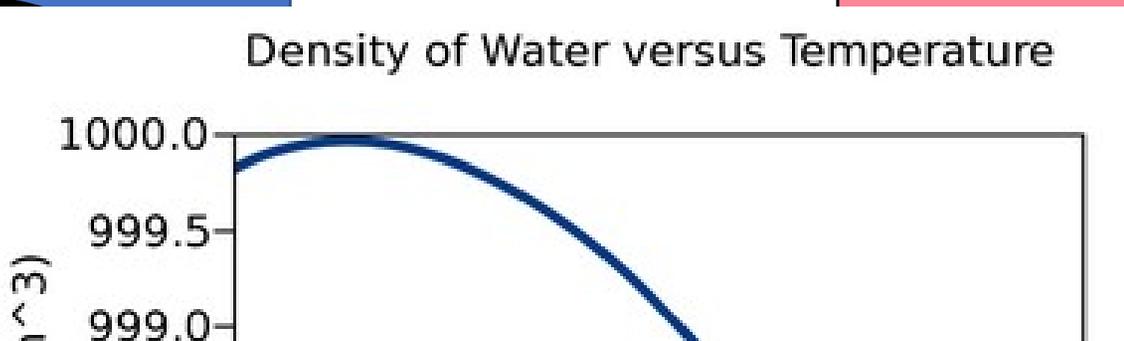
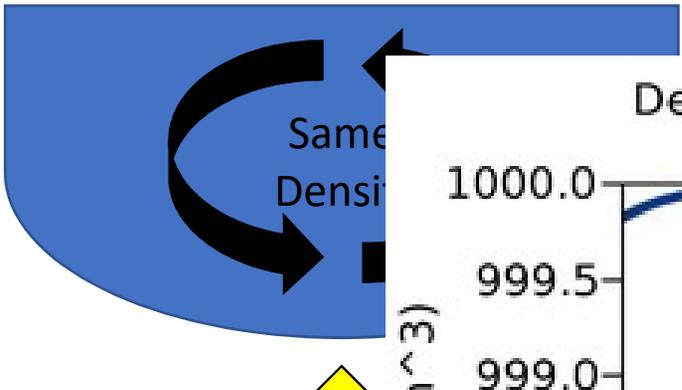


Stratification

Spring

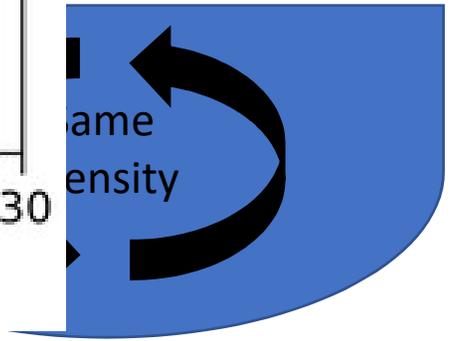
