

LAKE KANASATKA

2018 SAMPLING HIGHLIGHTS

Station – 1 Deep

Moultonborough, NH



Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

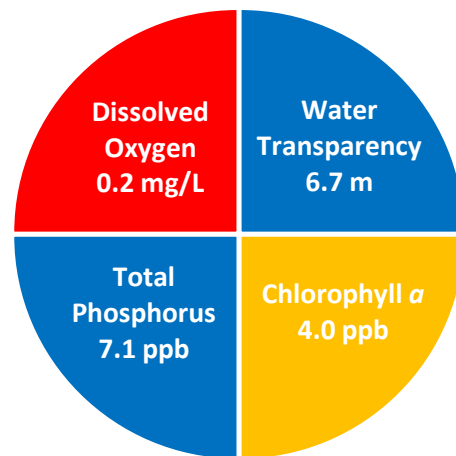


Figure 1. Lake Kanasatka Water Quality (2018)

Station 1 Deep (Figure 7) was used as a reference point to represent the overall Lake Kanasatka water quality. Water quality data displayed in Tables 1, 2 and 3 are surface water measurements with the exception of the dissolved oxygen data that were measured near the lake bottom.

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

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Lake Kanasatka – 1 Deep Average (range)	Lake Kanasatka – 1 Deep Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	6.7 meters (6.4 – 6.8)	Oligotrophic
Chlorophyll a ¹ (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	4.0 ppb (3.3 – 4.8)	Mesotrophic
Total Phosphorus ¹ (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	7.1 ppb (single sample)	Oligotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	0.2 mg/L (0.2 – 0.2)	Eutrophic

* Dissolved oxygen concentrations were measured on August 13, 2018 between 12.0 and 13.0 meters, in the bottom waters.

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

Parameter	Assessment Criteria					Lake Kanasatka – 1 Deep Average (range)	Lake Kanasatka – 1 Deep Classification
	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored		
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	10.1 color units (range: 8.9 – 10.8)	Slightly 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	13.7 mg/L (single sample)	Low vulnerability
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			7.5 standard units (range: 7.5 – 7.5)	Optimal range for fish growth and reproduction
Specific Conductivity (uS/cm)	< 50 uS/cm Characteristic of minimally impacted NH lakes		50-100 uS/cm Lakes with some human influence	> 100 uS/cm Characteristic of lakes experiencing human disturbances		100.6 uS/cm (single sample)	Characteristic of lakes experiencing human disturbances

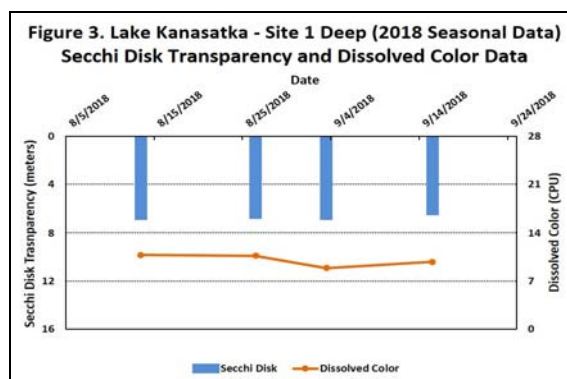
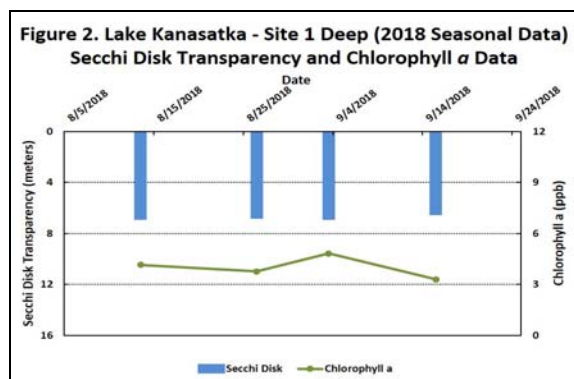


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll a concentrations and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll a and dissolved color. Shallower water transparency measurements oftentimes correspond to increases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

LONG-TERM TRENDS

WATER CLARITY: The Lake Kanasatka water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity over thirty-six years of water quality monitoring conducted between 1983 and 2018 (Figure 4).

CHLOROPHYLL: The Lake Kanasatka chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a relatively stable trend over thirty-four years of water quality monitoring conducted between 1983 and 2016 (Figure 4). However, elevated chlorophyll *a* concentrations have been measured over the past two sampling seasons (2017 and 2018).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Lake Kanasatka total phosphorus concentrations display a trend of increasing concentrations over thirty-three years of water quality monitoring conducted between 1985 and 2018 (Figure 5).

