



Town of Bristol
5 School Street
Bristol, NH 03222
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townofbristolnh.org
(603) 744-3354

Conservation Commission

Newfound Lake Water Quality Study Group
Special Committee

Final Report

Submitted to: Town of Bristol Select Board
May 2025

Executive Summary

The Lake Water Quality Study Group - Special Committee (Committee) (LWQSG) under the Bristol Conservation Commission (BCC) has determined that the quality of the waters in Newfound Lake is at an excellent level. Sampling data shows that the lake is “oligotrophic”, which is an expected “trophic” (aging of water bodies) level. Certain measured water quality parameters, such as phosphorous, indicate a decline in the lake’s water quality, although still within an excellent range. It is apparent that most of the impacts to water quality parameters are due to input from tributaries and runoff from land and road drainage. There was no specific evidence that near shore septic systems have caused a particular issue in any one location. Management of land use and runoff is known to help to reduce the input of contaminants to the lake. The Town should prioritize setting a goal to investigate potential improvements to land use and zoning that would address methods to reduce runoff to the lake. As part of accomplishing this goal, the Town should adopt the recommendations in the Newfound Lake Region Association’s (NLRA) Watershed Management Plan. The Committee also recommends that further work needs to be done to characterize the near shore conditions of the water quality, such as near shore sampling, as most of the water quality parameters originate from specific sampling stations farther from shore. Also, further work needs to be done working with the NH Department of Environmental Services to assess the aquatic vegetation seen in the lake. Ongoing efforts to assess and address contributions of stormwater runoff to the foot of the lake must be continued. While the Town does work with the Newfound Lake Region Association it is seen that many of the NLRA’s recommendations are not followed through on. Finally, it is important that the recommendations in this report are considered and a path forward clearly outlined. Assignment of tasks and tracking of completion will help to assure the protection of Newfound Lake’s water quality for Bristol’s use into the future.

The LWQSG would like to express its thanks to the efforts of the Bristol Town Administrator and staff of the Land Use and Water/Sewer Departments for their work efforts during this process. These efforts turned out to require more time than expected and the staff’s dedication to the task, professionalism and knowledge was greatly appreciated. Our intent was to minimize the staff’s time involved, however; managing the scheduling, agenda creation, recording and creation of minutes, room setup, web page updates and providing research was considerable. The Committee wishes to specifically acknowledge the following:

- Christina Goodwin, Bristol Town Administrator
- Donna Sullivan, Land Use Administrative Assistant
- Janet Cote, Land Use Associate

History

The Bristol Conservation Commission (BCC) members, either individually or as a Commission, were presented with many questions, comments and statements about the quality of Newfound Lake's waters, particularly within the Town of Bristol's boundaries. Some of this interest was sparked by conversations surrounding the proposed sewer to the lake from downtown Bristol, while some was from observations made by Bristol residents/taxpayers unrelated to the sewer project. As a result, the BCC discussed how to investigate the concerns and decided that a "Special Committee" would be formed per the Conservation Commission's Bylaws to take on this task.

The Special Committee was termed the "Lake Water Quality Study Group - Special Committee (LWQSG). The BCC prepared a proposed work scope and presented this to the Bristol Selectboard for approval and guidance. The approved work scope is included as Reference 1. Once the work scope was approved by the Select Board the LWQSG worked on finding appropriate members and tasks for the Committee based on the guidance in the approved work scope, as follows:

1. Membership

- Any members of the Conservation Commission with interest in the project (at least 2)
- A representative of the Newfound Lakes Region Association
- 2 residents/taxpayers from the Town of Bristol showing interest in the project.

The final LWQSG membership consisted of:

- Richard Batchelder: Chair Bristol Conservation Commission,
- Elizabeth Miller: Member Bristol Conservation Commission,
- Carroll Brown: Member Bristol Conservation Commission,
- Rebecca Hanson: Executive Director Newfound Lake Region Association,
- Kane Lorah: Bristol taxpayer and property owner at Newfound Lake,
- Ken Milender: Bristol taxpayer and property owner at Newfound Lake,
- Mary Gebhart: Bristol resident, taxpayer and property owner,
- Christina Goodwin, Bristol Town Administrator,
- As needed: Jeff Chartier, Superintendent Bristol Water and Sewer Department.

2. Tasks

The LWQSG reviewed the work scope and set out the tasks and goals. An important consideration was that the LWQSG was not intended to be funded by the Town of Bristol and was specifically designed to minimize the impact of adding work to the Town's employees. The initial intent of the work scope was not to conduct water sampling or field assessments because there is a significant amount of this type of work that has been done by various parties such as the Newfound Lake Region Association (NLRA), NH Dept of Environmental Services (NHDES), the Town of Bristol's summer beach

sampling program, the University of New Hampshire (UNH) and engineering firms hired by the Town during the proposed sewer improvement efforts.