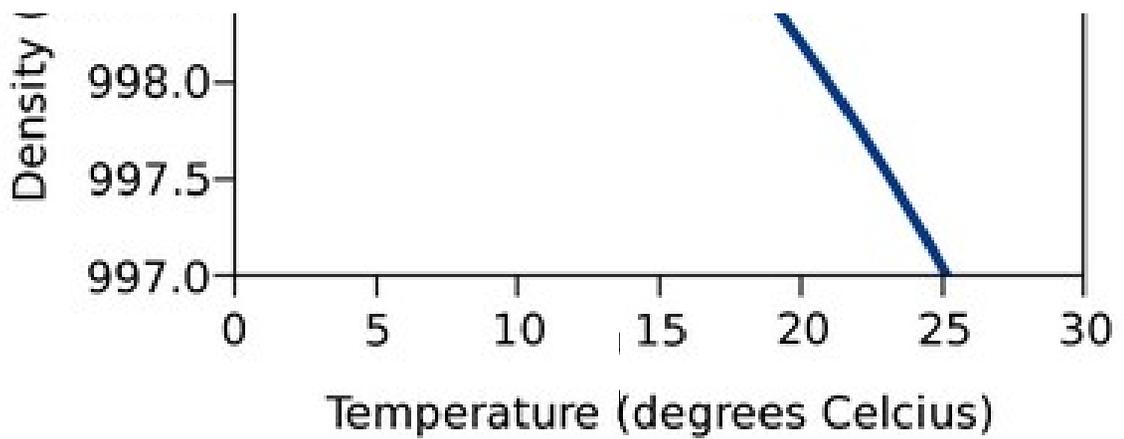
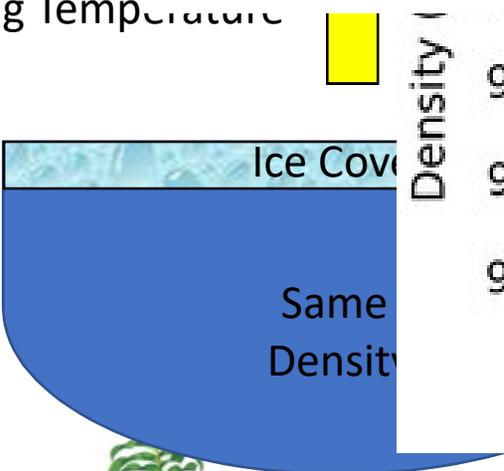
Increasing Sunlight
Increasing Water Temperature

