

Introductory Comments Based on 2020 CSLAP Report

The following items are intended as summary and explanatory comments made by the LWLA board of directors after our review of the 2020 CSLAP reports for Lamoka and Waneta Lakes.

- Both lakes are listed as “Impaired” which translates to infested/weakened/damaged. This is one step worse than “Stressed” which indicates susceptible to infestation. It should be noted that “Impaired” is not as bad as “Precluded” which indicates a lake that is unsuitable for recreational use.
- Waneta lake is considered eutrophic¹ while Lamoka lake is considered mesotrophic² based on the chemical analyses and physical observations of conditions.
- Eutrophic is said of a body of water that is rich in nutrients supporting a dense plant population, the decomposition of which kills animal/fish life by depriving it of oxygen; Total Phosphorous concentration 25 to 100 µg/L. Waneta lake’s 2020 average TP was 46 µg/L, range was 25 - 95 µg/L.
- Mesotrophic is said of a body of water that has a moderate amount of nutrients supporting a moderate amount of plant growth. This level is intermediate between eutrophic and oligotrophic³. Total Phosphorous concentration 10 to 25 µg/L. Lamoka lake’s 2020 average TP was 19 µg/L, range was 13 - 34 µg/L. The one data point >25 µg/L served to have the lake classified as mesoeutrophic in one column of the report.
- Oligotrophic is said of a body of water that is relatively low in nutrients and has relatively low plant life as a result. This type of water body has abundant oxygen throughout all depths. Total Phosphorous concentration < 10 µg/L.
- Waneta lake also contains about 45% more nitrogen than Lamoka lake. Phosphorous and nitrogen are both nutrients that promote algae and weed growth.
- The deepest parts of Lamoka lake contain much higher concentrations of phosphorous and nitrogen, in the form of ammonia, than the normal water sample collected at 1.5 meters (nearly 5 feet) depth.
- There is a huge difference in water retention time between the two lakes confirming the stagnation of Waneta lake. Waneta lake’s average retention time is 3.66 years while Lamoka lake’s average retention time is a much healthier 0.8 years. We believe this is due to the differences in watershed areas and more importantly, the fact that Waneta can only drain through a narrow channel into Lamoka lake.
- The open water algae analysis charts also point out major differences between Waneta and Lamoka. Waneta reached 33 µg/L Chlorophyll a while Lamoka never went above 8 µg/L - in other words Waneta has over 300% more algae living in its waters than Lamoka. This is another indication of eutrophic vs. mesotrophic. Furthermore, just looking at the blue colored portion of the charts you can see that on average, over 70% of Waneta’s open water algal population is blue-green algae (cyanobacteria) while Lamoka’s open water blue-green algae is down around 40% of the total algae.

What are we going to do about this?

We plan to use this information to prepare a nutrient reduction plan for one thing. The data may help us to leverage some grant monies from the state or federal agencies. We are desperately in need of someone to volunteer to chair the LWLA’s Environmental Committee to lead the way in this effort. If you are interested, please contact President Jay White at (570) 529-0411 or teresa517@yahoo.com.

