

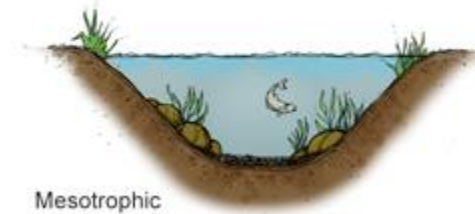
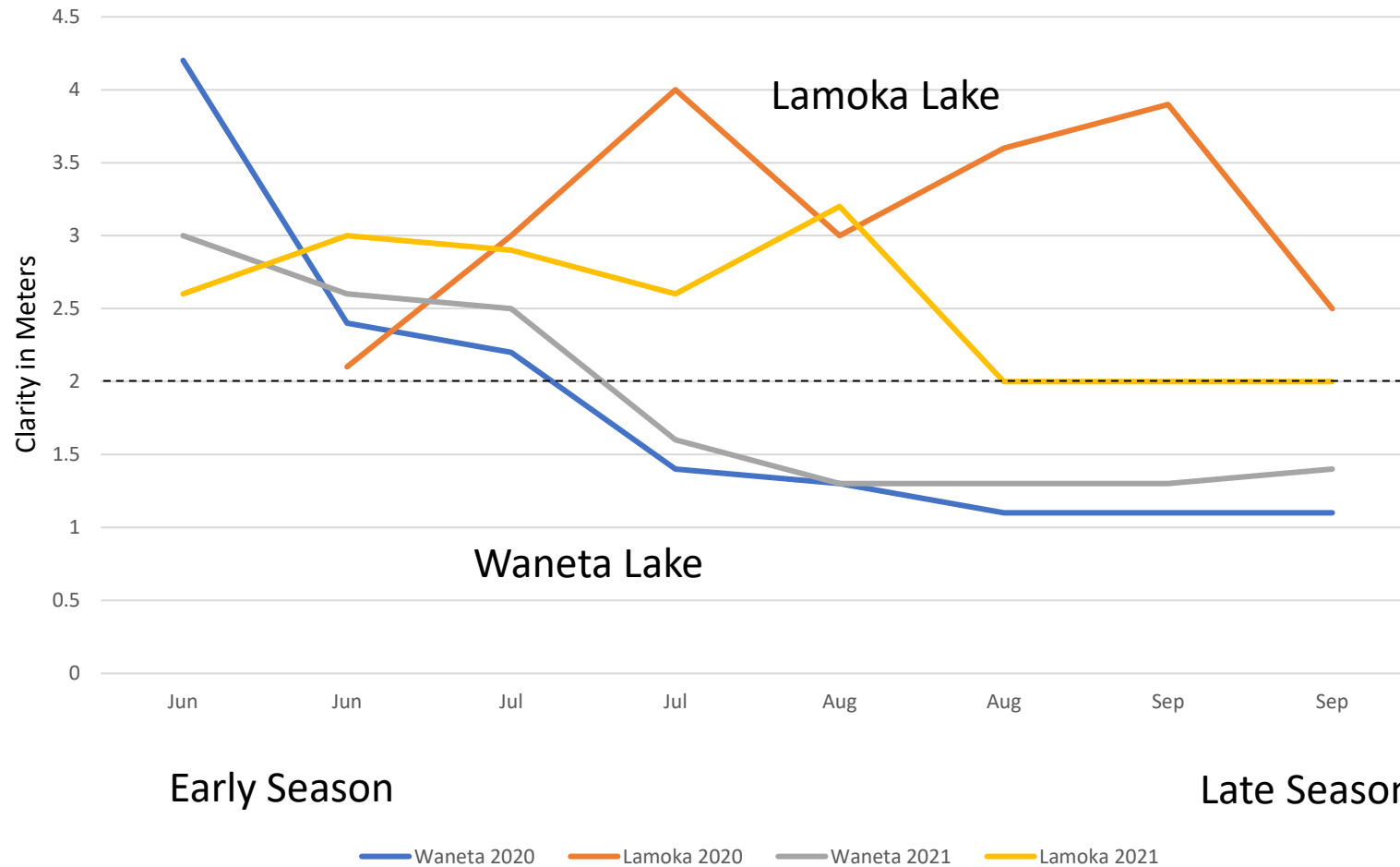
Lamoka – Waneta Lakes CSLAP Water Data Visualization

