BALCH POND

2021 SAMPLING HIGHLIGHTS

Station –Deep

Wakefield, NH & Acton and Newfield ME

Extension

Station Deep (Figure 6) was used as a reference point to represent the overall Balch Pond water quality. With the exception of the dissolved oxygen measurements, that are measured near the lake bottom, the water quality data displayed in Tables 1, 2 and 3 are surface water measurements.

Blue = Oligotrophic

Yellow = Mesotrophic

Red = Eutrophic

Gray = No Data

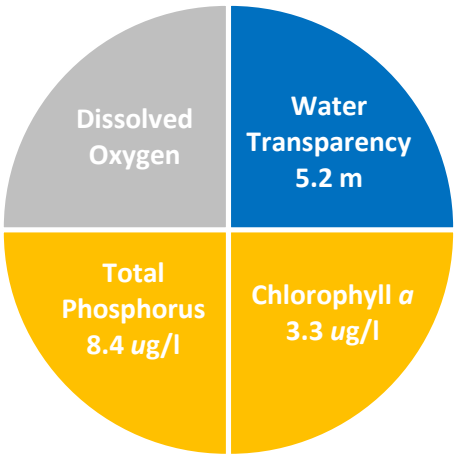


Figure 1. Balch Pond Water Quality (2021)

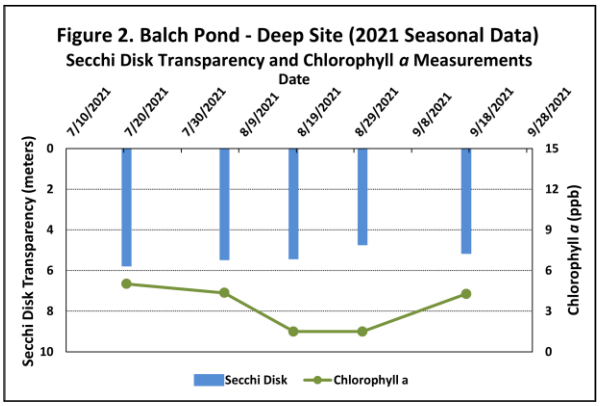
Table 1. 2021 Balch Pond Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic	Mesotrophic	Eutrophic	Balch Pond Average (range)	Balch Pond Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	**5.2** meters (4.7 – 5.7)	Oligotrophic
Chlorophyll *a* [1] (*ug*/l)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	**3.3** *ug*/l (1.5 – 5.0)	Mesotrophic
Total Phosphorus [1] (*ug*/l)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	**8.4** *ug*/l (7.1 – 9.3)	Mesotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	Not assessed *	Not assessed

* Late season dissolved oxygen data, the basis for classification, were not collected during the summer of 2021.

Table 2. 2021 Balch Pond Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Balch Pond Average (range)	Balch Pond Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**35.3** color units (range: 20.8 – 42.3)	Lightly tea colored
Alkalinity (mg/L)	< 0.0 acidified	0.1 – 2.0 extremely vulnerable	2.1 – 10 moderately vulnerable	10.1 – 25.0 low vulnerability	> 25.0 not vulnerable	No Data	Not Assessed
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			No Data	Not Assessed
Specific Conductivity (*u*S/cm)	< 50 *u*S/cm Characteristic of minimally impacted NH lakes		50-100 *u*S/cm Lakes with some human influence	> 100 *u*S/cm Characteristic of lakes experiencing human disturbances		**76.4** *u*S/cm (single value)	Characteristic of lakes with some human influence



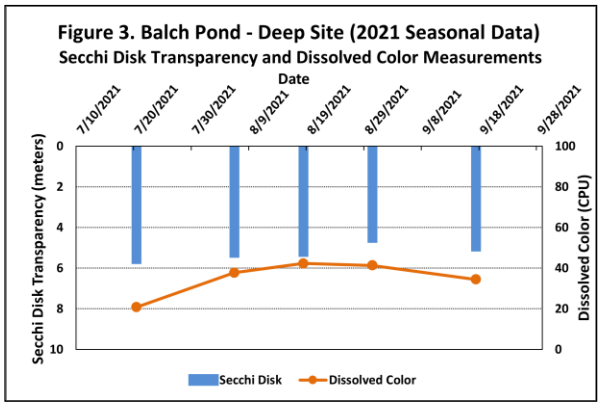


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* concentrations and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations.

