Summary of Water Quality Monitoring in the Lamprey River 2012-2013

Water quality monitoring on the Lamprey is a partnership among the Lamprey River Watershed Association, the Lamprey Rivers Advisory Committee, and the New Hampshire Volunteer River Assessment Program (VRAP), managed by the NH Dept. of Environmental Services. The goals of VRAP are as follows:

- Monitor water quality and provide ecology education.
- Increase community involvement and awareness.
- Provide better watershed planning.
- Detect problems early.
- Identify and target problem areas.
- Assist with Clean Water Act reporting to EPA.
- Document designated impaired waters.

Sampling along the Lamprey included the following details:

- 13 sites from Newmarket to Candia
- 16 sampling events in both 2012 & 2013
- 10 volunteers involved in sampling
- 30+ volunteer hours logged in 2013

These standard tests are conducted:

- pH
- dissolved oxygen
- specific conductivity
- turbidity
- temperature

pH: Measures acidity in water on a scale of 0 to 14.

- High pH indicates basic conditions; low pH indicates acidic conditions. Neutral pH is 7.
- Low pH can be indicative of acid rain or human activity.
- Sample sites near wetlands have a lower pH due to acids that are released from natural plant decay.
- Low pH interferes with animal reproduction and survival. Is related to increased uptake of ammonia and metals into biological organisms.

NH DES pH Surface Water Quality Standard

< 5.0	high impact
5.0 – 5.9	moderate to high impact
6.0 – 6.4	normal; low impact
6.5 – 8.0	normal
6.1 – 8.0	satisfactory

3 most acidic sites

- Smoke St. Bridge, Nottingham, Little River
- Freeman Hall Rd., Nottingham, North River
- New Boston Rd., Candia, North Branch River

Dissolved Oxygen: Amount of oxygen gas in the water, measured in mg/L.

- Oxygen gas enters water from the atmosphere, aided by wave action and rocky or steep stream beds.
- Aquatic plants and algae also produce oxygen gas during the day.
- Bacteria consume oxygen gas when they decompose organic matter into smaller particles.
- The presence of dissolved oxygen is vital to aquatic animals.
- Warm water has less dissolved oxygen than cold water if all other conditions are the same.
- DES unacceptable limit **< 5.0 mg/L.**

worst location: New Boston Rd., Candia, North Branch River, average 5.52 mg/L

best locations:

- Freeman Hall Rd. Nottingham, North River, average 8.3 mg/L
- Epping Waste Water Treatment Facility, Lamprey River, average 8.1 mg/L
- Mill St. Epping, Lamprey River, average 7.9 mg/L

Specific Conductance: Measures water's ability to carry an electrical charge and charged particles in the water. Tightly correlated to salt concentration.

High levels can indicate pollution in stormwater run-off from the following:

- road salt
- septic systems
- waste water treatment facilities (WWTF)
- agriculture
- urban development
- chloride
- naturally occurring ions from bedrock or ground water

NH DES Acceptable Limit is 835 µS/cm

- The typical range for Lamprey River and its tributaries is 80-215 µS/cm.
- Average is 122.4 µS/cm.
- Epping WWTF is consistently high, average 177 µS/cm up to 849 µS/cm.

Turbidity: Measures the amount of suspended particles in the water.

High turbidity usually comes from eroded soil or microalgae,

High turbidity has the following negative impacts:

- increased temperature

- reduced light penetration
- damage to fish
- smothering of aquatic eggs

Warmer t**emperature** can have the following impacts:

- lower dissolved oxygen levels
- increased bacterial activity
- impaired reproductive and metabolic process of aquatic species

New Hampshire has no state standard.

Average temperature of the Lamprey River and its tributaries is 20.41 c or 68.7 F.

E. Col measures fecal pollution from mammals.

This test cannot be done in the field. Water samples were collected and then cultured at the Rockingham County Complex, Brentwood, NH.

Three sampling events were done per year in 2012 and 2013.

Seven sites were sampled throughout Newmarket, Lee, Durham, Epping, Raymond, and Nottingham.

A total of 36 samples was collected and analyzed in 2012-13.

All samples in 2012-13 were within the NHDES limit for safe swimming and recreational use.

DES standard for acceptable is 47 cts/100 mL or fewer. Beach closure occurs with a result of 88 cts /100 mL or higher.