2020-2021

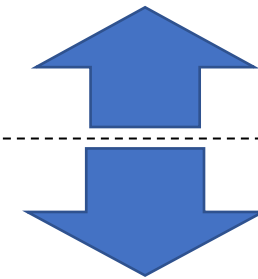
J. Terry Fisk

Patrick M. O'Shaughnessy

Clarity of Lamoka & Waneta Lakes 2020-2021



Mesotrophic is between 2.0 - 5.0

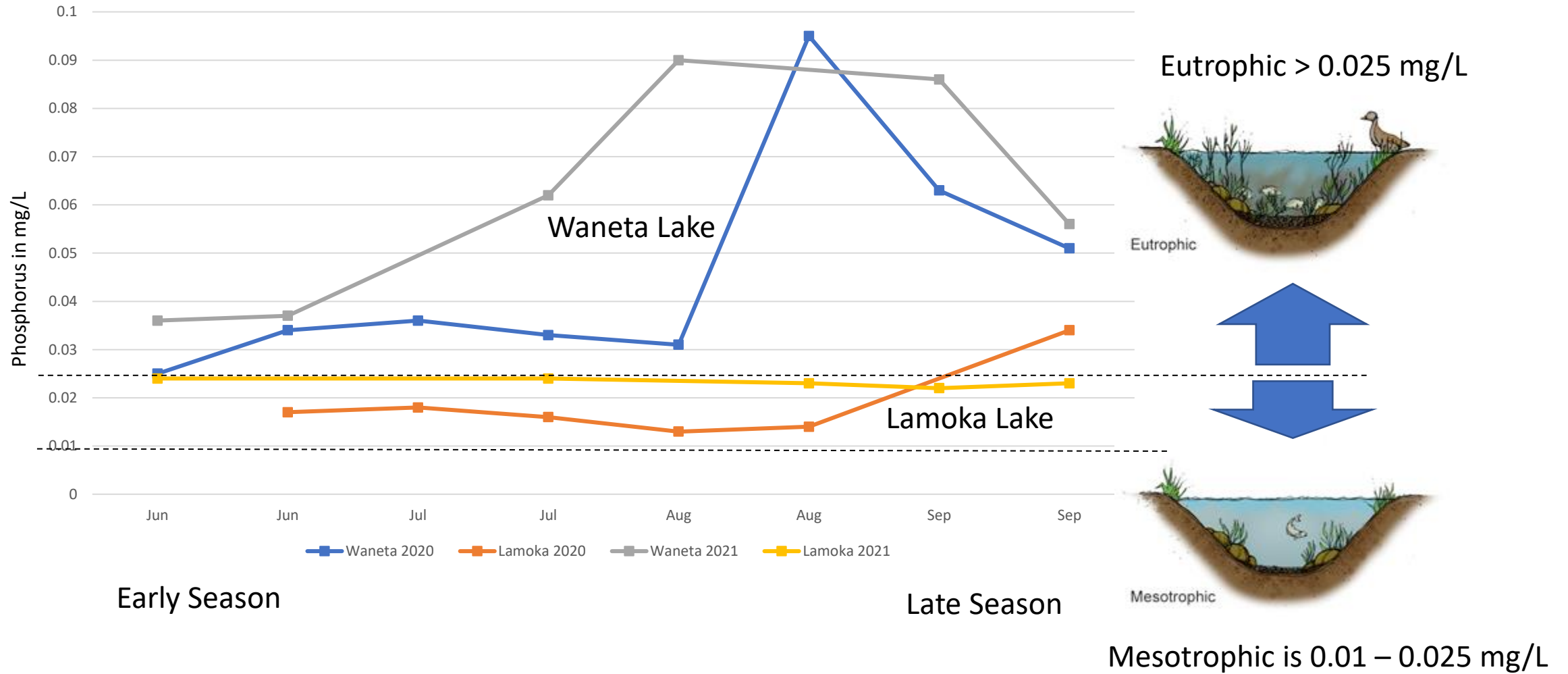


Eutrophic by definition is < 2.0



