

NEWFOUND LAKE

2019 SAMPLING HIGHLIGHTS

Black Brook Subwatershed



Blue = Excellent

Yellow = Fair

Red = Poor

Light Gray = No Data

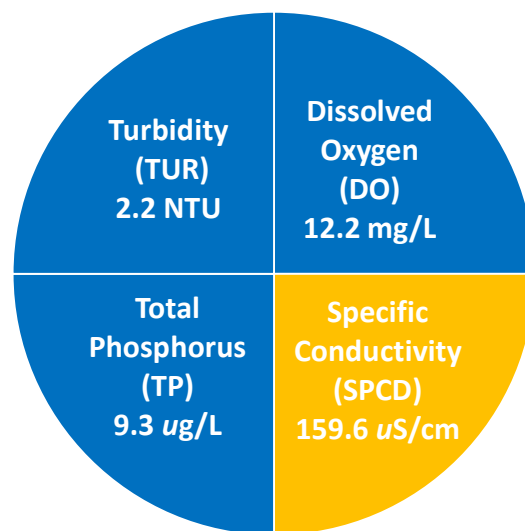


Figure 1. Black Brook Subwatershed Average Water Quality (2019)

Table 1. 2019 Black Brook Subwatershed Seasonal Average Water Quality Measurements.

Parameter	Assessment Criteria					Black Brook Subwatershed Average (range)	Black Brook Subwatershed Classification
Turbidity * (NTU)	< 0 - 5.0 Desirable	6 - 10 Low Impact	11 - 50 Moderate impact	51 - 100 Moderate - high impact	> 101 High impact	2.2 NTU (range: 0.3 - 7.5)	Desirable
pH (standard units)	< 5.5 suboptimal for successful fish growth and reproduction		5.5 - 6.5 sufficient for successful fish growth and reproduction		6.5 - 8.5 optimal range for fish growth and reproduction	6.4 standard units (range: 6.3 - 6.8)	Sufficient for successful fish growth and reproduction
Dissolved Oxygen (mg/L)	< 5 Suboptimal for successful brook trout growth and survival		> 5 Typically sufficient for successful brook trout growth and survival			12.2 mg/L (range: 6.8 - 14.7)	Typically sufficient for successful brook trout growth and survival
Specific * Conductivity (uS/cm)	0 - 100 Normal	101 - 200 Low Impact	201 - 500 Moderate Impact	> 501 High Impact		159.6 uS/cm (range: 43.0 - 474.6)	Low Impact
Total * Phosphorus (ug/L)	< 10 ug/L Ideal	11 - 25 Average	26.0 - 50.0 More than desirable	> 51 Excessive		9.3 ug/L (range: 8.2 - 11.9)	Ideal

* Water quality assessment criteria are provided by the New Hampshire Department of Environmental Services for general guidance only. Natural variations among rivers and streams will occur and should be considered when interpreting the water quality data.

Table 2. 2019 Black Brook Subwatershed Seasonal Average Water Quality Inter-comparison among Sampling Stations.

Site ID *	Average Turbidity (NTU)	Average Specific Conductivity (uS/cm)	Average Total Phosphorus (ug/L)	Average Dissolved Oxygen (mg/L)	Average pH (standard units)
BB H23	4.0	276.3	10.3	9.6	6.5
BB U10	0.3	43.0	8.2	14.7	6.3

* Refer to Figure 4 for a map of the sampling locations.

Black Brook Subwatershed Highlights

The Black Brook subwatershed is the eighth largest stream drainage network that feeds into Newfound Lake. The 582-acre Black Brook subwatershed is monitored with two active sampling locations that include an upstream and a downstream location along Black Brook. Sampling locations were selected to characterize the overall water quality and to screen for potential problem areas within the Black Brook subwatershed.

The 2019 Black Brook water quality measurements generally indicate moderate to high water quality between the sampling sites. However, variations in average specific conductivity concentrations (a surrogate for salt runoff) between the sites are apparent (Figure 2). The 2019 specific conductivity concentrations were higher at the downstream sampling location, BB H-23, (Figure 2) and suggest increased salt loadings from overland and groundwater sources that include salted roadways, fertilized lawns and septic systems.

The 2019 average turbidity (suspended soil and other particles) and average total phosphorus (nutrient) concentrations were low in the Black Brook subwatershed (Figure 3). Dissolved oxygen concentrations remained sufficient to support successful fish growth and reproduction.