Summer



Increasing Sunlight
Increasing Temperature

As Water Temperature Increases, Water Density Decreases



Winter

Fall

Dissolved Oxygen

Critical for all aquatic animals to survive

- > 5mg/L of dissolved oxygen is necessary to avoid stress in most animals.
- Oxygen loss starts at the bottom of the lake and is a result of organic matter decomposing on the bottom of the lake.
- Oxygen loss can rise from the sediments into the water column as the season progresses.

Reduction reactions occur when oxygen drops below 1 mg/L

- These reactions result in the release of phosphorus and ammonia from lake sediments, which can fuel algae growth.



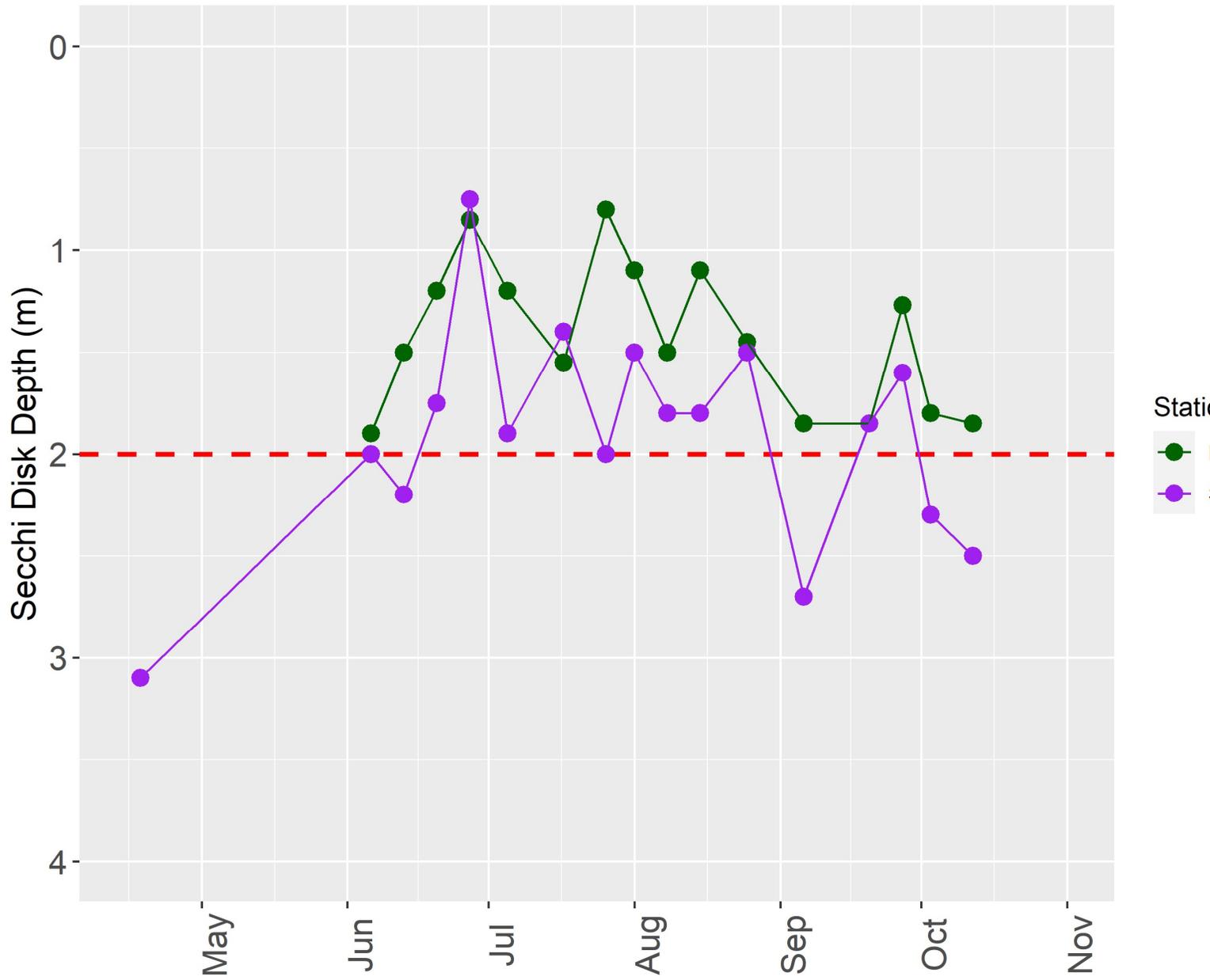
Water Clarity

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Water clarity was poor much of the season.

Values were below the 2-m guidance value (Red dashed line) for excess algae set by York.