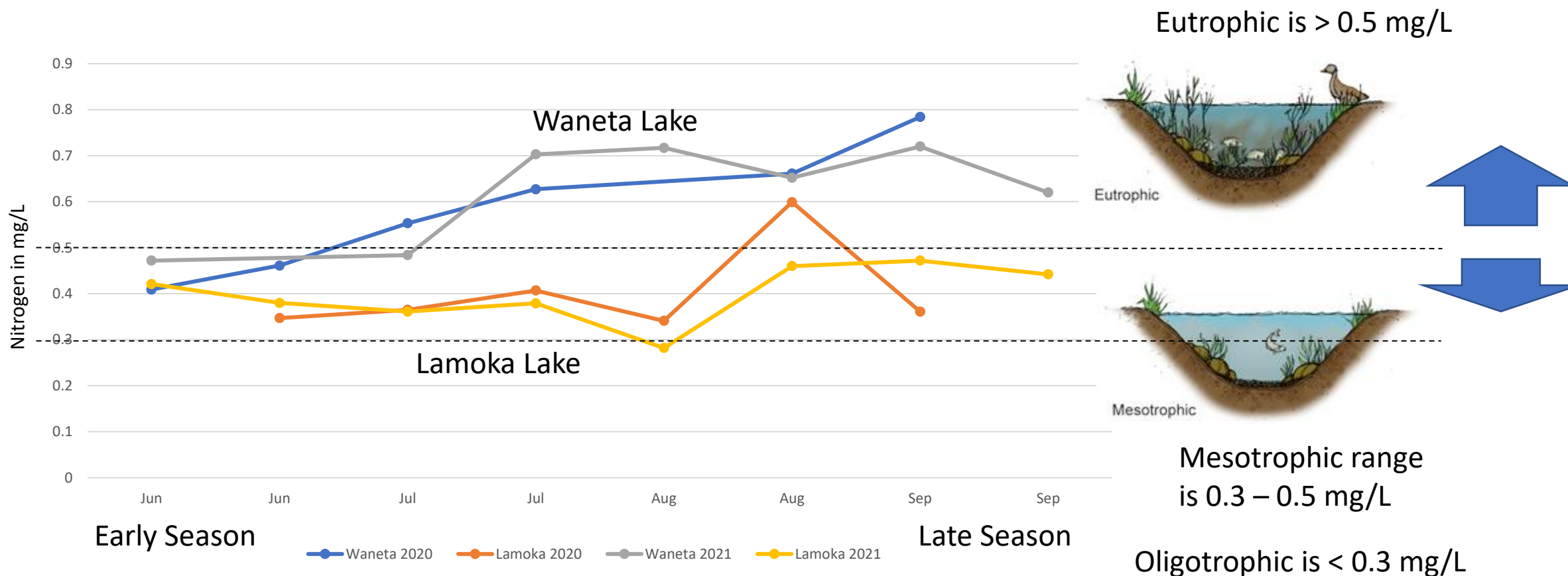
Secchi disc data shows Lamoka is better than Waneta, but may be worsening.

Total Phosphorus Lamoka & Waneta Lakes 2020-2021



Waneta has on average ~150% more phosphorus than Lamoka, but Lamoka increased 33% in 2021 and is now just below Eutrophic.