2020 CSLAP Water Testing Data Summary for Waneta and Lamoka Lakes

| Analysis | units | Lake | 17-Jun | 27-Jun | 12-Jul | 26-Jul | 9-Aug | 23-Aug | 6-Sep | 20-Sep | Median | Average | Comments |
|-----------------------|----------|---------------|--------|--------|--------|--------|-------|--------|-------|--------|--------|---------|---|
| Clarity (Secchi disk) | meters | Waneta | 4.2 | 2.4 | 2.2 | 1.4 | 1.3 | 1.1 | 1.1 | 1.1 | 1.3 | 1.85 | Eutrophic by definition is < 2.0 |
| | | Lamoka | | 2.1 | 3 | 4 | 3 | 3.6 | 3.9 | 2.5 | 3 | 3.16 | Mesotrophic is between 2.0 - 5.0 |
| Total Phosphorus | mg/L | Waneta | 0.025 | 0.034 | 0.036 | 0.033 | 0.031 | 0.095 | 0.063 | 0.051 | 0.035 | 0.046 | Eutrophic is > 0.020; 140% > Lamoka values! |
| | | Lamoka | | 0.017 | 0.018 | 0.016 | 0.013 | 0.014 | | 0.034 | 0.016 | 0.019 | Mesotrophic is between 0.010 - 0.020 |
| | | Lamoka - DEEP | | 0.019 | 0.099 | 0.098 | 0.184 | 0.018 | | 0.339 | 0.094 | 0.126 | Eutrophic is > 0.020 Very high in the deep water |
| Dissolved Phosphorus | mg/L | Waneta | 0.017 | | 0.026 | | 0.029 | 0.026 | 0.015 | | 0.026 | 0.023 | 155% > Lamoka values! |
| | | Lamoka | | 0.011 | 0.009 | | 0.01 | 0.004 | | 0.009 | 0.009 | 0.009 | |
| | | Lamoka - DEEP | | 0.006 | 0.011 | | 0.006 | | | 0.011 | 0.008 | 0.009 | |
| Total Nitrogen | mg/L | Waneta | 0.409 | 0.461 | 0.553 | 0.627 | | 0.661 | 0.784 | | 0.59 | 0.583 | About 45% higher in Waneta than Lamoka |
| | | Lamoka | | 0.347 | 0.365 | 0.407 | 0.341 | 0.599 | 0.361 | | 0.363 | 0.403 | |
| TN : TP | -- | Waneta | 16 | 14 | 15 | 19 | | 7 | 12 | | 15 | 13.8 | Waneta ratio indicates nearly equal availability |
| | | Lamoka | | 20 | 20 | 26 | 27 | 42 | | | 26 | 27 | Lamoka is phosphorus limited or Nitrogen-rich |
| Ammonia | mg/L | Waneta | 0.027 | 0.018 | 0.03 | 0.027 | 0.039 | 0.034 | 0.047 | 0.083 | 0.032 | 0.038 | About 50% higher in Waneta than Lamoka |
| | | Lamoka | | | 0.011 | 0.013 | 0.03 | 0.026 | 0.037 | 0.032 | 0.028 | 0.025 | |
| | | Lamoka - DEEP | | 0.381 | | 0.944 | 0.025 | 0.791 | 0.139 | 0.127 | 0.858 | 0.401 | There's lots of ammonia deep down in Lamoka |
| Chlorophyll a | ug/L | Waneta | 4.2 | 12.1 | 16.5 | 15.6 | 33.8 | 15.5 | 29.2 | | 15.6 | 18.1 | --> Eutrophic; 450% higher in Waneta than Lamoka |
| | | Lamoka | | 4.8 | 1.4 | 1.6 | 5 | 3.5 | 3.2 | | 3.4 | 3.3 | --> Mesotrophic |
| pH | -- | Waneta | 8.1 | 8.2 | 7.7 | 9 | 8.8 | 8.8 | 8.2 | 7.8 | 8.2 | 8.3 | Healthy range = 6.5 - 8.5 |
| | | Lamoka | | 8 | 6.8 | 8.1 | 8 | 8.2 | 8.3 | 7.8 | 8 | 7.9 | Healthy range = 6.5 - 8.5 |
| Conductivity | uOhms/cm | Waneta | 272 | 273 | 278 | 283 | 287 | 279 | 283 | 284 | 281 | 280 | FYI: > 250 = hard water, < 125 = soft water |
| | | Lamoka | | 241 | 246 | 249 | 252 | 244 | 248 | 240 | 246 | 245 | |
| Calcium | mg/L | Waneta | 19 | | | | 24 | | | | 21 | 21.5 | for acid buffering; >20 susceptible to zebra mussels |
| | | Lamoka | | 20 | | | | 22 | | | 21 | 21 | ditto |
| Chloride | mg/L | Waneta | | 37 | | 37 | | 39 | | 17 | 37 | 32.5 | FYI: Can begin to impact fish health > 100 mg/L |
| | | Lamoka | | | 28 | | 29 | | 30 | | 29 | 29 | |
| | | Lamoka - DEEP | | | 27 | | 27 | | 28 | | 27 | 27 | |
| Temperature | C | Waneta | 22 | 24 | 27 | 21 | 25 | 25 | 22 | 17 | 23 | 23 | |
| | | Lamoka | | 25 | 27 | 26 | 24 | 24 | 21 | 16 | 24 | 23 | |
| | | Lamoka - DEEP | | 15 | 20 | 18 | 14 | 12 | 14 | 9 | 14 | 15 | |
| FP/BG Chlorophyll a | ug/L | Waneta | 1.4 | 8.7 | 12.1 | 6.8 | 18.9 | 23.2 | 13.6 | 17.8 | 12.8 | 12.8 | <i>Chlorophyll a</i> is derived from blue-green algae, a.k.a. |
| | | Lamoka | | 1.5 | 2.2 | 1.1 | 1.4 | 1.6 | 1.3 | 0.5 | 1.4 | 1.4 | cyanobacteria; Waneta 815% higher than Lamoka! |

