

## Lake Owen Association Lake Manager Activities Report Board Update April 18, 2022

### Lake Protection Grant Update

Grant extension was granted through 12/31/2022.

With expenses through 3/31/2022, remaining grant available is \$30,681, which requires \$40,908 in expenses to “earn.” Projected grant-related activities approved at November 2021 meeting have anticipated total expenses of \$51,295. So, additional \$10,387 plus grant match of \$10,277 will be needed to complete approved activities [grant expense tracking 041422.pdf \(83 KB\)](#).

Above does not include normal LOA administration and social functions or the CBCW program.

### Boat Landing AIS Prevention: Decontamination Stations, etc.

The decon committee met March 9<sup>th</sup> via Zoom.

#### PARTICIPANTS

Tom Johnson  
Bill Hannaford  
Ed Ronkowski  
Jon Nymo  
Cheryl Clemens  
Addie Ahrens

North Outlet: to be staffed 7 days a week with normal shift 7 a.m. – 3 p.m., weekend shifts may be split 7 a.m. – 1 p.m. and 1 p.m. to 7 p.m. CBCW inspectors may be added at north landing to help screen boats during busy weekends

Campground: Fri. 10-6, Sat. 7-3, and Sun. 7-1

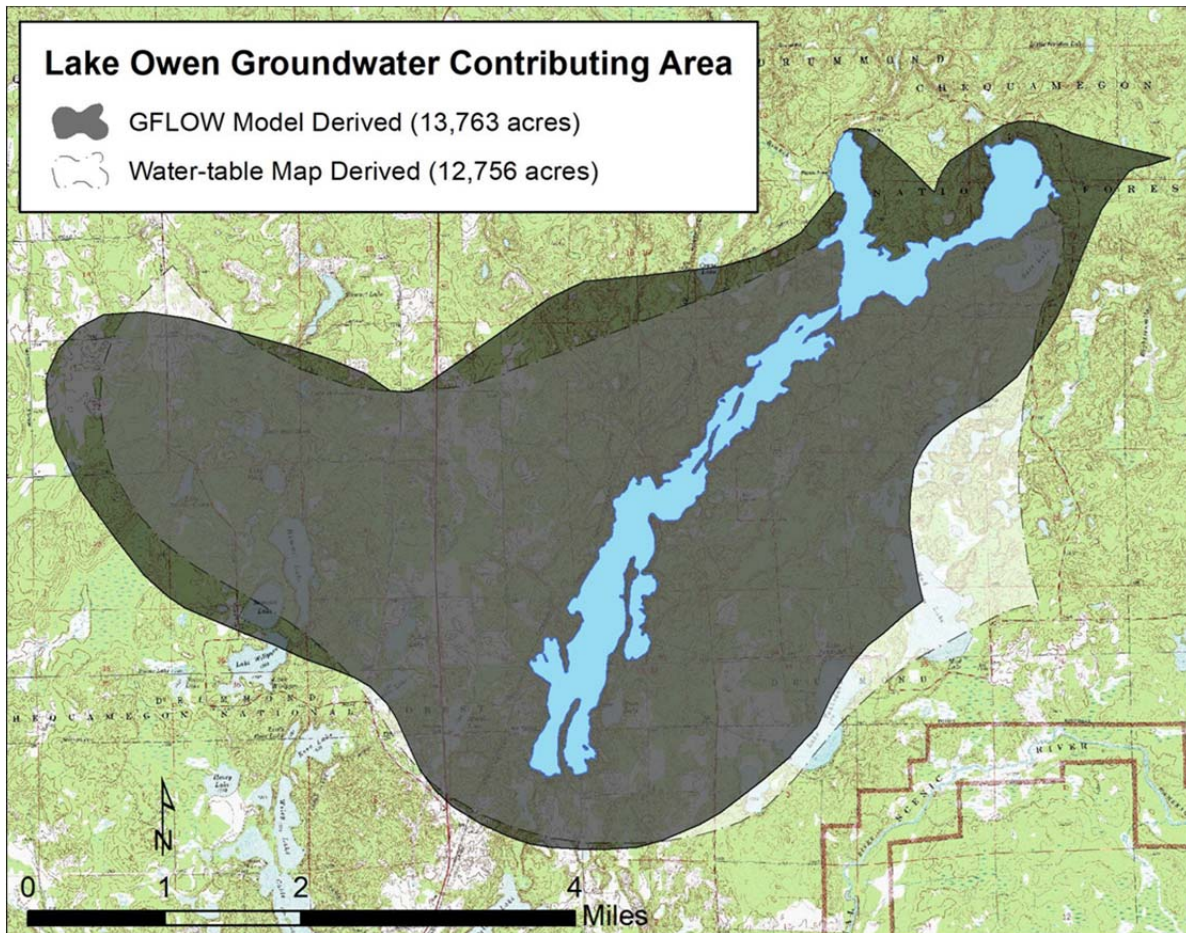
Recruiting is underway for 2022 staff. Addie Ahrens is assisting. She will also provide administrative services for the 2022 including scheduling, coordinating supplies, time reporting, and inputting data. We have drafted a schedule for the year. Training for new staff will be provided in early May. Inclement weather and emergency procedures will be provided to staff along with decon procedures. Ed Ronkowski will provide overall supervision as the board representative and will assist with incident reporting.