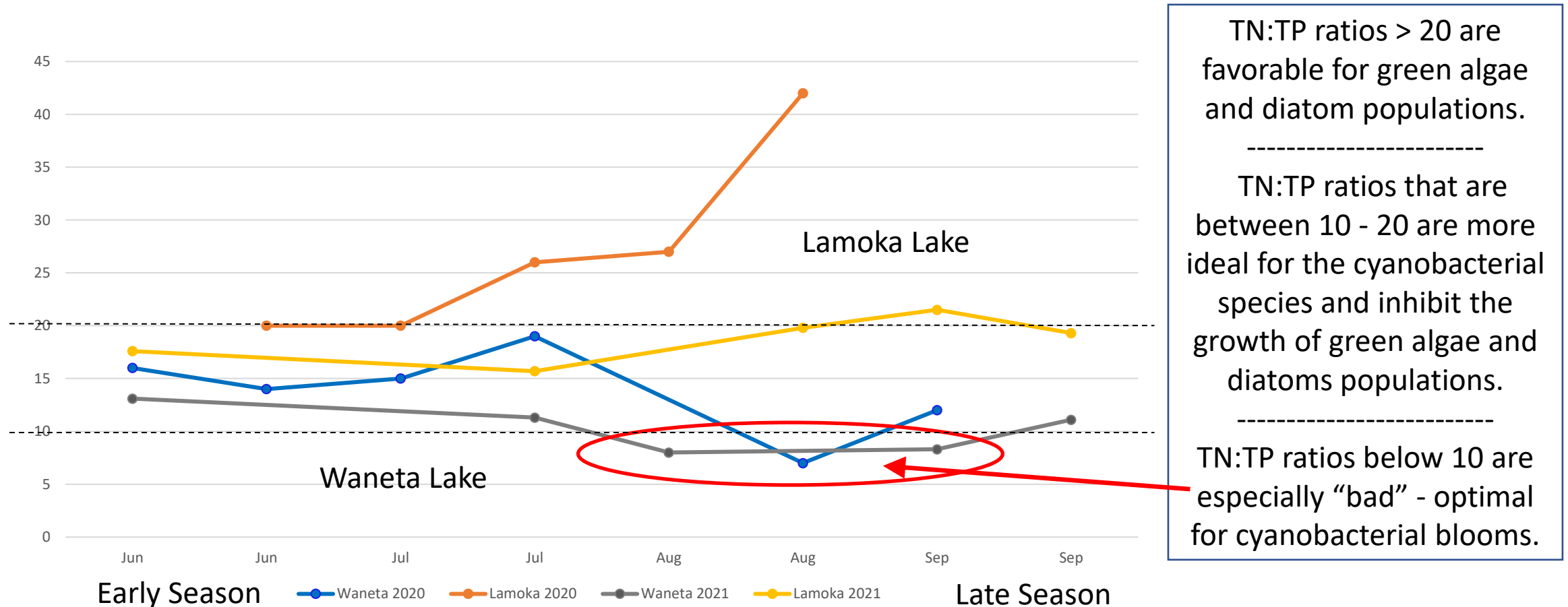
Total Nitrogen Lamoka & Waneta Lakes 2020-2021