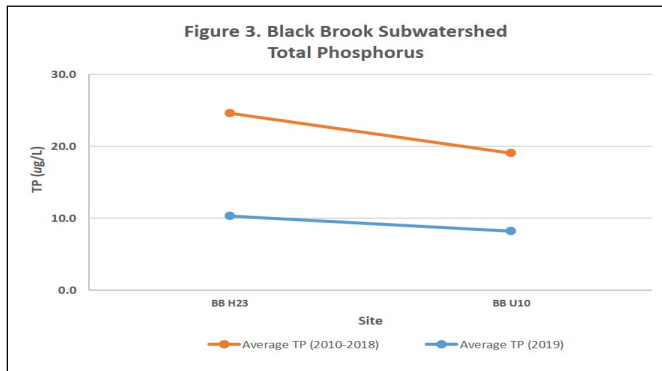
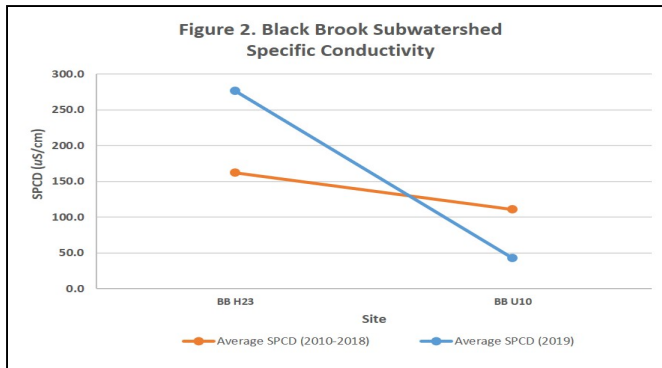


Table 3. Comparison of Seasonal Average Water Quality by Subwatershed (2019)

Subwatershed	Average * Turbidity (NTU)	Average * Specific Conductivity (µS/cm)	Average * Total Phosphorus (µg/L)	Average * Dissolved Oxygen (mg/L)	Average * pH (Standard Units)
Black Brook	2.2	159.6	9.3	12.2	6.4
Cockermouth River	0.5	39.9	4.9	11.8	6.4
Dick Brown Brook	0.9	40.2	7.7	10.5	6.6
Fowler River	0.6	29.3	7.7	10.9	6.3
Georges Brook	0.5	39.0	6.8	10.8	6.4
Hemlock Brook	0.4	36.7	5.4	10.8	6.8
Whittemore Brook	0.3	26.9	5.0	11.0	6.6
Tilton Brook	0.4	107.3	7.5	11.1	6.7