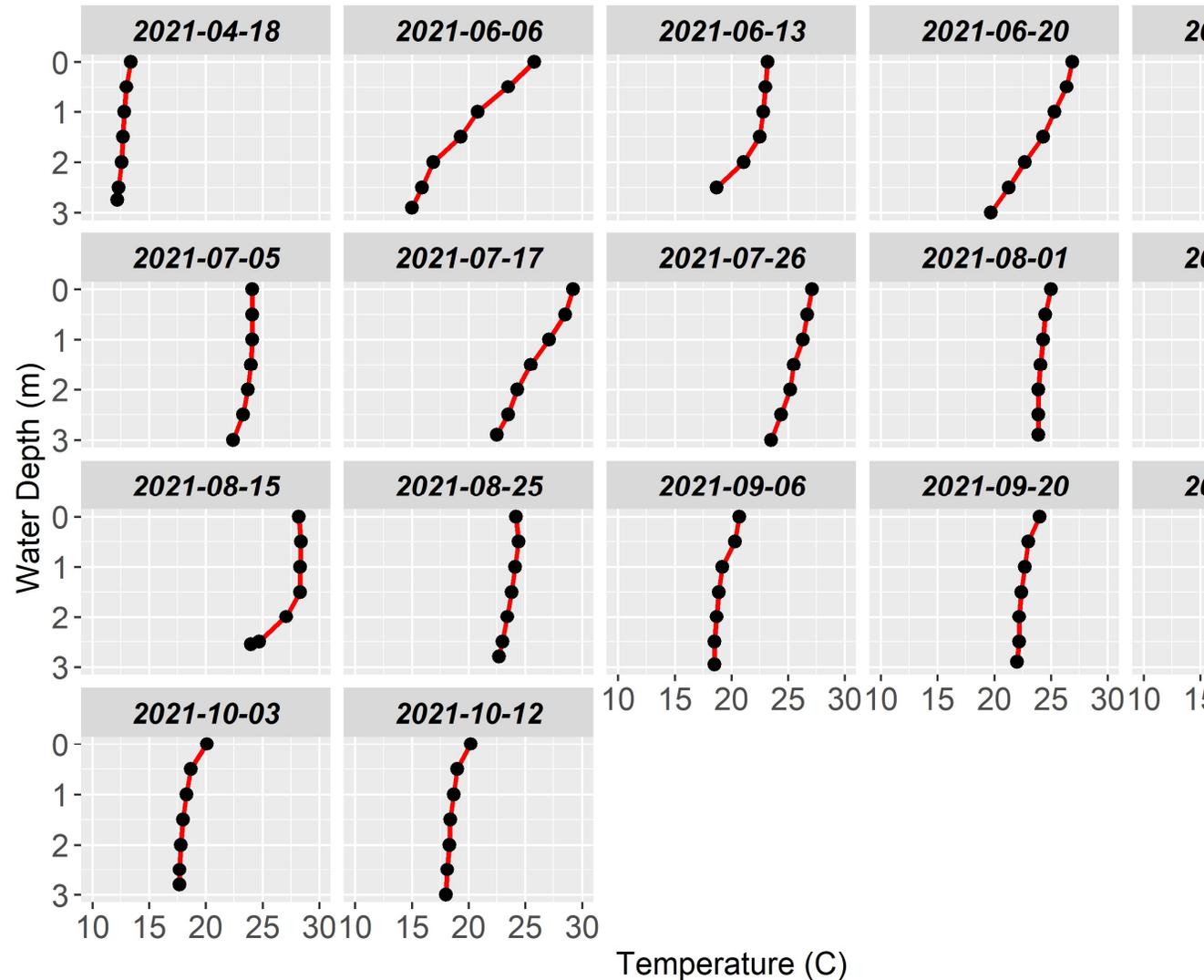
Southern buoy station consistently had better clarity than the northern buoy station.



Water Temperature Profiles (Southern Buoy)