Source: <https://www.umass.edu/mwwp/resources/factsheets.html>

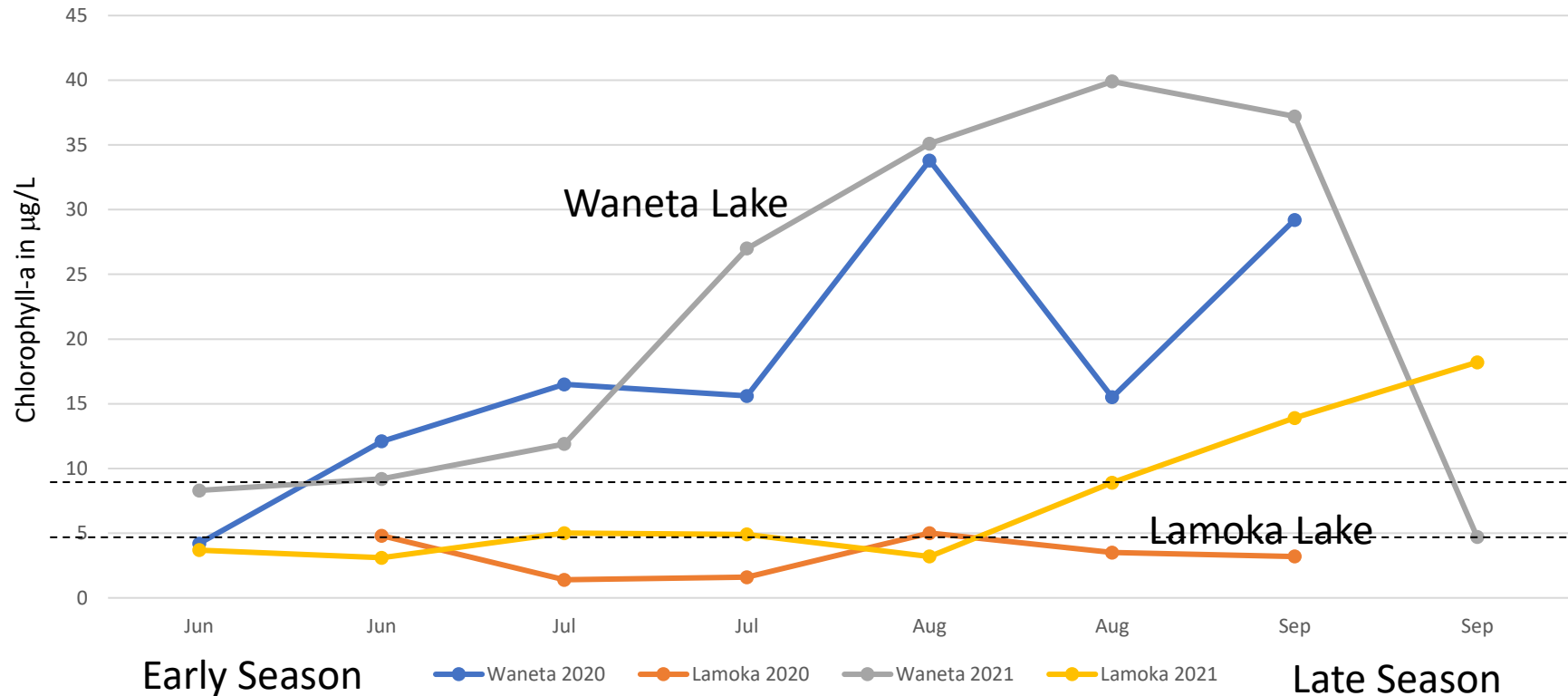
Nitrogen levels increase seasonally in both lakes. Waneta is on average ~56% higher (worse) than Lamoka, but Lamoka is flirting with Eutrophic levels.

Total Nitrogen : Total Phosphorous Ratio Lamoka & Waneta Lakes 2020-2021



This reveals a major difference between Lamoka and Waneta lakes. We must reduce the phosphorus in both lakes in order to reduce the cyano-HABs!

Chlorophyll-a Lamoka & Waneta Lakes 2020-2021



Chlorophyll-a is tested in lakes to determine how much algae is in the lake. Algae is important in lakes because it adds oxygen to the water as a by-product of photosynthesis. On the other hand, if there is too much algae in a lake it can produce a foul odor and be unpleasant for swimming. We can compare annual chlorophyll-a values to see if the amount of algae in the lake per year is increasing, decreasing, or staying the same.