CSLAP 2020 REPORT: STATISTICS & COMPARISONS

| LAKE CHARACTERISTICS | WANETA LAKE | LAMOKA LAKE |
|------------------------|-------------|-------------|
| SURFACE AREA (Acres) | 780 | 826 |
| MAXIMUM DEPTH (Feet) | 32 | 46 |
| MEAN DEPTH (Feet) | 15 | 22 |
| RETENTION TIME (Years) | 3.66 | 0.8 |

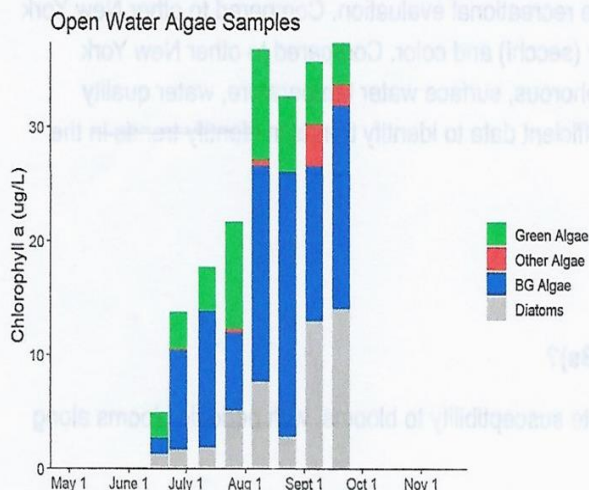
| WATERSHED CHARACTERISTICS | WANETA LAKE | LAMOKA LAKE |
|----------------------------|-------------|-------------|
| WATERSHED AREA (Acres) | 6,285 | 17,915 |
| WATERSHED/LAKE RATIO | 8 | 22 |
| LAKE & WETLANDS (%) | 14.4 | 10.1 |
| AGRICULTURAL (%) | 38.5 | 34.3 |
| FOREST, SHRUB, GRASSES (%) | 39.7 | 51.4 |
| RESIDENTIAL (%) | 7.4 | 4.2 |
| URBAN (%) | 0.0 | 0.0 |

| TROPHIC STATUS | WANETA LAKE | LAMOKA LAKE |
|---------------------------------|---|---|
| | EUTROPHIC | MESOEUTROPHIC |
| | Periodic blooms, with moderate susceptibility | No reported blooms, moderate susceptibility |
| | Invasives present, with high vulnerability | Invasives present, with high vulnerability |
| PRIORITY WATERBODY LIST: | IMPAIRED | IMPAIRED |

(Classifications ranking: Fully supported, Threatened, Stressed, Impaired, or Precluded)

| WATER QUALITY INDICATORS | WANETA LAKE | LAMOKA LAKE |
|--------------------------|-------------|-------------|
| PHOSPHORUS | EUTROPHIC | MESOTROPHIC |
| CHLOROPHYLL A | EUTROPHIC | MESOTROPHIC |
| SECCHI DISC | EUTROPHIC | MESOTROPHIC |
| LAKE PERCEPTION | FAIR | GOOD |
| HAB'S | GOOD | GOOD |
| OPEN WATER ALGAE LEVELS | GOOD | GOOD |
| AQUATIC INVASIVE SPECIES | PRESENT | PRESENT |

