MERRYMEETING RIVER

2019 SAMPLING HIGHLIGHTS
Station – River Run
Alton, NH

NH | Extension

Station River Run (Figure 5) was used as a reference point to represent the condition of the Merrymeeting River as water discharged out of Merrymeeting Marsh near Route 28. 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
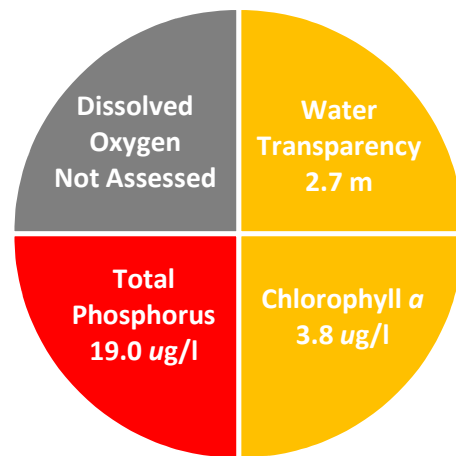
Yellow = Mesotrophic

Red = Eutrophic

Gray = No Data

Figure 1. River Run Water Quality (2019)

Dissolved Oxygen Not Assessed | Water Transparency 2.7 m | Total Phosphorus 19.0 ug/l | Chlorophyll *a* 3.8 ug/l

Table 1. 2019 River Run Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

Parameter	Oligotrophic	Mesotrophic	Eutrophic	River Run Average (range)	River Run Classification
Water Clarity (meters)	**4.0 – 7.0**	**2.5 - 4.0**	**< 2.5**	**2.7** meters (2.5 – 3.0)	**Mesotrophic**
Chlorophyll *a*[1] (ug/l)	**< 3.3**	**> 3.3 – 5.0**	**> 5.0 – 11.0**	**3.8** ug/l (2.5 – 5.0)	**Mesotrophic**
Total Phosphorus[1] (ug/l)	**< 8.0**	**> 8.0 – 12.0**	**> 12.0 – 28.0**	**19.0** ug/l (11.0 – 25.0)	**Eutrophic**
Dissolved Oxygen (mg/L)	**5.0 – 7.0**	**2.0 – 5.0**	**<2.0**	**Not Assessed**	**Not Assessed**

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

Table 2. 2019 River Run Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					River Run Average (range)	River Run Classification
Color (color units)	**< 10 uncolored**	**10 – 20 slightly colored**	**20 – 40 lightly tea colored**	**40 – 80 tea colored**	**> 80 highly colored**	**61.9** color units (range: 31.7 – 81.2)	**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**	**8.1** mg/L (range: 7.4 – 9.2)	**Moderately vulnerable**
pH (std units)	**< 5.5 suboptimal for successful growth and reproduction**		**6.5 – 9.0 optimal range for fish growth and reproduction**			**6.4** standard units (range: 6.0 – 6.6)	**acceptible 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**		**67.9** uS/cm (range: 66.0 – 69.3)	**Characteristic of lakes with some human influence**

Figure 2. MM River- River Run (2019 Seasonal Data) Secchi Disk Transparency and Chlorophyll a Data

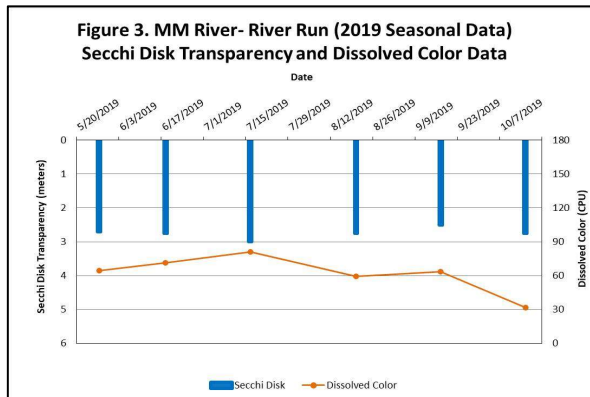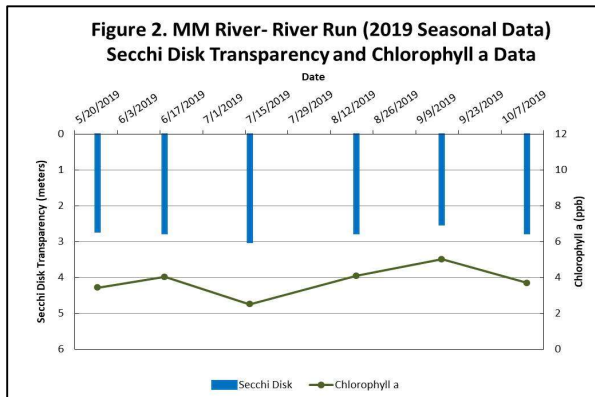**Figure 3. MM River- River Run (2019 Seasonal Data) Secchi Disk Transparency and Dissolved Color Data**