Table 3. Wakefield New Hampshire inter-lake comparison (2021 Data)

Lake	Average (range) Secchi Disk Transparency (meters)	Average (range) Chlorophyll *a* (ppb)	Average (range) Total Phosphorus (ppb)	Average (range) Dissolved Color (CPU)	Average (range) Dissolved Oxygen (mg/l)
Balch Pond	5.2 meters (range: 4.7 – 5.7)	3.3 *ug*/l (range: 1.5 – 5.0)	8.4 *ug*/l (range: 7.1 – 9.3)	35.3 CPU (range: 20.8 – 42.3)	Not Assessed
Belleau Lake	1.9 meters (range: 1.5 – 2.2)	6.1 *ug*/l (range: 5.5 – 6.6)	14.0 *ug*/l (range: 12.4 – 16.1)	64.0 CPU (range: 47.0 – 75.3)	------
Great East Lake	10.2 meters (range: 9.5 – 10.9)	1.5 *ug*/l (range: 1.1 – 1.7)	3.8 *ug*/l (range: 3.2 – 4.7)	9.1 CPU (range: 7.5 – 10.7)	6.0 mg/l (range: 3.5 – 9.4)
Lake Ivanhoe	4.2 meters (range: 3.6 – 4.7)	5.0 *ug*/l (range: 4.5 – 5.4)	8.2 *ug*/l (range: 7.5 – 8.6)	5.7 CPU (range: 5.2 – 6.7)	------
Lovell Lake	7.0 meters (range: 4.7 – 9.7)	2.9 *ug*/l (range: 1.8 – 6.3)	7.2 *ug*/l (range: 5.7 – 8.5)	9.8 CPU (range: 7.6 – 11.7)	1.9 mg/l (range: 0.2 – 5.5)
Pine River Pond	5.7 meters (range: 5.0 – 6.2)	3.1 *ug*/l (range: 2.7 – 3.6)	6.5 *ug*/l (range: 5.2 – 7.3)	17.9 CPU (range: 13.9 – 20.6)	0.2 mg/l (range: 0.1 – 1.1)
Province Lake	3.6 meters (range: 3.0 – 4.9)	3.2 *ug*/l (range: 2.6 – 4.0)	15.2 *ug*/l (range: 11.9 – 17.3)	25.6 CPU (range: 22.7 – 30.7)	------

- Water quality data are reported for a deep reference sampling location in each lake/pond.
- Dissolved oxygen measurements were collected late in the season (late August/early September) in the bottom water layer (hypolimnion or metalimnion).
- ------ Indicates the site is too shallow to form a stable deep water layer (hypolimnion or metalimnion) during the summer months.

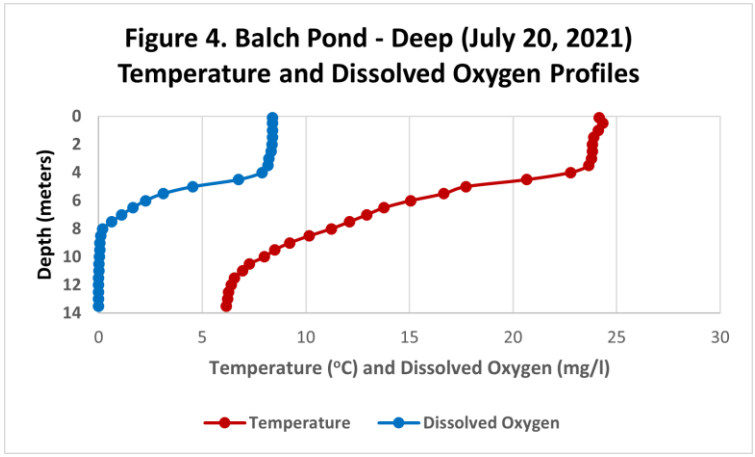


Figure 4. Balch Pond - Deep (July 20, 2021) Temperature and Dissolved Oxygen Profiles

Figure 4. Balch Pond temperature and dissolved oxygen profiles collected on July 20, 2021. *Notice the reduced dissolved oxygen concentrations near the lake bottom.*

Figure 5. Balch Pond surface water total phosphorus inter-site comparison. Notice the difference in total phosphorus concentrations among sampling locations