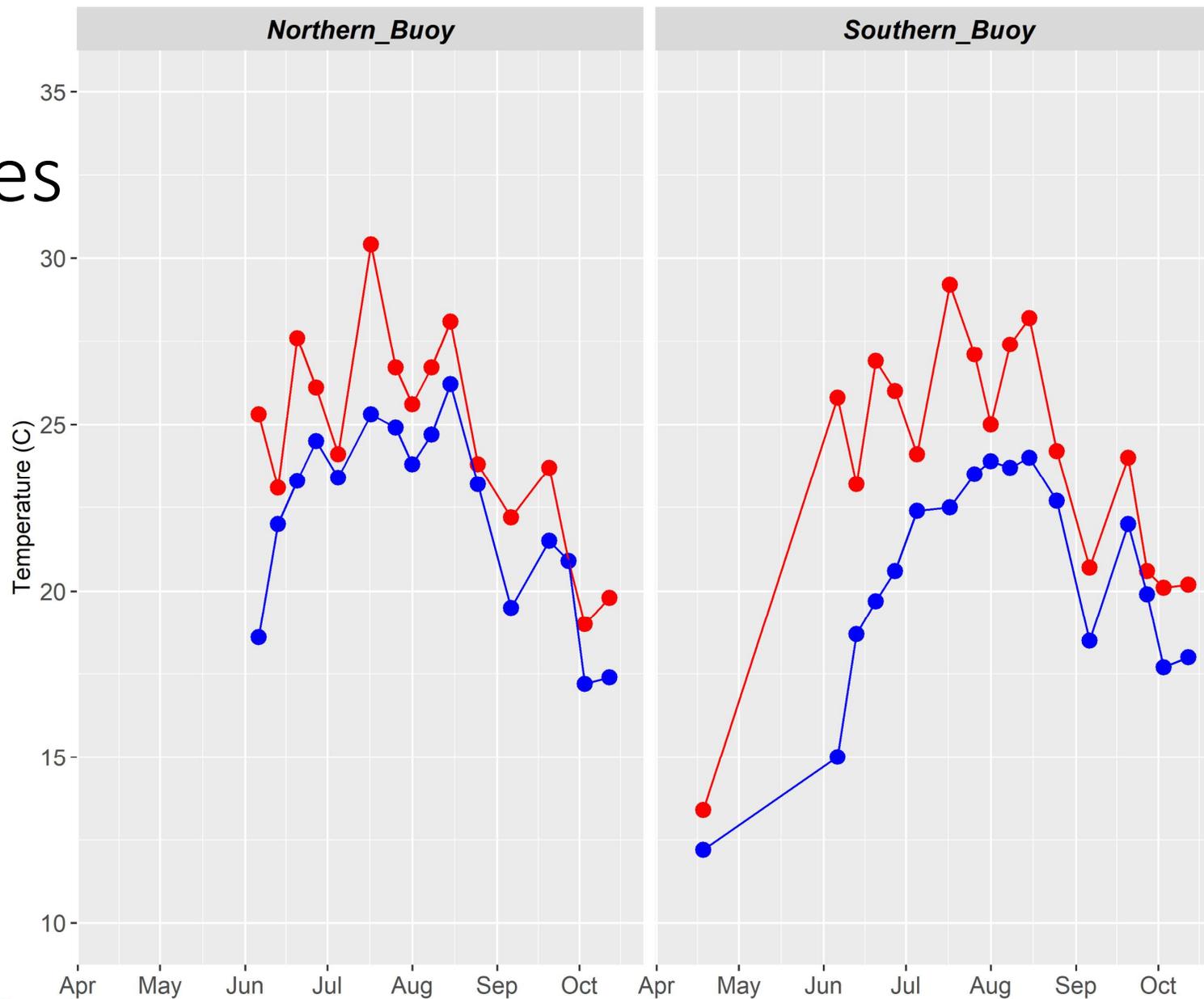
temperature declined with depth on
ates. The remaining dates showed no
e in water temperature from top to
n.

ke does not stay consistently stratified
hout the season, with mixed
ons on July 5th, August 1st, August 25th,
eptember 27th.



