

CRYSTAL LAKE

2018 SAMPLING HIGHLIGHTS

Station – 1 Deep

Enfield, NH



Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

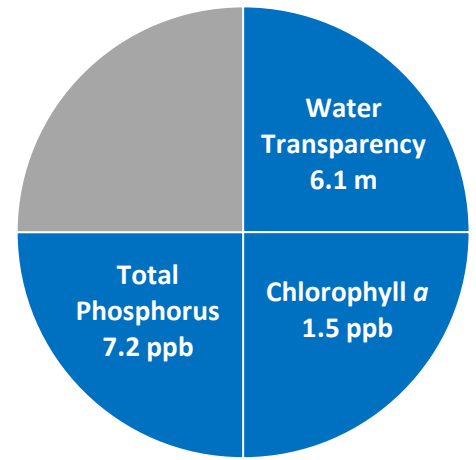


Figure 1. Crystal Lake Water Quality (2018)

Station 1 Deep was used as a reference point to represent the overall Crystal Lake water quality. Water quality data displayed in Tables 1 and 2 are surface water measurements.

Table 1. 2018 Crystal Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria¹

| Parameter | Oligotrophic "Excellent" | Mesotrophic "Fair" | Eutrophic "Poor" | Crystal Lake Average (range) | Crystal Lake Classification |
|---|--------------------------|--------------------|------------------|------------------------------|-----------------------------|
| Water Clarity (meters) | 4.0 – 7.0 | 2.5 - 4.0 | < 2.5 | 6.1 meters (5.0 – 7.3) | Oligotrophic |
| Chlorophyll <i>a</i> ¹ (ppb) | < 3.3 | > 3.3 – 5.0 | > 5.0 – 11.0 | 1.5 ppb (0.9 – 2.2) | Oligotrophic |
| Total Phosphorus ¹ (ppb) | < 8.0 | > 8.0 – 12.0 | > 12.0 – 28.0 | 7.2 ppb (6.4 – 7.7) | Oligotrophic |

Table 2. 2018 Crystal Lake Seasonal Average Accessory Water Quality Measurements

| Parameter | Assessment Criteria | | | | | Crystal Lake Average (range) | Crystal Lake Classification |
|---------------------|---------------------|--------------------------------|--------------------------------|-------------------------------|-----------------------|---------------------------------------|-----------------------------|
| Color (color units) | < 10 uncolored | 10 – 20 slightly colored | 20 – 40 lightly tea colored | 40 – 80 tea colored | > 80 highly colored | 22.2 color units (range: 15.4 – 28.0) | 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 | 8.2 mg/L (range: 7.8 – 8.8) | Moderately vulnerable |

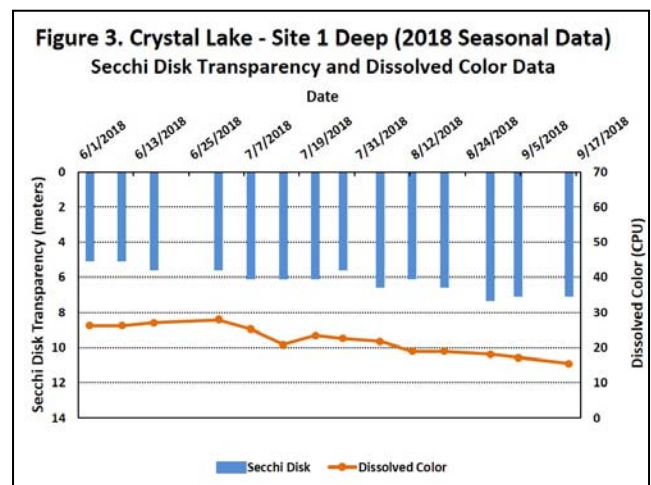
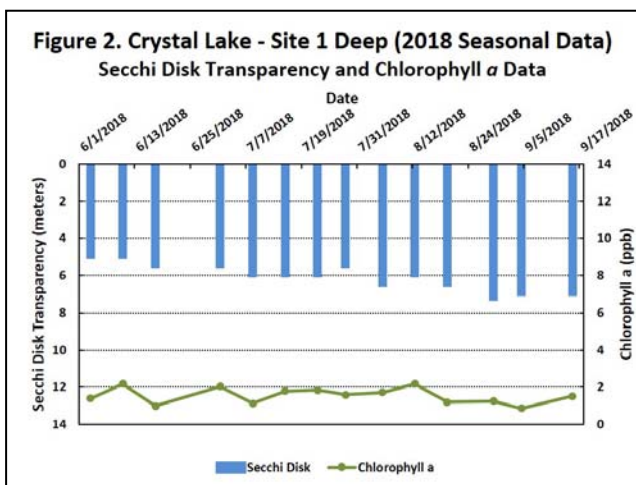


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* concentrations and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* concentrations and dissolved color concentrations. Shallower water transparency measurements oftentimes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