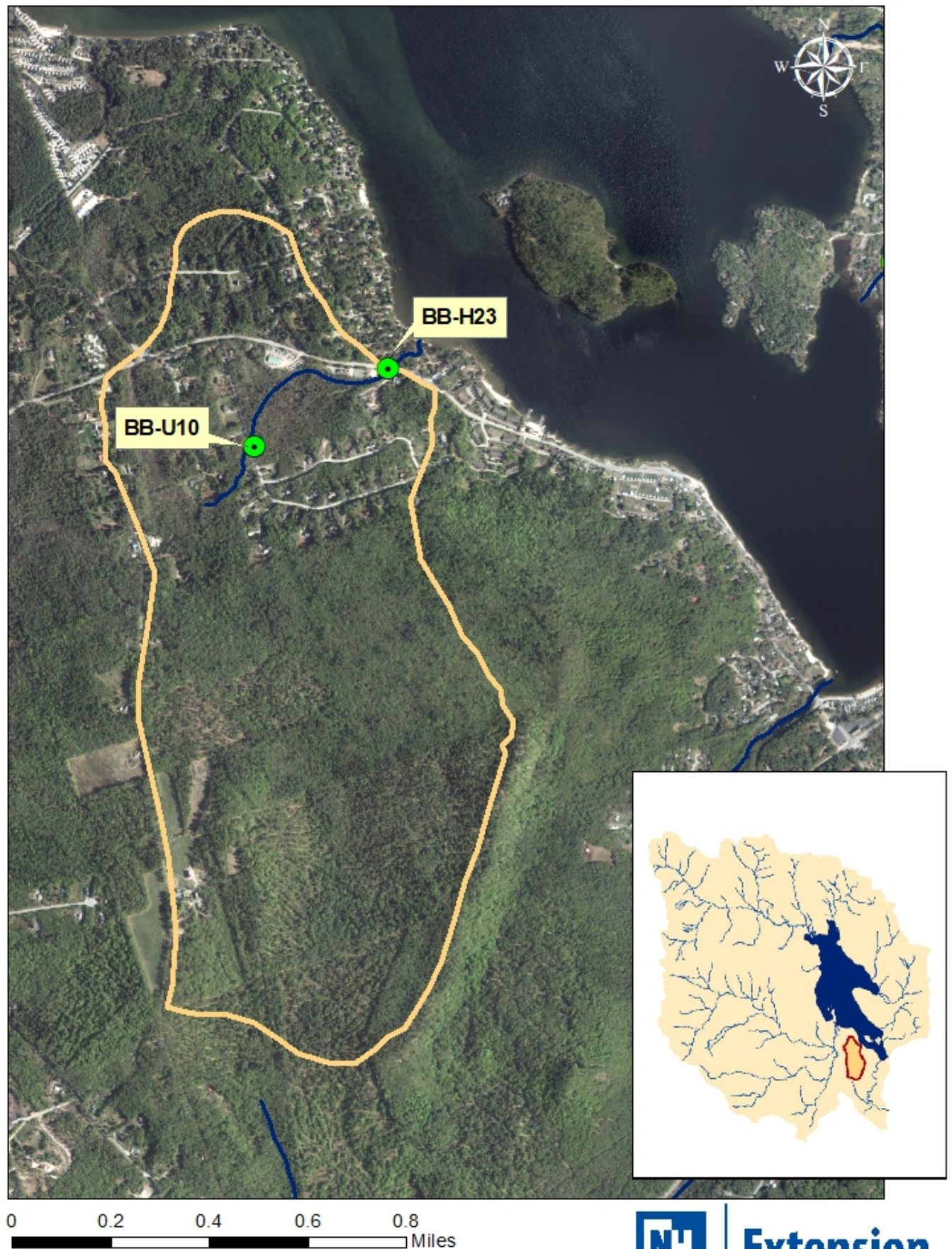
* The displayed water quality results are average values for all sampling locations within the respective subwatersheds.

Recommendations for Property Owners:

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

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

Figure 4.
2019 Sampling Highlights - Black Brook Subwatershed



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



Extension

NEWFOUND LAKE

2019 SAMPLING HIGHLIGHTS

Fowler River Subwatershed



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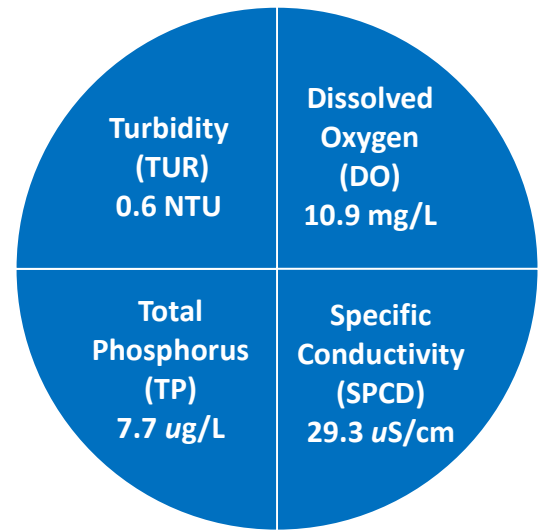


Figure 1. Fowler River Subwatershed Average Water Quality (2019)

Table 1. 2019 Fowler River Subwatershed Seasonal Average Water Quality Measurements.

Parameter	Assessment Criteria					Fowler River Subwatershed Average (range)	Fowler River Subwatershed Classification
Turbidity * (NTU)	< 0 - 5.0 Desirable	6 - 10 Low Impact	11 - 50 Moderate impact	51 - 100 Moderate - high impact	> 101 High impact	0.6 NTU (range: 0.2 - 1.7)	Desirable
pH (standard units)	< 5.5 suboptimal for successful fish growth and reproduction		5.5 - 6.5 sufficient for successful fish growth and reproduction		6.5 - 8.5 optimal range for fish growth and reproduction	6.3 standard units (range: 5.8 - 7.0)	Sufficient for successful fish growth and reproduction
Dissolved Oxygen (mg/L)	< 5 Suboptimal for successful brook trout growth and survival		> 5 Typically sufficient for successful brook trout growth and survival			10.9 mg/L (range: 5.9 - 14.0)	Typically sufficient for successful brook trout growth and survival
Specific * Conductivity (uS/cm)	0 - 100 Normal	101 - 200 Low Impact	201 - 500 Moderate Impact	> 501 High Impact		29.3 uS/cm (range: 10.3 - 77.0)	Normal
Total * Phosphorus (ug/L)	< 10 ug/L Ideal	11 - 25 Average	26.0 - 50.0 More than desirable	> 51 Excessive		7.7 ug/L (range: 2.7 - 28.1)	Ideal