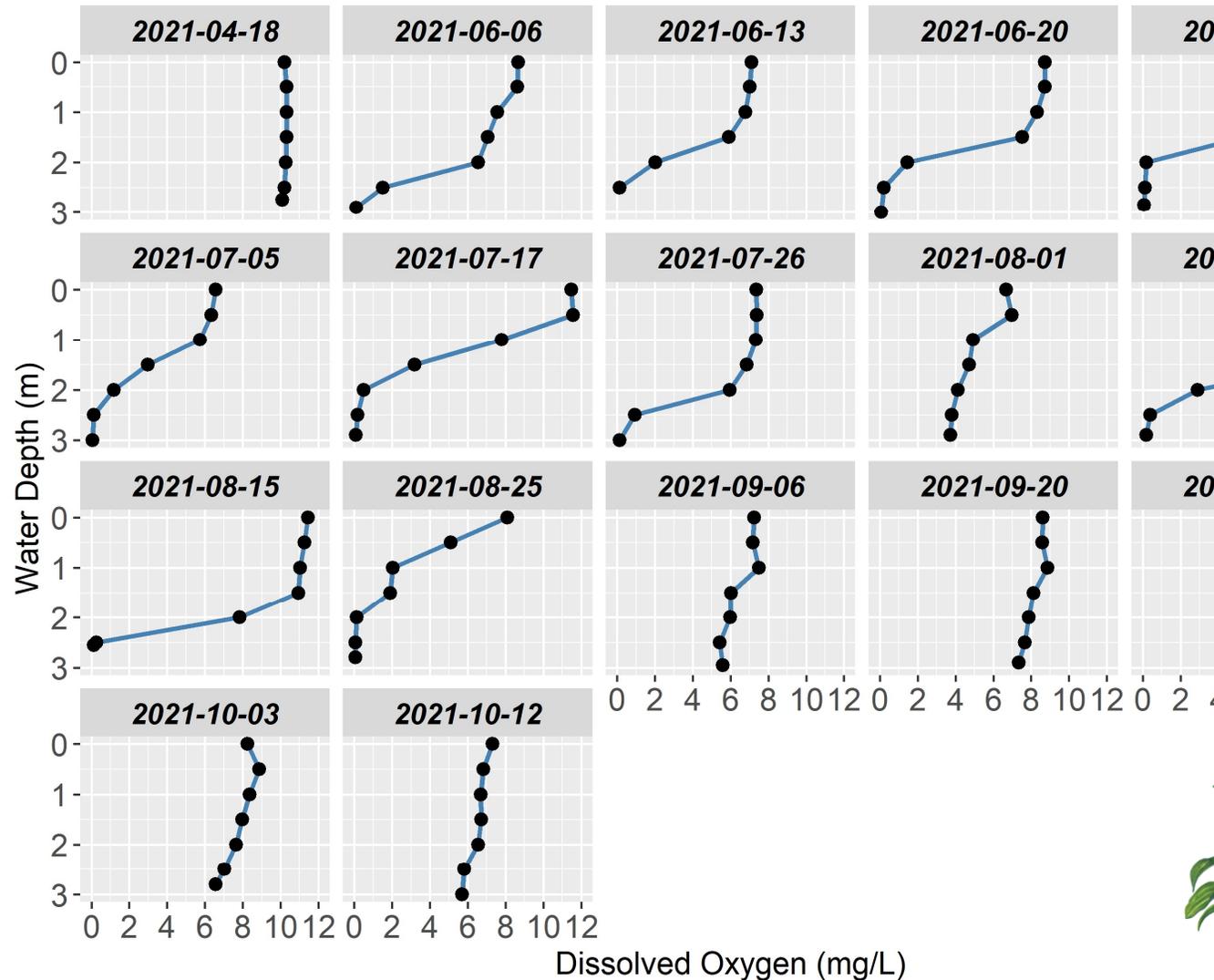
Northern vs Southern Buoy Water Temperatures

Water temperatures were highest on July 17th.
Water temperatures were more consistent at the southern buoy than at the northern buoy.