COLOR: The Lake Kanasatka color data, the result of naturally occurring “tea” color substances from the breakdown of soils and plant materials, display a trend of increasing concentrations over thirty-two years of water quality monitoring conducted between 1985 and 2018 (Figure 5).

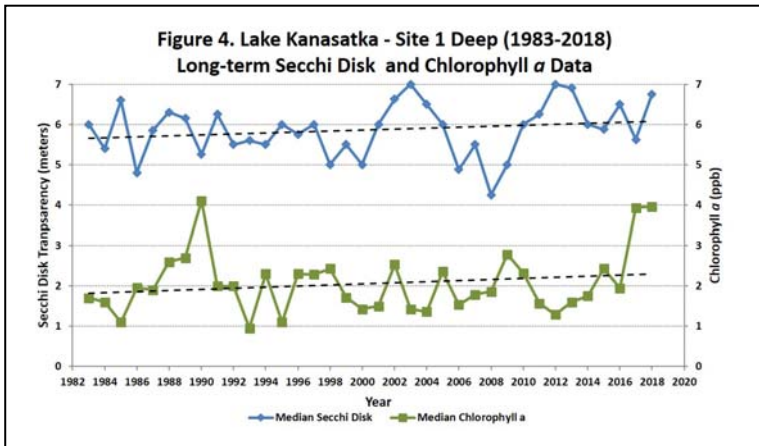
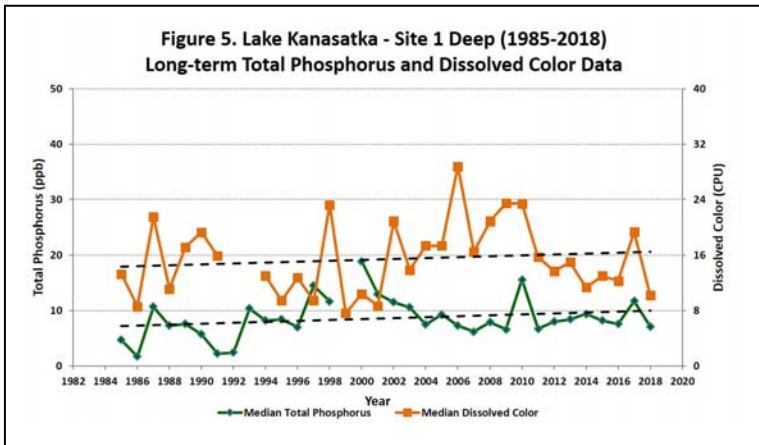


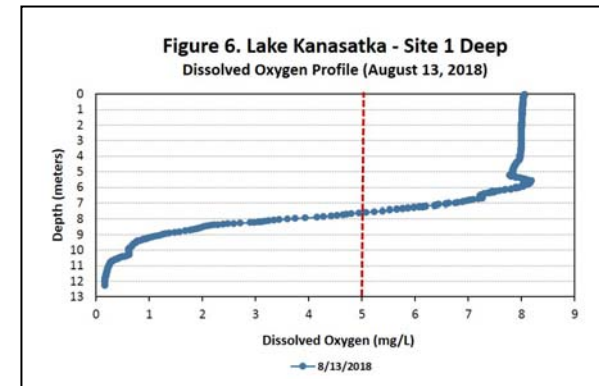
Table 3. Lake Kanasatka Seasonal Average Water Quality Inter-Site Comparison (2018)

Sampling Station	Average (range) Secchi Disk (meters)	Average (range) Total Phosphorus (ppb)	Average (range) Chlorophyll <i>a</i> (ppb)	Average (range) Dissolved Color (CPU)
1 Deep	6.7 m (range: 6.4 – 6.8)	7.1 ppb (single sample)	4.0 ppb (range: 3.3 – 4.8)	10.1 CPU (range: 8.9 – 10.8)
2 Animal	5.5 m (range: 3.9 – 6.8)	8.3 ppb (single sample)	3.6 ppb (range: 1.1 – 5.0)	15.7 CPU (range: 10.8 – 17.3)
3 West	5.5 m (range: 4.1 – 6.7)	10.1 ppb (single sample)	2.8 ppb (range: 0.6 – 9.8)	12.1 CPU (range: 9.9 – 15.2)



Figures 4 and 5. Changes in the Lake Kanasatka water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1983 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. Lake Kanasatka dissolved oxygen profile collected on August 13, 2018. The vertical red line indicates the dissolved oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish such as trout and salmon. *Notice the low dissolved oxygen concentrations near the lake bottom.*