Open Water Algae Waneta



Open Water Algae Lamoka

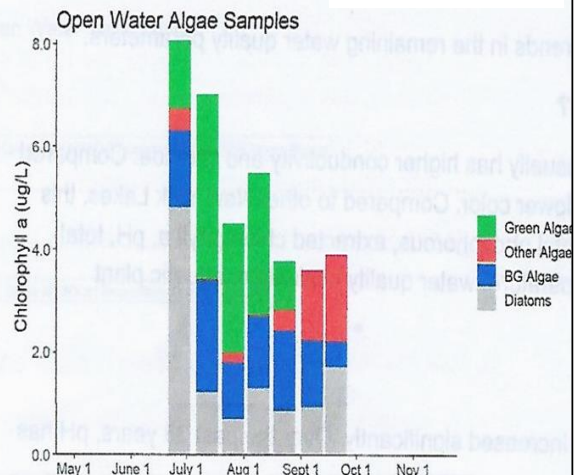


Chart minus Conductivity values (averages)

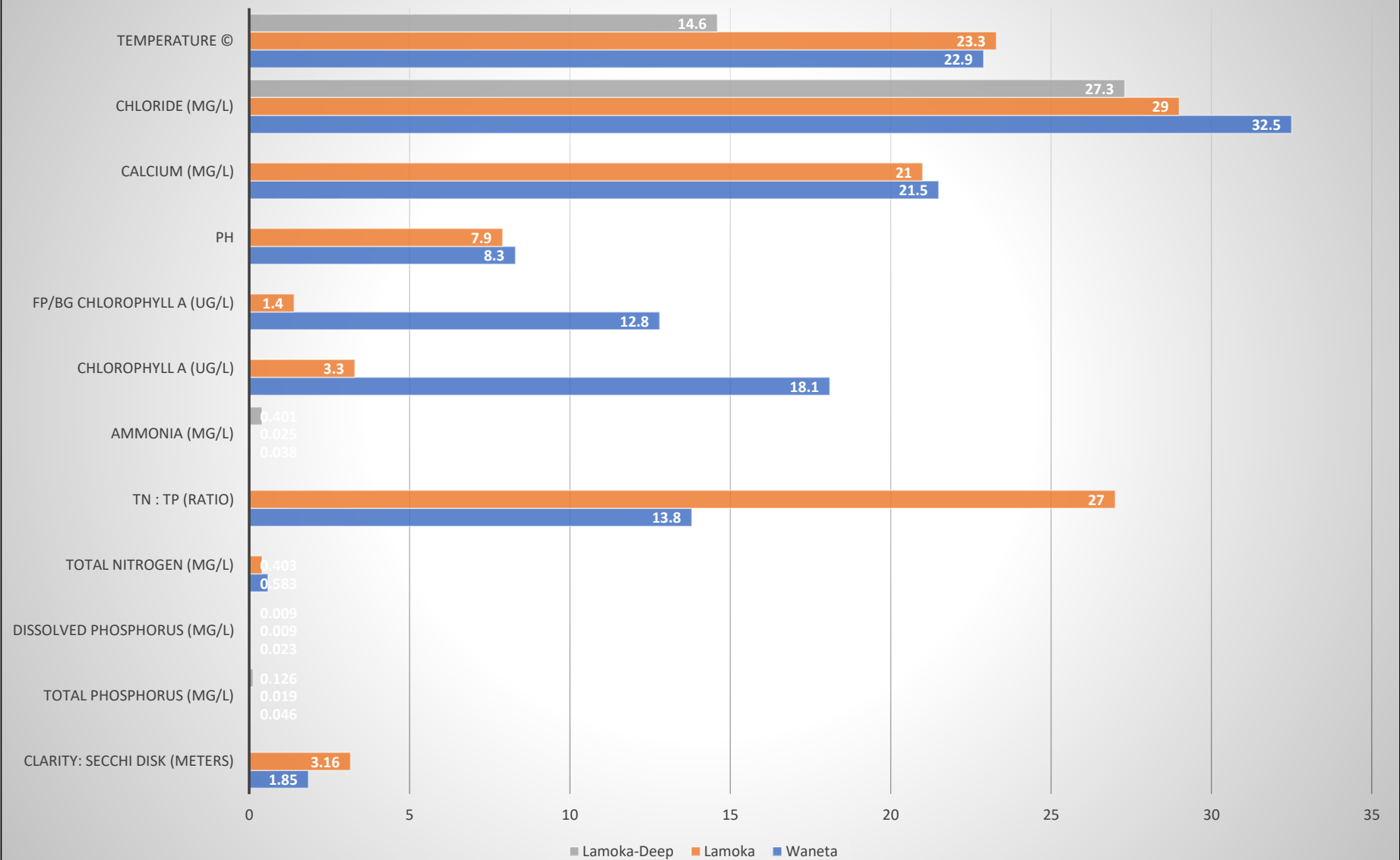


Chart comparing values 0 to 2.0 (averages)