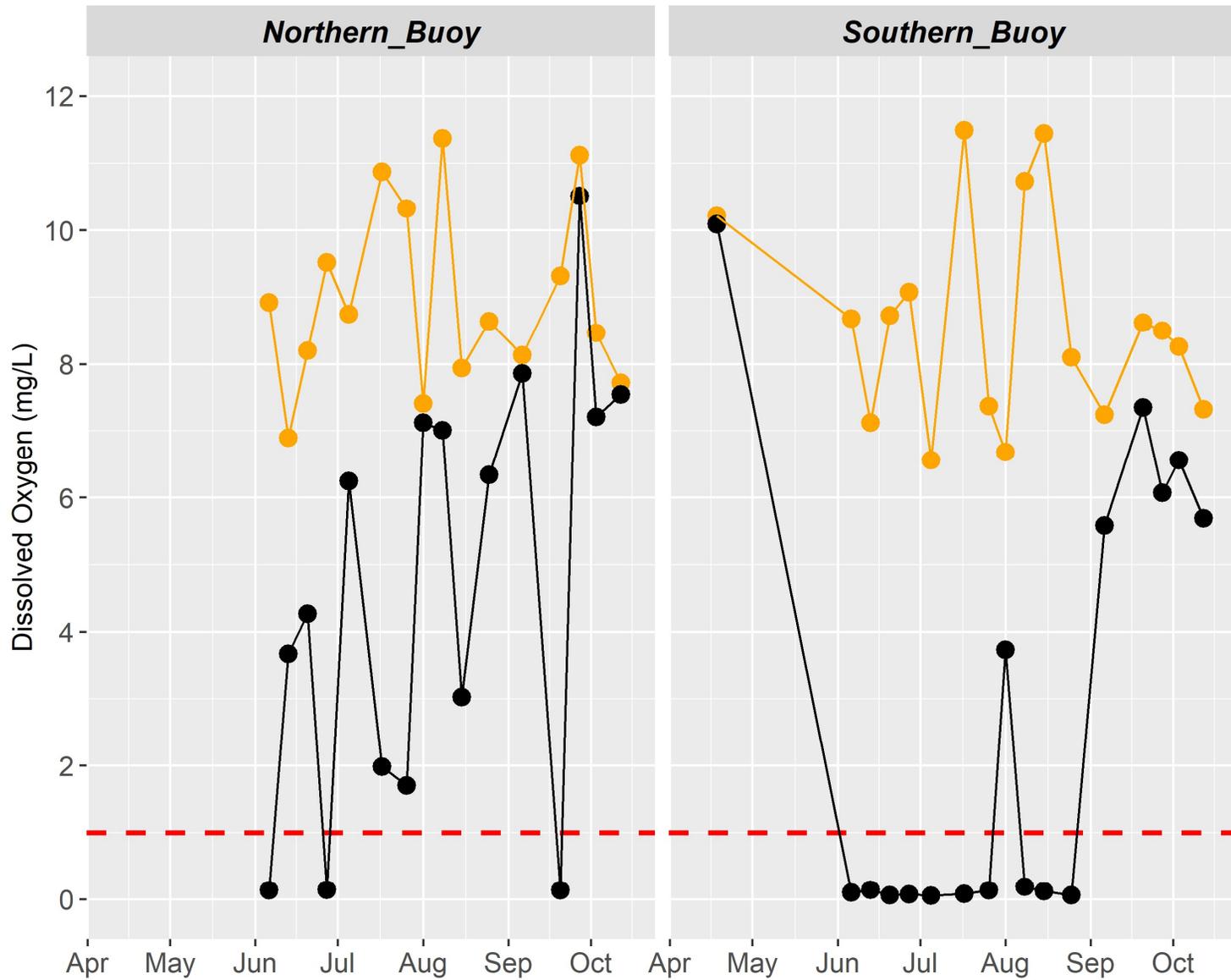
Dissolved Oxygen Profiles (Southern Buoy)

Dissolved oxygen (DO) loss starts sometime between mid-April and early June. The depth of anoxic boundary (minimum depth where DO is lower than 1 mg/L) fluctuates throughout the season. On August 1st, the lake exhibited uniform conditions from top to bottom. Major events that improved DO conditions in deeper waters occurred on July 5th, August 1st, and August 25th, consistent with temperature profiles showing loss of stratification on those dates.



Northern vs Southern Buoy Dissolved Oxygen

DO was consistently higher at the Southern Buoy bottom DO. DO concentrations vary greatly throughout the season at both buoys. Hypoxic conditions (below the red line) were present for most of the season at the Southern Buoy but intermittent at the Northern Buoy. Occurred briefly and only in late summer at the Northern Buoy.



Summary

Water clarity was variable, but poor to very poor for most of the season.

- No algae data to tell if the lake was cyanobacteria-dominated or not.

Shallow nature of lake leads to shifts between stratification and mixed conditions.

- Wind and rain can cause the lake to mix, extended high temperatures with calm conditions make the lake stratify.
- The mixing and stratifying conditions happen throughout the season.

Changes in thermal stratification result in changes in oxygen conditions.

- Bottom dissolved oxygen concentrations were below 1 mg/L for most of the season for the southern buoy; variable for the northern buoy.