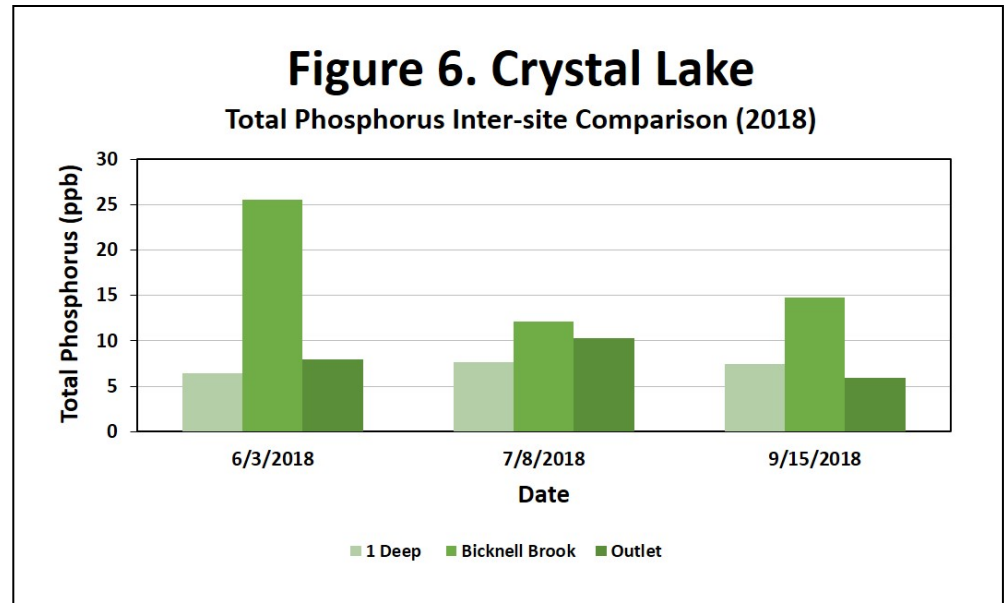
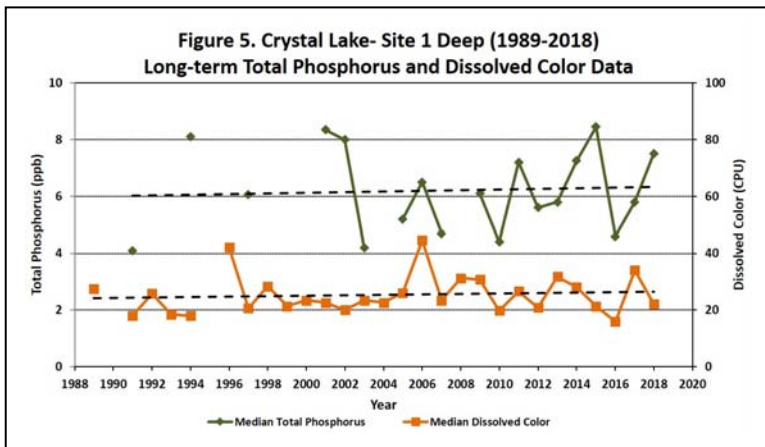
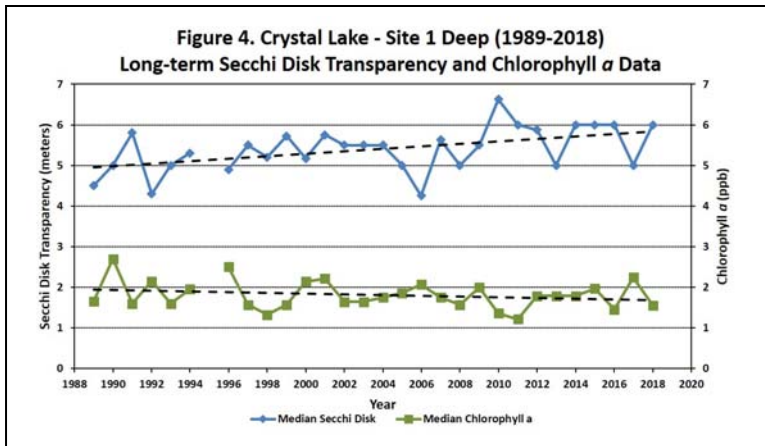
LONG-TERM TRENDS

WATER CLARITY: The Crystal Lake water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity since 1989 (Figure 4).

CHLOROPHYLL: The Crystal Lake chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of decreasing concentrations since 1989 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Crystal Lake total phosphorus concentrations have oscillated among years while the long-term trend is stable (Figure 5).

COLOR: The Crystal Lake color data, the result of naturally occurring “tea” color substances from the breakdown of soils and plant materials, have oscillated among years while the long-term trend is stable (Figure 5).