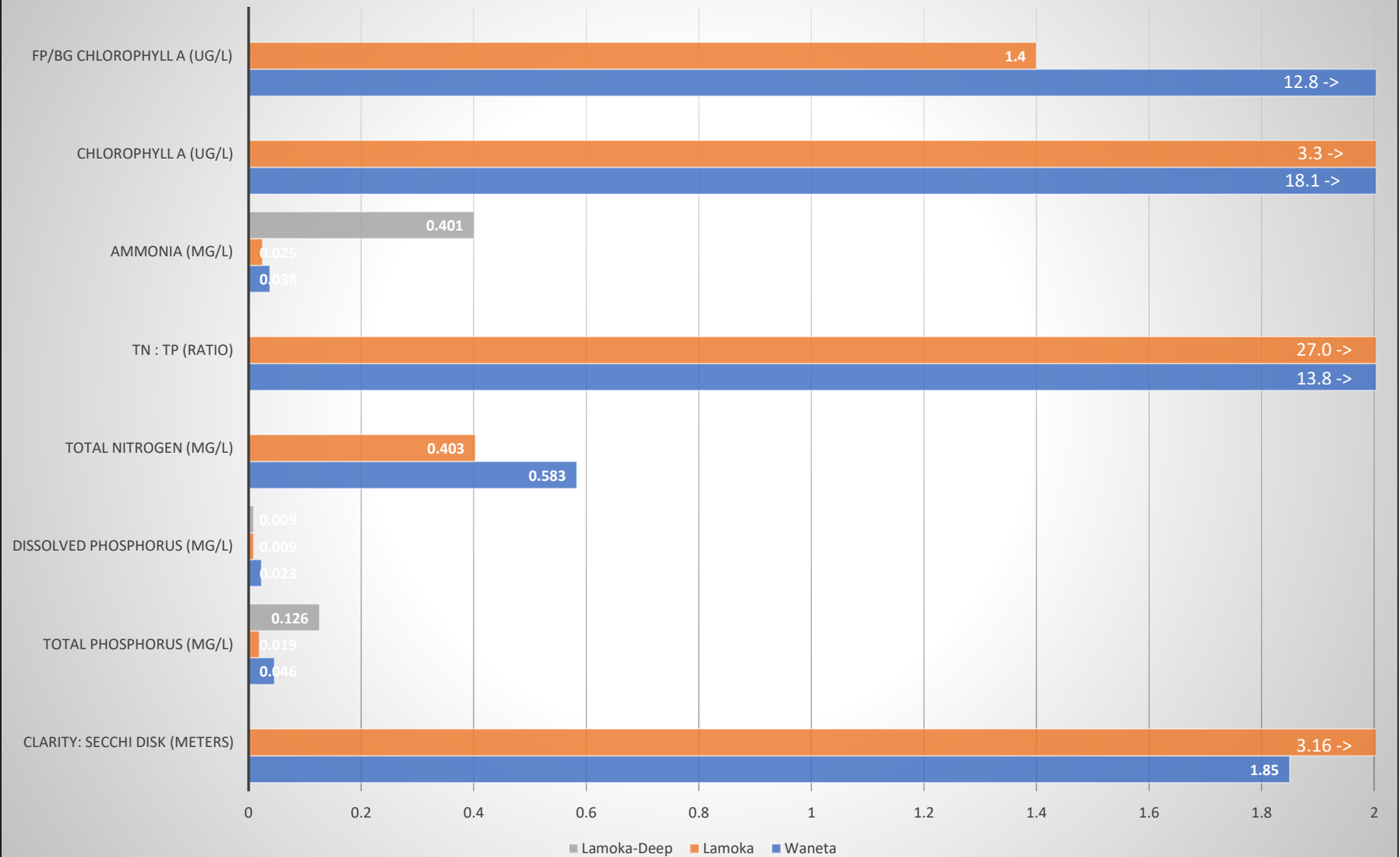


Chart comparing all average values