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Table 2. 2019 Fowler River Subwatershed Seasonal Average Water Quality Inter-comparison among Sampling Stations.

Site ID *	Average Turbidity (NTU)	Average Specific Conductivity (uS/cm)	Average Total Phosphorus (ug/L)	Average Dissolved Oxygen (mg/L)	Average pH (standard units)
FR-H20	0.9	43.6	13.8	9.3	6.2
FR-H21	1.2	54.3	14.6	8.8	6.4
FR-H22	0.5	34.2	4.9	11.4	6.3
FR-U05	0.5	25.6	5.5	11.6	6.2
FR-U10	0.3	17.8	3.5	10.8	6.3
FR-U20	0.3	15.1	6.4	11.2	6.0
FR-U25	0.4	13.0	5.9	11.6	6.1
FR-U30	0.9	38.7	7.8	11.6	6.5
FR-U40	0.9	19.1	10.9	11.4	6.3
FR-U50	0.3	12.9	5.0	11.1	6.1
FR-U60	0.4	47.7	6.4	10.9	6.3

* Refer to Figure 4 for a map of the sampling locations.

Fowler River Subwatershed Highlights

The Fowler River subwatershed is the largest river drainage network that feeds into Newfound Lake. The 22,713-acre Fowler River subwatershed is monitored with 11 active sampling locations that are positioned at various points along the Fowler River and its feeder streams. Sampling locations were selected to characterize the overall water quality and to screen for potential problem areas within the Fowler River subwatershed.

The 2019 Fowler River water quality measurements generally indicate high water quality among the sampling sites. However, variations in average specific conductivity concentrations (a surrogate for salt runoff) are visible (Figure 2). Two upstream sampling locations, FR-U30 and FR-U60, were characterized by higher specific conductivity measurements relative to the more downstream sampling locations. The pattern of lower 2019 specific conductivity measurements, relative to the 2010-2018 measurements, was common among the majority of the Fowler River sampling locations (Figure 2).

The 2019 average turbidity (suspended soil and other particles) levels were low while the average total phosphorus (nutrient) concentrations were low to moderate in the Fowler River subwatershed (Figure 3).

Brook trout, an indicator of high quality water, have frequently been observed during field sampling visits to the Fowler River and the affiliated feeder streams. Dissolved oxygen concentrations measured in the Fowler River tributaries generally remained within the range considered sufficient to support the successful brook trout growth and reproduction.

Figure 2. Fowler River Subwatershed Specific Conductivity

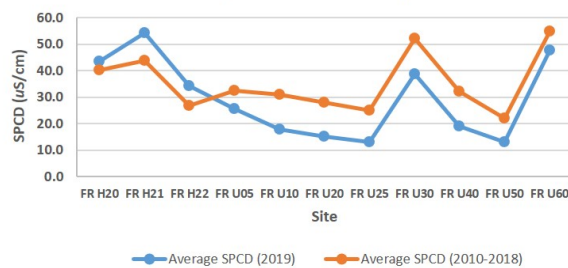


Figure 3. Fowler River Subwatershed Total Phosphorus

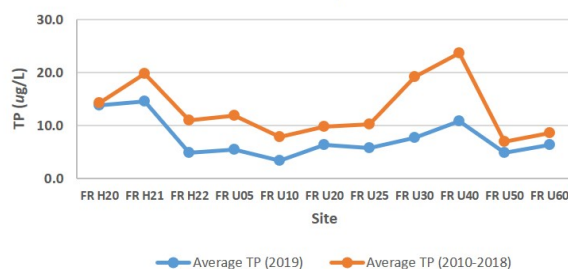


Table 3. Comparison of Seasonal Average Water Quality by Subwatershed (2019)