With the varied input on the LWQSG and guidance from the Town Administrator it was decided that a thorough review of the existing information and discussions with any relevant experts would prove sufficient to accomplish the goals set out in the work scope.

Process

The LWQSG began its work by setting out a list of resources/documents to review and discuss. This list was continually updated and increased as more questions and discussions brought out new sources of information. The list of sources reviewed are listed in the Town of Bristol Conservation Commission's web page under the "Lake Water Quality Study Group-Special Committee". The following link to the "Study documents" is provided at the very bottom of the LWQSG page. [Study Documents | Bristol NH](#)

The LWQSG set out to review and discuss all the documents in the list, concentrating on any specific data and recommendations. This review was conducted in no particular order nor with any time limit on the review of each resource. Much of the effort in the review process included discussion and education on the meaning of certain water quality sampling and results to assure that all members of the LWQSG clearly understood the meaning in each piece of information reviewed.

The LWQSG reviewed each document with an intent to understand the findings and any recommendations contained in the document. It was not the Committee's intention, nor was it needed, to review the sampling/monitoring techniques or methods of providing data analysis in the documents, but rather to review existing information to understand the current lake condition. The information reviewed was professionally produced, and the monitoring conducted and data analysis was performed by qualified personnel. Because of the professional quality of the field work and data analysis we did not need to duplicate efforts by reviewing these topics. The LWQSG did, however, review findings carefully to determine if they were based on data collected specifically on Newfound Lake or generalizations based on data collected on a broader scale.

Findings

1. As a result of a review of monitoring and data the overall quality of Newfound Lake is excellent, based upon the N.H. Department of Environmental Services (NHDES) standards.
2. Water monitoring has shown that there are some changes in certain sampled parameters. There has been a decline in quality in certain water quality parameters; however the levels of these parameters and the quality of the lake are still in the "excellent" range.
3. There are decades of data available from monitoring that has been used to track the water quality.
4. Continued development along the Bristol shoreline is a concern for water quality because of related sediment and nutrient impacts from construction projects, erosion, fertilizers, septic systems, etc.

5. There is much anecdotal evidence that there are failing septic systems and other inadequate treatment of wastes along the Bristol shoreline, however, there was no direct evidence found in any documentation of any specific instances of this nature and there is no direct evidence from monitoring data that there is a contribution of bacteria along the foot of the lake that can be definitively attributed to septic or other waste systems. Geological conditions along much of Bristol's shoreline can limit the full capacity of the soil formations to reduce or remove pollutants from residential sanitary wastes, even from properly designed and constructed sanitary septic systems. Discharges of pollutants to these soil conditions from inadequately sized, poorly designed, and/or unmaintained septic systems can adversely affect the quality of the lake's waters. For example:
 - a) The glacial till soils in the bluffs above the lake (under Lakeside Drive on the east side and Camelot Acres, Batten Road, and the south end of Wulamat Road on the west side) consist of low-permeability soils with limited water-transmitting capacity; and
 - b) The well-draining (high permeability) soils along the lake shore (below Shore Drive, West Shore Road between the Newfound River Bridge and Shackett's Store, and the Bristol Shores - Wulamat Road area) have a high groundwater table, which limits the ability of the soils to completely treat the pollutants from septic systems. These releases could build up over time and, without mitigation or treatment, may eventually degrade the quality of the lake water.
6. There are currently no specific studies or sampling efforts in process to generate data on potential impacts to the lake from waste systems. The current water quality sampling network likely can't definitively corroborate or eliminate potential contributions to water quality from these systems. Additionally, there have been no studies of the condition, design and maintenance of the septic systems along the lake.
7. A study of Lake Waukegan does indicate that a number of septic systems are failing along that lake and did contribute Phosphorous to the lake's water. There have been no similar studies on Newfound Lake.
8. All new construction and any changes to protected shoreline areas must meet current NH Dept of Environmental Services standards including Shoreland Water Quality Protection Act and sub-surface regulations.
9. Phosphorous is one of the most impactful contaminants to surface waters which can lead to degradation of water quality. In the case of Newfound Lake modeling has shown that about 6% of the Phosphorous found in the lake originates from groundwater. The greatest source of Phosphorous to the lake comes from tributaries. Phosphorous levels have increased in some monitoring locations in the lake; however, these results are well below levels of concern.
10. The NLRA regularly monitors 8 sampling stations in the lake, all located in deeper areas. The Town of Bristol Monitors bacteria in 6 stations at the two Town beaches during June, July August (formerly done by NHDES).
11. The NLRA reports reviewed indicate that stormwater runoff is the biggest threat to water quality of the lake, which is consistent with lakes around the State.
12. The Town of Bristol has not adopted the NLRA Watershed Management Plan recommendations or implemented any recommendations to guide decisions on land use.