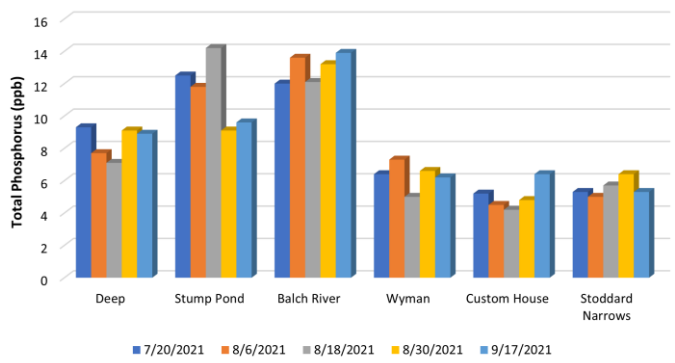


Figure 5. Balch Pond - 2021 Bi-weekly Total Phosphorus Concentrations

Recommendations

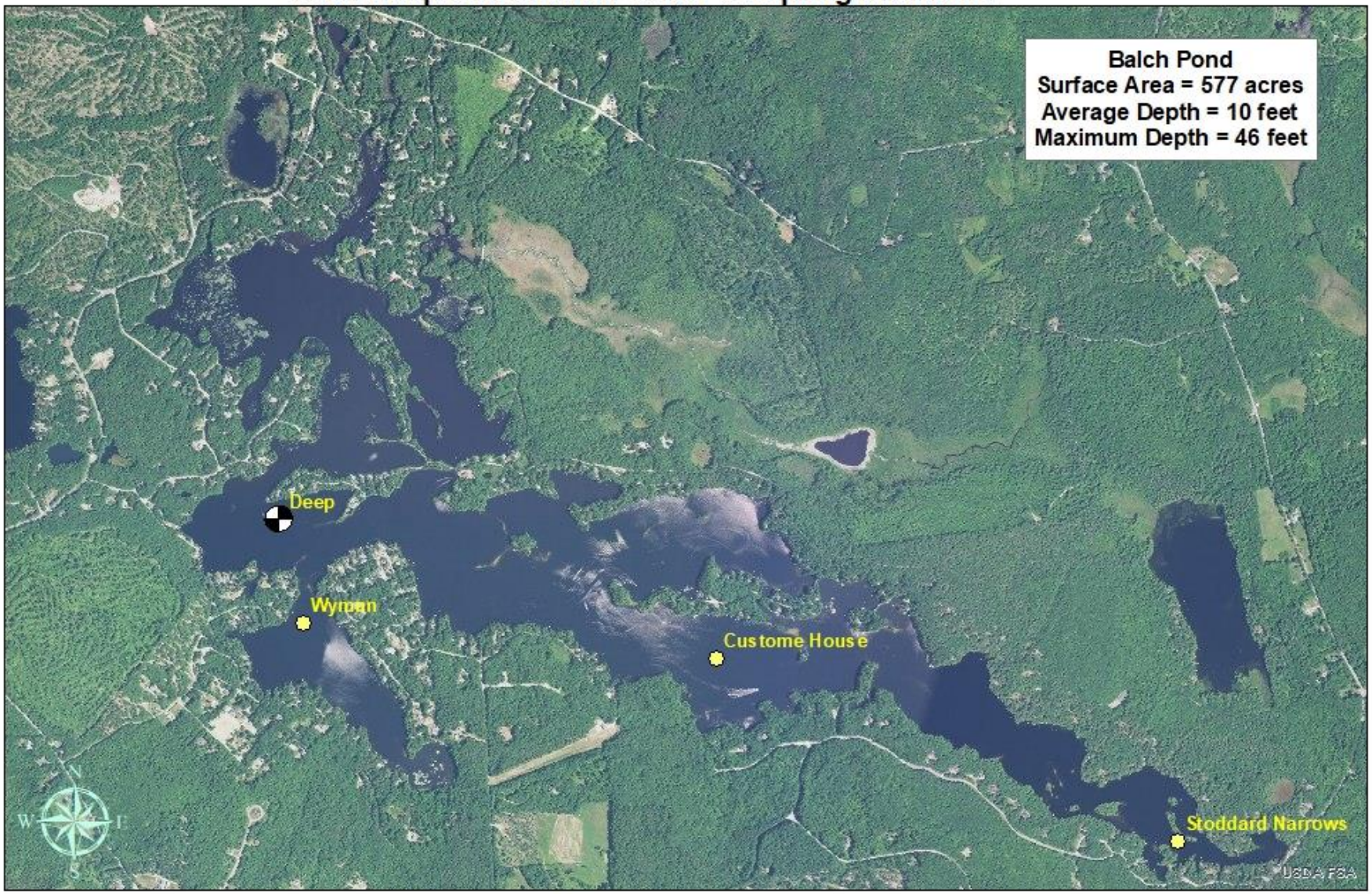
Implement Best Management Practices within the Balch Pond watershed to minimize the adverse impacts of polluted runoff and erosion into Balch Pond. Refer to "Landscaping at the Water's Edge: An Ecological Approach" and "New Hampshire Homeowner's Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home" for more information on how to reduce nutrient loading caused by overland run-off. The Acton Wakefield Watersheds Alliance also offers technical assistance to help design and implement erosion control projects that protect and improve the water quality

- https://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/homeowner-guide-stormwater.pdf
- https://awwatersheds.org/healthy-lakes/conservation-practices-for-homeowners/

Figure 6. Balch Pond

Acton & Newfield, ME and Wakefield, NH

2021 deep and shallow-water sampling locations



Aerial Orthophoto Source: Maine Office of GIS, National Agriculture Imagery Program 2015 Maine
GPS Coordinates collected by the UNH Center for Freshwater Biology

NH Extension