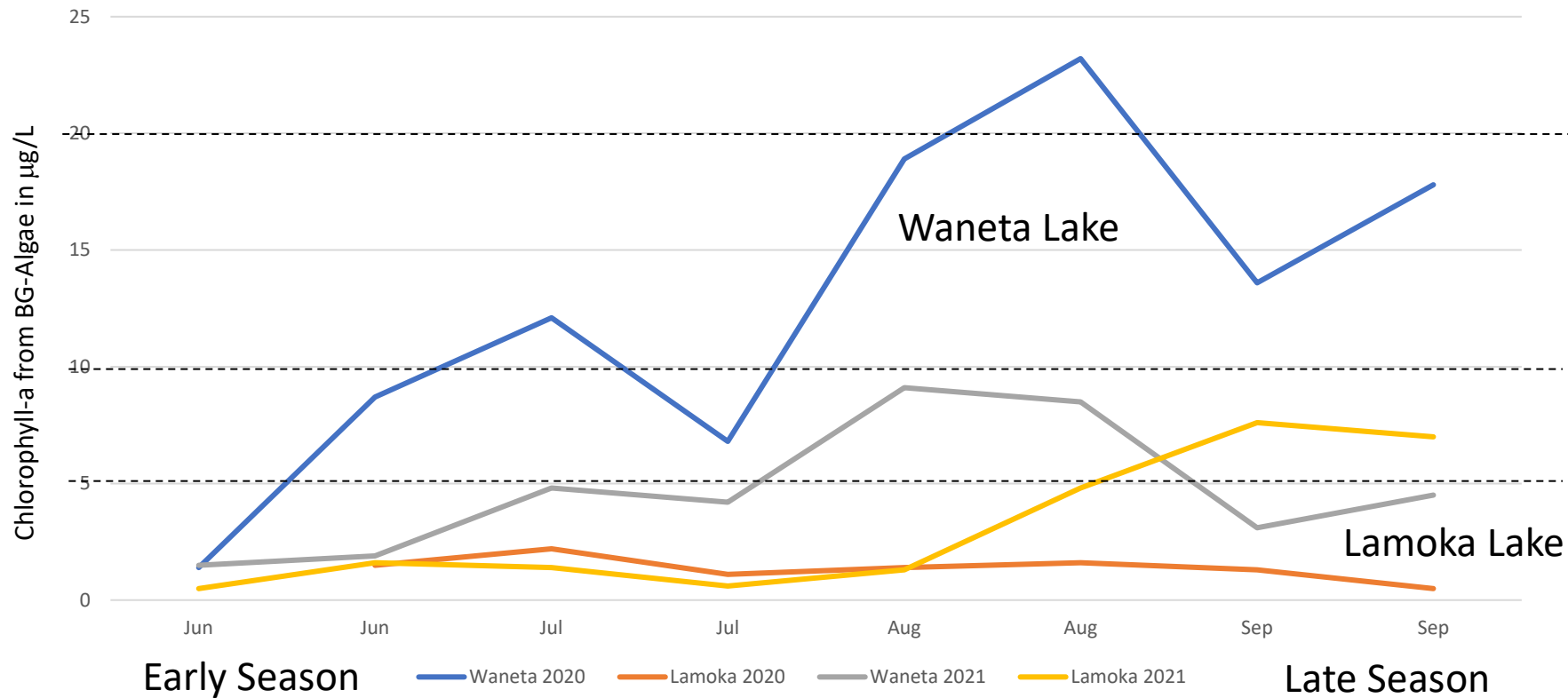
Eutrophic is > 10 µg/L

Mesotrophic is 5 – 10 µg/L

Oligotrophic is < 5 µg/L

Over-abundant chlorophyll-a from suspended algae makes the water murky, blocks sunlight to rooted plants, causes decreased oxygen production, which causes fish to leave or die, and algal blooms become more likely to occur.