Subwatershed	Average * Turbidity (NTU)	Average * Specific Conductivity (uS/cm)	Average * Total Phosphorus (ug/L)	Average * Dissolved Oxygen (mg/L)	Average * pH (Standard Units)
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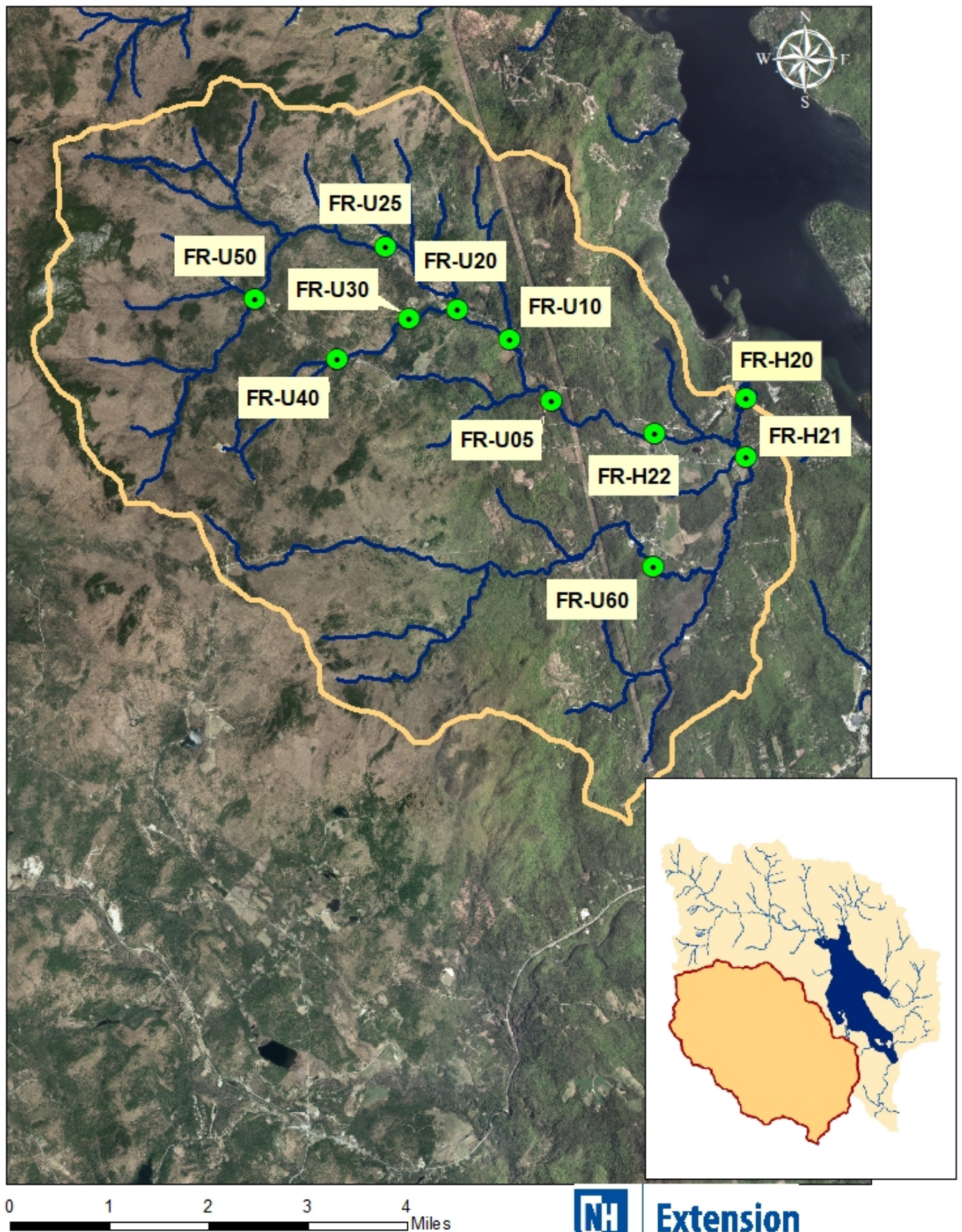
* The displayed water quality results are average values for all sampling locations within the respective subwatersheds.

Recommendations for Property Owners:

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Figure 4.
2019 Sampling Highlights - Fowler River Subwatershed



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Site location GPS coordinates collected by the UNH Center for Freshwater Biology