DOWNING POND

2019 SAMPLING HIGHLIGHTS

Station – 8 Deep

New Durham, NH

Extension

Station 8 Deep (Figure 5) was used as a reference point to represent the overall Downing Pond water quality. With the exception of the dissolved oxygen measurements, the water quality data displayed in Tables 1, 2 and 3 are surface water measurements.

Blue = Oligotrophic

Yellow = Mesotrophic

Red = Eutrophic

Gray = No Data

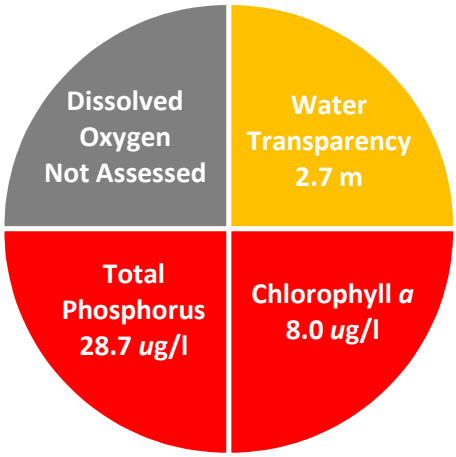


Figure 1. Downing Pond Water Quality (2019)

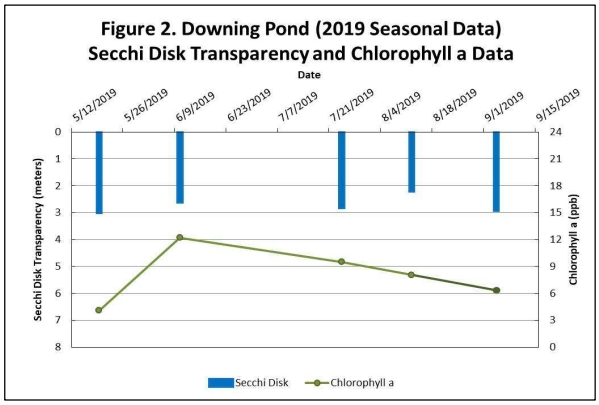
Table 1. 2019 Downing Pond Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic	Mesotrophic	Eutrophic	Downing Pond Average (range)	Downing Pond Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	2.7 meters (2.2 – 3.0)	Mesotrophic
Chlorophyll *a* [1] (*ug*/l)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	8.0 *ug*/l (4.1 – 12.2)	Eutrophic
Total Phosphorus [1] (*ug*/l)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	28.7 *ug*/l (19.0 – 37.4)	Eutrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	Not Assessed	Not Assessed

* Downing Pond did not develop a stable mid or deep water layer upon which the dissolved oxygen level is assessed.

Table 2. 2019 Downing Pond Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Downing Pond Average (range)	Downing Pond Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	35.2 color units (range: 25.7 – 41.1)	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	7.0 mg/L (range: 6.3 – 7.7)	Moderately vulnerable
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			7.0 standard units (range: 6.8 – 7.2)	Optimal range for fish growth and reproduction
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		54.5 *u*S/cm (range: 53.8 – 54.9)	Characteristic of lakes with some human influence