FP/BG Chlorophyll-a (i.e.: blue-green algae) Lamoka & Waneta Lakes 2020-2021

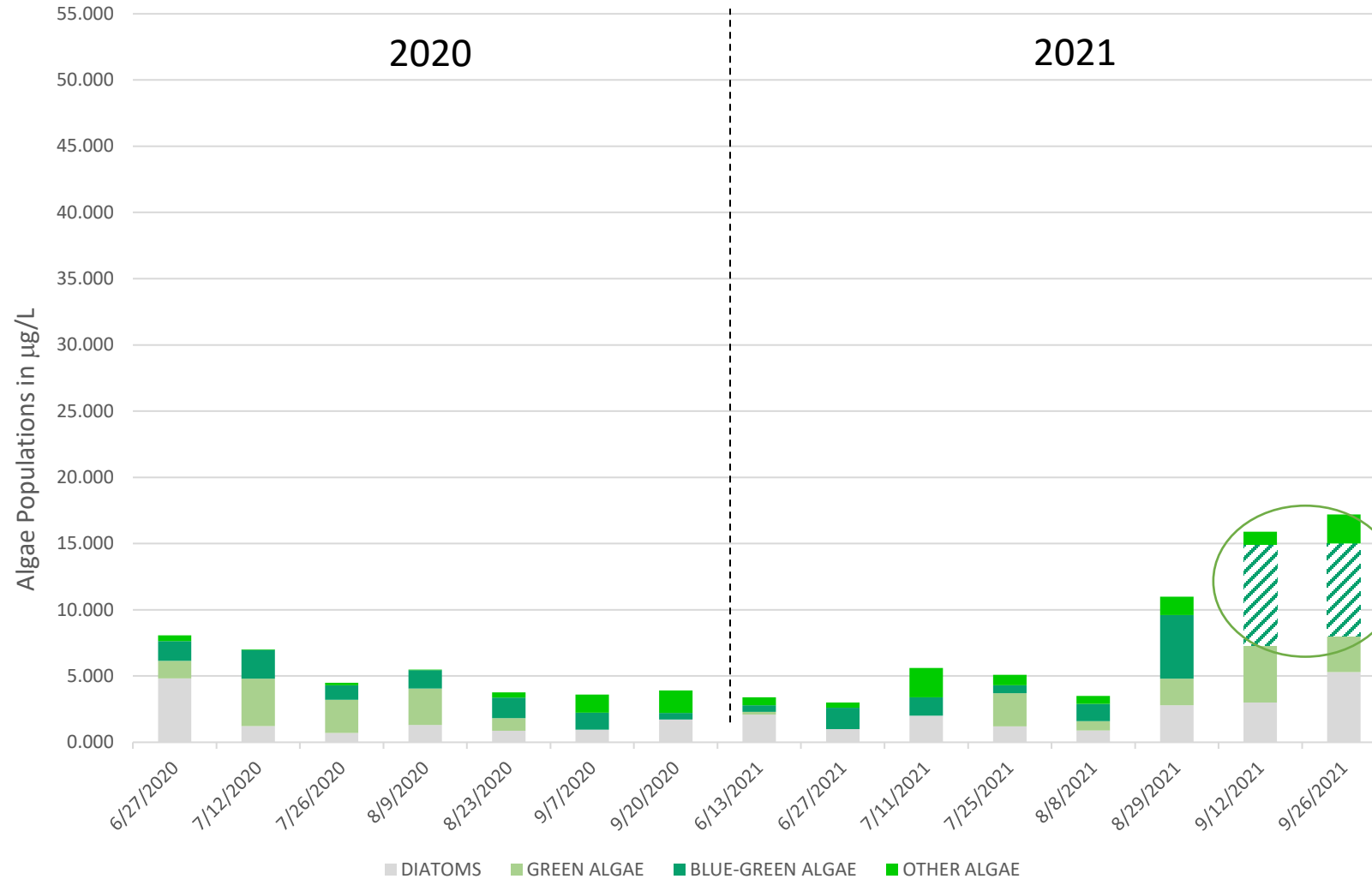


This represents the chlorophyll-a that is contributed by the cyanobacteria only.

- < 5 µg/L is GOOD
- 5-10 µg/L is a CONCERN
- 10-20 µg/L is a POTENTIAL RISK for health effects
- > 20 µg/L is a HIGH RISK for health effects

Waneta Lake’s open water harbors much higher concentrations of blue-green algae than Lamoka Lake, and hits “Potential Risk” and “High Risk” in July to September. Lamoka Lake’s BG algae rose dramatically in 2021 vs 2020.