Installation of sanitizing station (using a dilute bleach solution like at Otter Bay) will occur at the campground boat landing in 2022. We might consider installing at the entrance to the campground instead.

Response from USFS Ranger regarding camera installation at the North Outlet Landing was negative. If board remains interested, we can investigate further when his replacement is appointed sometime this year.

## Groundwater Study

A summary of results of the groundwater model and study are attached. While the results are brief, the development process was extensive. The groundwater map for Lake Owen is now very precise. The model will be available to evaluate the potential impact of changes in the groundwater contributing area such as installation of high-capacity wells, pollution sources, land-use changes that can affect groundwater, etc. Groundwater provides 80% or more of the water contribution to Lake Owen, so this model is important.



## Thermistor String

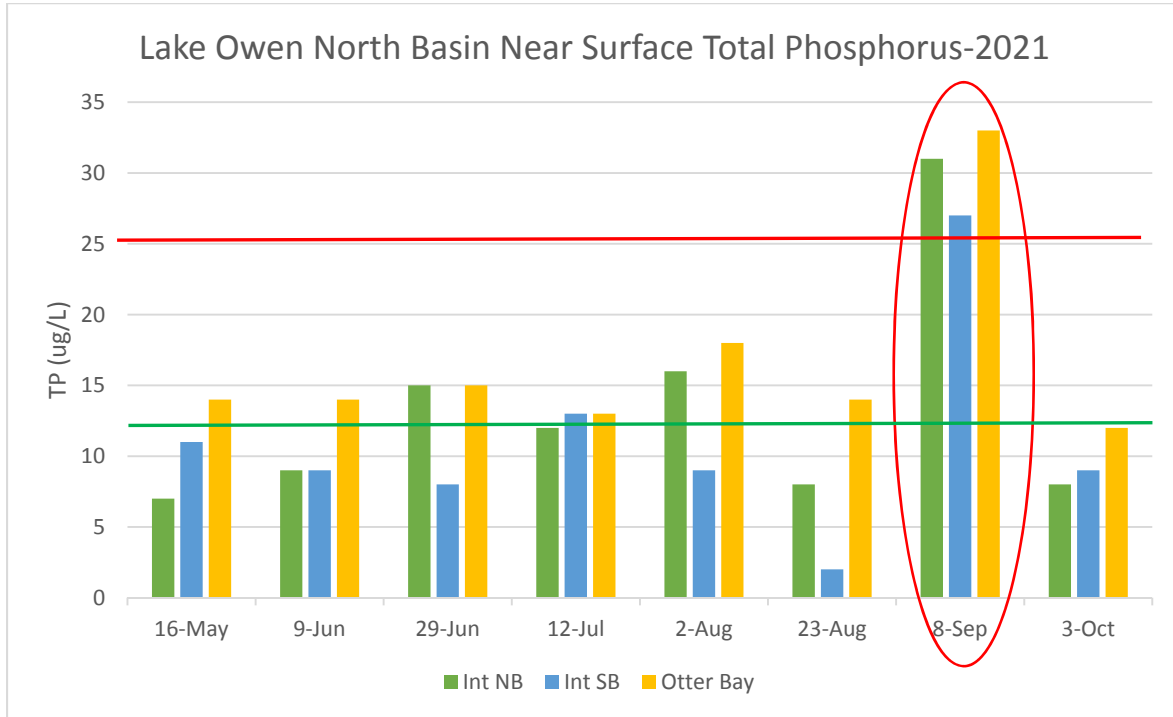
The materials for the thermistor string have been purchased, and the apparatus is being built. The thermistor string will be installed shortly after ice-out (if that ever happens 😊). The string will remain in the lake until after fall turnover, which is expected in mid-November.

## Water Quality

The data for water quality analysis are all complete except for one winter run in March, and we are in the process of summarizing these data. A summary analysis will be provided when all of the winter data has cleared. The winter data is somewhat limited (compared to what was planned) as we observed several spring holes while walking out on the ice and returned when an otter popped out in the path we were walking...we didn't feel safe.