Recommendations

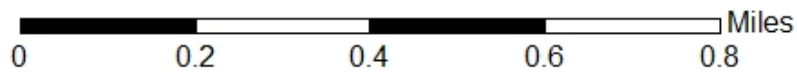
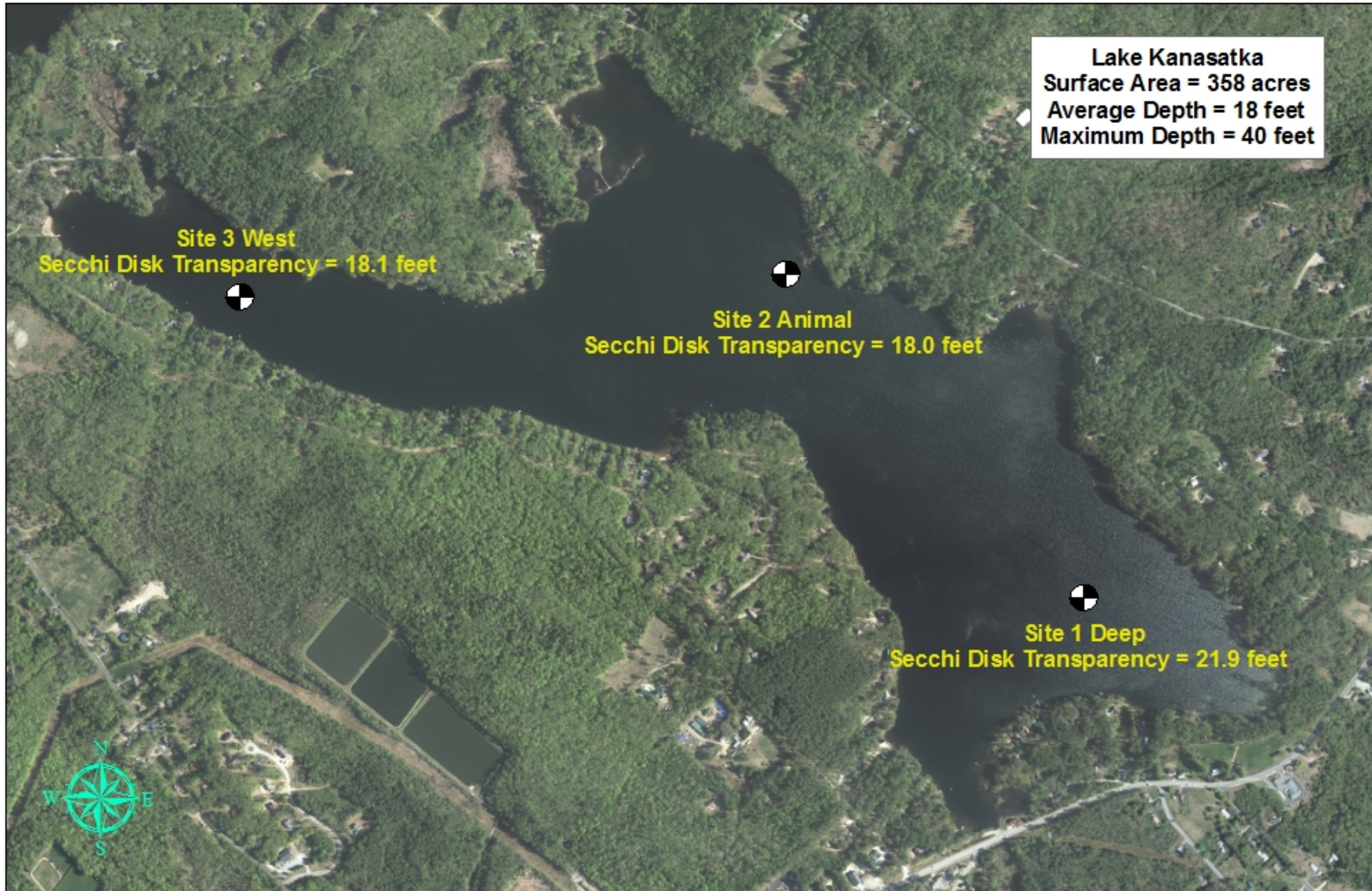
Implement Best Management Practices within the Lake Kanasatka watershed to minimize the adverse impacts of polluted runoff and erosion into Lake Kanasatka. Refer to “Landscaping at the Water’s Edge: An Ecological Approach” and “New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself 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. Lake Kanasatka

Moultonborough, NH

2018 Deep water sampling sites and seasonal average water transparency.



Aerial Orthophoto Source: NH GRANIT
GPS Coordinates collected by the UNH Center for Freshwater Biology



Extension