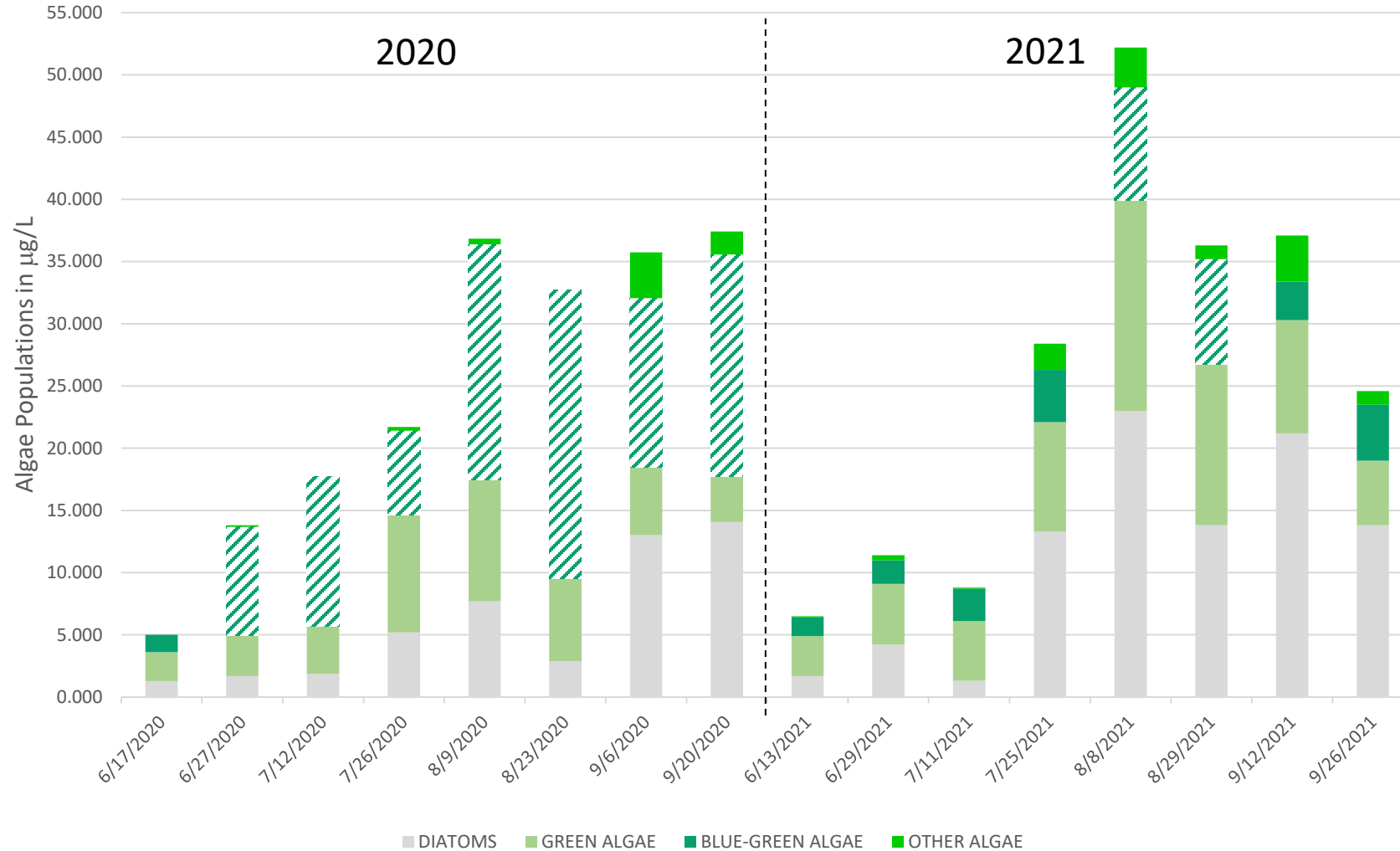
Lamoka Lake Algae Distribution by type 2020-2021



The cross-hatch symbol shows Blue-Green algae $\geq 5 \mu\text{g/L}$ in an open water sample is the trigger point for microcystin toxins analysis. For these cases, the results were $0.3 \mu\text{g/L}$ which is below the human hazard level of $10 \mu\text{g/L}$.

Not much of a concern in Lamoka Lake until August-September 2021

Waneta Lake Algae Distribution by type 2020-2021



Waneta Lake has thriving populations of diatoms, green algae and cyanobacteria throughout the year in open water samples.

Conclusions and Next Steps

- Both lakes are listed as “Impaired” furthermore Waneta is “Eutrophic” and Lamoka is “Mesotrophic”
- Nutrient levels are high in both lakes, contributing to weeds, cyanobacteria and eutrophication process
- Based on TN:TP ratio, we need to lower the amount of phosphorus in Waneta Lake NOW to put an end to the cyano-HABs that we have been experiencing in 2021 and even worse in 2022, Lamoka lake also in 2022
- **NEXT STEPS:**
- Awaiting measurement data for the 2022 Season which will be available in the Spring of 2023.
- Currently researching ways to:
 - decrease phosphorus and nitrogen in the water (Septic system inspections and repairs, stop lawn fertilization, improve stormwater runoff systems, dredging, Phos-Lok, Alum, Zeolites, etc.)
 - improve oxygenation of the water (aerators, fountains, other?)
 - reduce biomass which adds to the bottom/muck and nutrients (harvesting, dredging, other?)
 - remove/reduce the sediment/muck that is rich in nutrients and choking off the bottom of the lakes and channels
 - All of the above will require educating the community and then on-going support from the community
- Plan to use the 3-year data to apply for state and federal grants to help fund these efforts