The summary analysis will include quantification of hypolimnetic (lake-bottom) accumulation of phosphorus. **We have confirmed that lake-bottom phosphorus is not available for algae growth due to lack of mixing in the lake during the growing season.**

The following graph shows the near-surface (integrated) phosphorus concentration:



*Note: The green line denotes oligotrophic (below) to mesotrophic (above) and the red line denotes mesotrophic (below) to eutrophic (above).*

**The phosphorus data shows that the north and south basins were in the oligotrophic range most of the growing season and entered the mesotrophic range a couple of times. Otter Bay was in the mesotrophic range and was consistently higher than the other two basins.** There was one exception and that was Sept. 8 (circled in red). All three locations had a spike in total phosphorus at the eutrophic level. We do not know what the cause of this spike could be. There is no evidence of mixing and there were no major storms (even then the runoff concentration would have to be higher than seen in the past). It may have been a contamination issue with the samples. However, all three were very high.

### What does Oligotrophic Mean???

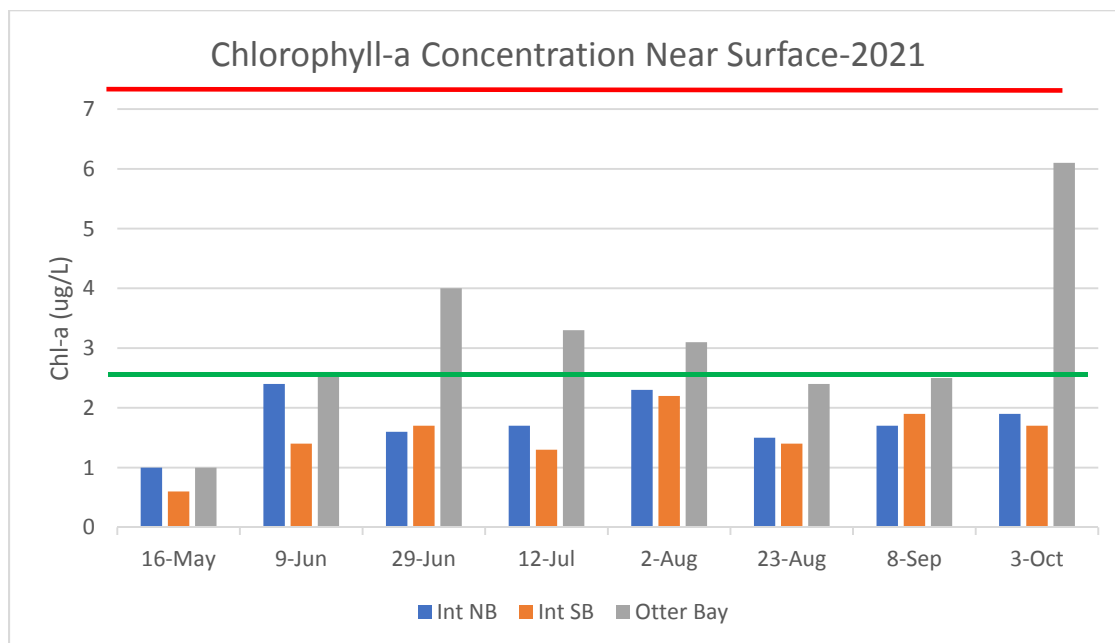
Oligotrophic is one category in the Carlson Trophic State Index (TSI). An oligotrophic lake is basically, low-nutrient, with little algae growth. The TSI is a measure of lake productivity or nutrient level. Higher trophic state index values indicate the lake has more nutrients which results in more algae growth. Various parameters (total phosphorus, chlorophyll-a, and Secchi depth) are used to calculate a TSI, and ranges of TSI value represent a particular trophic state. A lower TSI reflects low nutrient levels and less algae.

30-40	Oligotrophic = very low nutrients and productivity
40-50	Mesotrophic = moderate nutrients and productivity
50-60	Mild Eutrophic = moderately high nutrients and productivity
60-70	Eutrophic = high nutrients and productivity
70-80	Hyper Eutrophic = very high nutrients and productivity

**There was no spike in chlorophyll-a in response to the increase in phosphorus in September.**

Chlorophyll-a is a measure of algae growth, and algae can be expected to increase following spikes in phosphorus concentration.

The following graph shows the chlorophyll-a concentration near the surface:



Note: The green line denotes oligotrophic (below) to mesotrophic (above) and the red line denotes mesotrophic (below) to eutrophic (above).

The chlorophyll-a data supports what we have seen in the past, all levels are very low in the north and south basin data (all in the oligotrophic trophic state). This data is also consistent with past data with the trophic state lower using chlorophyll-a data than when using total phosphorus data. Note that Otter Bay has more algae production (higher chlorophyll-a concentration), but is still in the mesotrophic range, so not a big concern. Otter Bay also showed a significant spike in chlorophyll-a in October.

We did catch the lake shortly after a turnover in mid-November. This is the first time we have seen the lake mix fully. The result was a consistent phosphorus concentration of about 25 µg/L top to bottom in the south basin. This shows that if the lake were to mix in late summer, the phosphorus values would increase immensely and likely grow much more algae. Since mixing took place so late, no algae could grow in response. Further, it appears that the phosphorus settles out over winter to result in lower values in the spring/summer.