Figures 4 and 5. Long-term changes in the Crystal Lake water clarity (Secchi Disk depth), chlorophyll *a*, water color and total phosphorus concentrations measured between 1989 and 2018. **These data illustrate the relationship among plant growth, water color and water clarity. Total phosphorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Long-term trends are based on the analysis of annual median values.

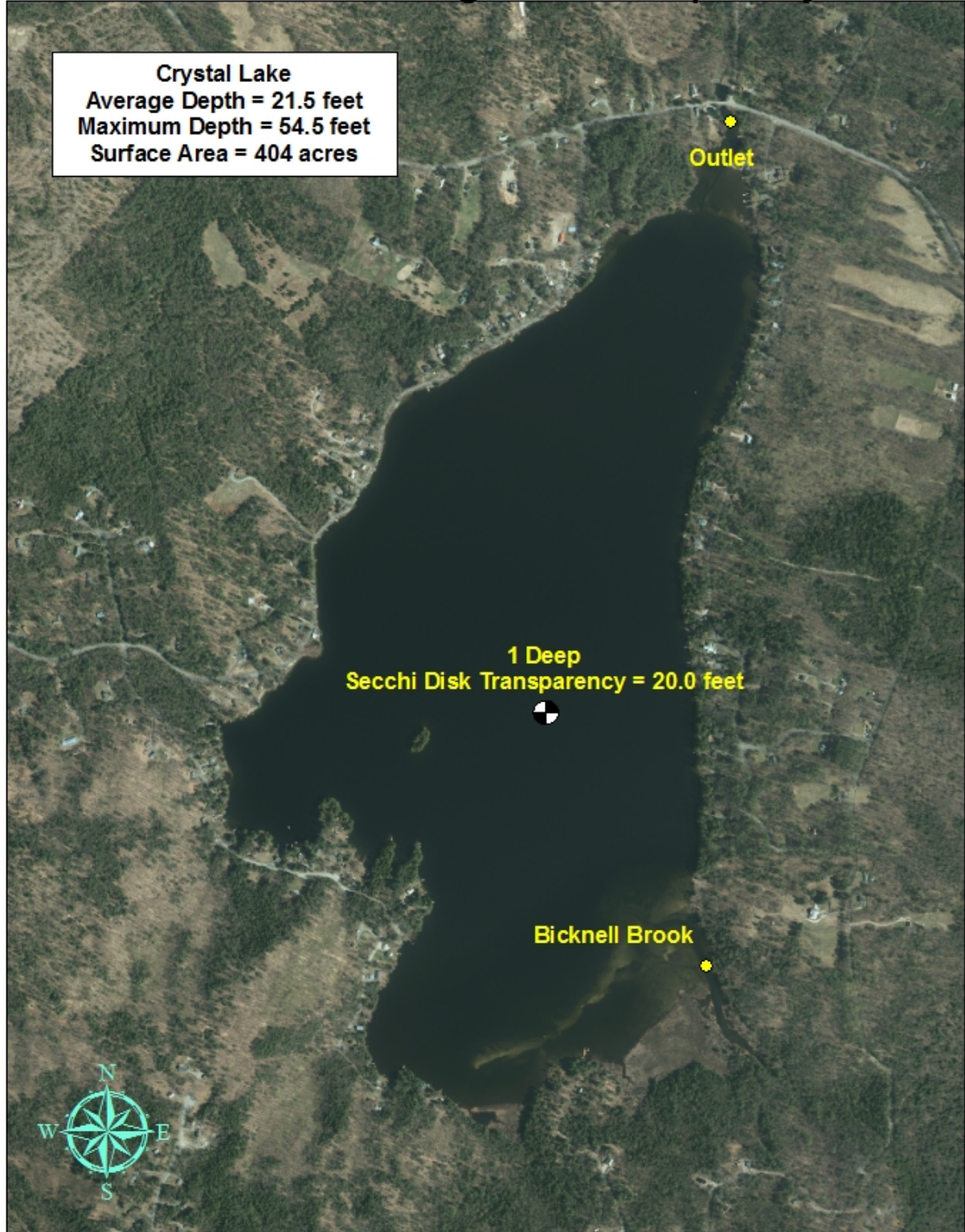
Figure 6. Inter-site comparison of the Crystal Lake Site 1 Deep, Bicknell Brook, and Outlet surface water total phosphorus concentrations. The inter-site comparison data provide insight into the variability among the three Crystal Lake sampling locations.

Recommendations

Implement Best Management Practices within the Crystal Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Crystal Lake. 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.

- https://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- <https://www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>

Figure 7. Crystal Lake (Enfield, NH)
2018 Deep and nearshore sampling locations
and seasonal average water transparency



0 0.15 0.3 0.45 0.6 Miles

Aerial Orthophoto Source: NH GRANIT
Site location GPS coordinates collected by the UNH Center for Freshwater Biology



Extension