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: most River Run Secchi Disk transparency measurements reached the lake bottom before disappearing from view and likely underestimate the water clarity.*

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)	------
MM River – River Run	2.7 meters (range: 2.5 – 3.0)	3.8 *ug*/l (range: 2.5 – 5.0)	19.0 *ug*/l (range: 11.0 – 25.0)	61.9 CPU (range: 31.7 – 81.2)	------
Wentworth Pond	2.7 meters (range: 2.0 – 3.5)	5.5 *ug*/l (range: 4.0 – 7.5)	19.6 *ug*/l (range: 11.8 – 26.0)	66.1 CPU (range: 22.6 – 87.6)	0.3 mg/l (range: 0.1 – 0.6)

- 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 and River Run 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. Merrymeeting River, Site River Run, dissolved oxygen profiles collected between May 27 and October 15, 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. *Notice the low dissolved oxygen concentrations that were documented on July 16 and August 20, 2019.*

Figure 4. Merrymeeting River - Site River Run
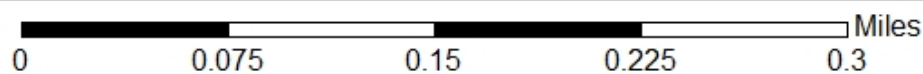Dissolved Oxygen Profiles (May 27 through October 15, 2019)
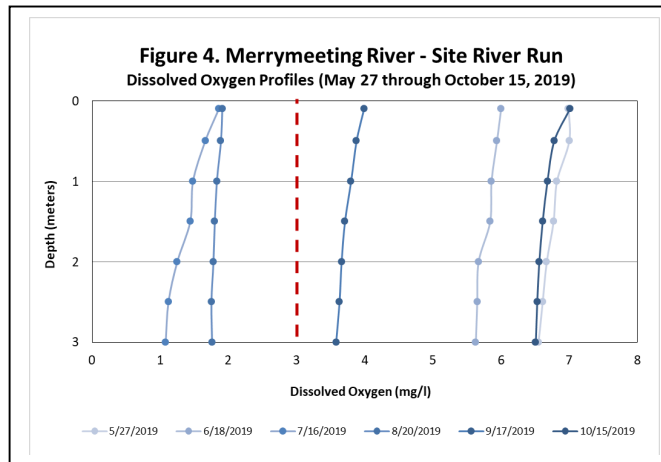
Recommendations

Review the "Merrymeeting Lake & River Watershed Management Plan" that provides background information and offers potential solutions to existing water quality problems. Homeowners within the Merrymeeting River watershed should consider implementing Best Management Practices to minimize the adverse impacts of polluted runoff and erosion on the Merrymeeting River. 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

Inset map labels: Merrymeeting Lake, Marsh Pond, Jones Pond, Downing Pond

Downing Pond
Surface Area = 52.9 acres
Average Depth = 3.0 feet
Maximum Depth = 11.5 feet

Downing Pond
Deep Site

Disclaimer: Due to the COVID-19 pandemic, access to University files needed to update this image are limited; the image currently illustrates the upstream Downing Pond sampling location. Once full University resources become available this map will be updated to illustrate the River Run Sampling location.

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

Miles
0   0.075   0.15   0.225   0.3

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

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