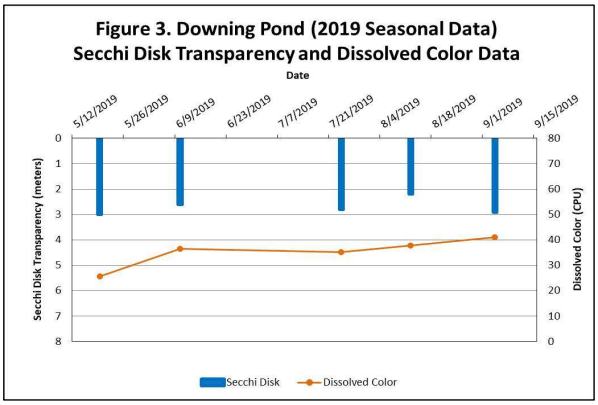


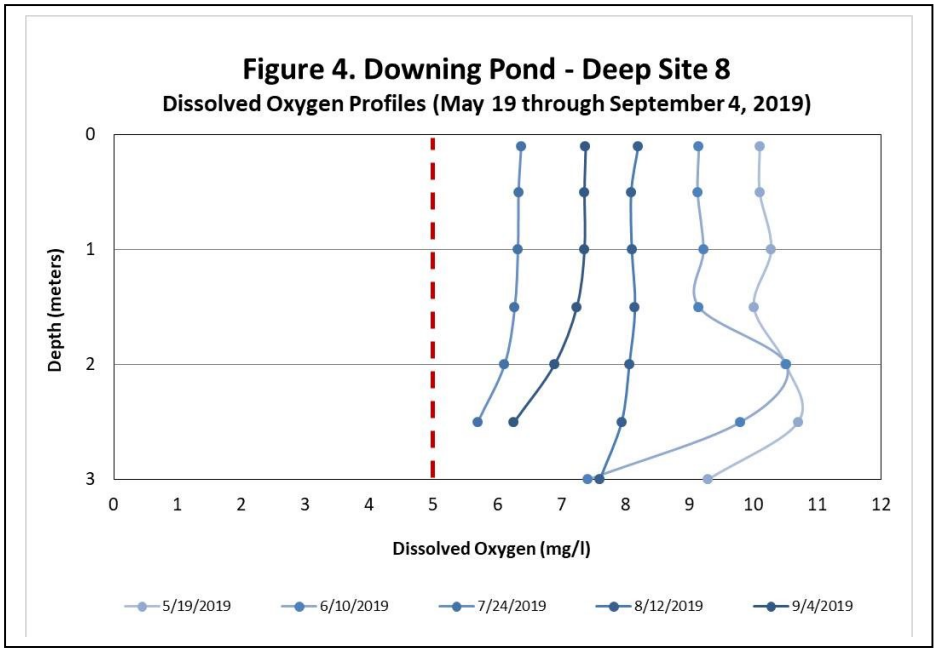
Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* concentrations and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *a* and/or color concentrations. *Note: some Downing Pond Secchi Disk transparency measurements reached the lake bottom before disappearing from view and thus may underestimate the water clarity among sampling dates.*

Table 3. Merrymeeting River watershed inter-lake comparison (2019 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)
Merrymeeting Lake	10.2 meters (range: 8.2 – 12.5)	0.7 *ug*/l (range: 0.1 – 1.0)	3.7 *ug*/l (range: 2.6 – 6.5)	4.2 CPU (range: 1.4 – 7.4)	10.9 mg/l (range: 8.7 – 12.2)
Marsh Pond	2.8 meters (range: 2.1 – 3.6)	14.2 *ug*/l (range: 4.8 – 24.6)	48.4 *ug*/l (range: 19.8 – 80.8)	19.3 CPU (range: 12.7 – 22.2)	2.0 mg/l (range: 0.0 – 4.7)
Jones Pond	2.7 meters (range: 2.1 – 3.5)	10.5 *ug*/l (range: 4.0 – 13.8)	29.0 *ug*/l (range: 18.2 – 34.8)	29.6 CPU (range: 24.3 – 35.6)	0.2 mg/l (range: 0.0 – 0.3)
Downing Pond	2.7 meters (range: 2.2 – 3.0)	8.0 *ug*/l (range: 4.1 – 12.2)	28.7 *ug*/l (range: 19.0 – 37.4)	35.2 CPU (range: 25.7 – 41.1)	------

- Water quality data are reported for a deep reference sampling location in each lake/pond.
- Dissolved oxygen measurements were collected in the summer (mid to late July) in the bottom water layer (hypolimnion or metalimnion).
- Downing Pond Secchi Disk transparency measurements intermittently reached the lake bottom before disappearing from view and likely underestimate the water transparency.
- ------ Indicates the site is too shallow to form a stable deep water layer (hypolimnion or metalimnion) during the summer months.

Figure 4. Downing Pond dissolved oxygen profile collected between May 19 and September 4, 2019. The vertical red line indicates the oxygen concentration commonly considered the threshold for successful growth and reproduction of warm water fish such as bass and perch.



Recommendations

Review the "Merrymeeting Lake & River Watershed Management Plan" that provides background information and offers potential solutions to existing water quality problems. Homeowners within the Downing Pond watershed should consider implementing Best Management Practices to minimize the adverse impacts of polluted runoff and erosion on Downing Pond. Homeowners can 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". Both self-help documents offer relatively simple solutions to reduce nutrient loading caused by overland run-off.

- https://www.newdurhamnh.us/home/news/merrymeeting-lake-river-watershed-management-plan
- 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 5. Downing Pond

New Durham, NH

2018 Deep water sampling site

Disclaimer: Due to the COVID-19 pandemic, access to University files needed to update this image are limited. Thus, the 2018 map was used. The sampling locations, average depth, maximum depth and surface area are accurately depicted. However, the year and seasonal average water transparency have not been updated. Once full University resources become available this map will be updated.

The information in the first two pages of this report reflects the 2019 conditions and is final.

Aerial Orthophoto Source: NH GRANIT

GPS Coordinates collected by the UNH Center for Freshwater Biology

NH Extension