

Newfound Lake Watershed Assessment (stream and in-lake water quality monitoring efforts)

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Overview: The Newfound Lake Watershed Assessment is designed to complete a series of independent, but interrelated objectives that will provide a better understanding of the impacts of development, population growth, and land use change on the Newfound Lake watershed. The following tasks will collectively be used to help develop a Watershed Master Plan based upon sound scientific data:

- Complete an 18-month Newfound Lake Water/Phosphorus Budget (completed – *report to be posted on the Newfound Lake Website*)
- Conduct In-lake Sampling at seven historical sampling stations (in-process)
- Conduct Near-shore Conductivity Surveys and Collect *E. Coli bacteria* samples (in-process)
- Continue Newfound Lake Tributary Sampling (in-process)
- Perform a Paired watershed study that compares reference (least impaired) streams to impaired streams based upon differences in land use among watersheds (in-process).
- Collect near-shore periphyton (attached algae) samples and associated information to document water quality variations among near-shore sampling locations.
- Collect benthic sediment core samples to provide insight into organic matter loading from watershed sources and to characterize the benthic (lake bottom) substrate composition that can provide insight into macrophyte (aquatic plant) colonization and internal nutrient loading (phosphorus recirculated from the sediments) potential.

The first phase of the water quality monitoring project consisted of the development of an 18-month assessment (water/phosphorus budget) of the primary tributary inlets performed by the UNH Center for Freshwater Biology (CFB) and volunteer monitors around Newfound Lake. The water/phosphorus budget was undertaken to discern the degree of nutrient input from the tributary inlets and to better understand the water quality variations among the Newfound Lake sub-watersheds. Study results indicate that the quality of water entering Newfound Lake through the stream inlets is generally high although there are differences among streams in terms of the amount of phosphorus runoff. Furthermore, steep slopes within the watershed, that tend to accelerate water movement and that can be associated with increased erosion, pose a threat to Newfound Lake that can be exacerbated when streamside vegetation is removed and as new structures (roads, houses, etc) are poorly placed and reduce the capacity of water to infiltrate into the ground and thus result in increased overland runoff and erosion potential.

On-going stream sampling includes supplemental sampling of both reference and impaired streams that will provide more insight into the relationship between land-use and water quality. The sampling involves the collection of water quality data in the spring, summer and fall and includes the collection of data during wet weather, intense, storm events.

Supplemental near-shore bacteria sampling, nutrient sampling and sediment core sampling is currently being undertaken to further understand the relationship between the upland (watershed) environment and the in-lake water quality.

Ongoing in-lake sampling is being undertaken at seven historical “deep” sampling locations to document water quality variations among Newfound Lake’s bays, coves and central sampling locations. Historical water quality data, as well as preliminary data collected through this study, indicate high water quality at all seven deep sampling sites. However, the southernmost sampling site, south of Mayhew Island, is characterized by poorer water quality relative to the other Newfound Lake sampling sites.