13. Citizens and users of the lake have voiced concerns that they have observed more “plant growth” in the water and decreased clarity in the water and objectionable odors from the water and in the air nearby.
14. Recent increases in severe rain events have negatively impacted the Town’s and State’s infrastructure and the lake water quality on a short-term basis.
15. There are no indications of water quality or quantity issues at the Town of Bristol’s water supply wells.
16. Runoff at the foot of the lake along Shore Drive has been shown to create some temporary water quality issues.
17. Recent local input has indicated a concern about the use of road salt near the lakefront.

Recommendations

1. The Town of Bristol through its Planning Board, Conservation Commission and Select Board and in association with other partners, such as the NH Department of Transportation (NHDOT) and the NLRA, should implement the guidance in the NLRA Watershed Management Plan to consider methods to reduce pollution to the lake, as follows:
 - a. Explore and implement zoning ordinances that protect water quality (*Planning Board lead*).
 - b. Explore and implement site plan and subdivision regulations that protect water quality (*Planning Board lead*).
 - c. Adopt and promote stormwater best management practices on public property, including culverts, in partnership with NLRA (*Select Board lead*).
2. The Town of Bristol should assess what more can be done within Bristol and in the overall Newfound Lake watershed to protect the lake from the impacts of severe rain events. Examples are:
 - a. Inventory and assessment of town culverts. (*Select Board lead*)
 - b. Improved road side ditching and maintenance (*Select Board lead*)
 - c. Include regular funding for these efforts and improvements (*Select Board lead*)
3. Review the NLRA Watershed Management Plan and the Bristol Master Plan, look for common goals. (*Planning Board lead*)
4. Assess level of contaminants contributed by runoff at the foot of the lake and implement methods to reduce the impact. NOTE that as of the writing of this document a working group led by the NLRA and Town of Bristol including the Holy Trinity Catholic Church, NHDOT and concerned citizens has begun work on this topic. (*Town Administrator lead*)
5. Update Bristol’s Natural Resource Inventory Assessment (*Conservation Commission lead*).
6. Implement more shallow water monitoring, in particular at the foot of the lake and other areas reported to be a concern by citizens. The Town should work and collaborate regularly with NLRA to ensure water quality monitoring continues and expands as needed to cover new and emerging threats to Newfound Lake. This can include near shore and extended bacteria monitoring. Note that this effort may require funding in the Town’s budget. (*Select Board, Conservation Commission, Health Officer lead*)

7. Work with NHDES to assess growth of aquatic vegetation in the lake and determine any causes and possible corrective measures (*Conservation Commission lead*)
8. Support efforts to assess the status of existing residential waste systems (septic systems) design and maintenance particularly in the Shoreland Protection area through cooperative efforts with property owners (*Select Board, NLRA, Conservation Commission lead*).
9. While this Committee's charge was to assess the area of the lake within the Bristol boundaries, we note that contributions to the waters will generally flow towards the foot of the lake; therefore, Bristol should work with all watershed towns to consider the impact from all towns along the shoreline and within the watershed to best reduce the impact on the lake quality. NLRA will annually convene towns through its watershed workshop. Bristol should assure that its representatives participate regularly in this workshop, which facilitates communication and collaboration between towns. Bristol to work more closely with NLRA to share information with other lake towns (*Conservation Commission and Select Board*).
10. Any future large projects proposing work to protect the Newfound Lake Watershed, or otherwise impacting the lake area in Bristol, must operate under the guidance of a qualified ad-hoc committee, i.e., under the Conservation Commission, Land Use, Planning Board or directly under the Select Board. It is suggested that the Select Board devise a policy to assure that any committees needed will be created as needed and how to assign members to these committees. The intent of this suggestion is to avoid projects moving forward that are based on anecdotal information and assure that the all the pertinent facts should drive the need for a project. Any committee would be short term and disbanded at the conclusion of each project. (*Select Board lead*)
11. The Town of Bristol should provide information to property owners, realtors and contractors regarding construction projects in the Lake District, including Best Management Practices for septic systems, fertilizer use and general shoreline development. (*Land Use lead*)
12. Provide educational information to the public on the benefits of a properly installed and healthy septic system. (*Land Use lead*). (*Note that the Land Use Department has already begun this effort*).
13. Conservation Commission should continue to keep apprised of legislative activity that can impact lake water quality (*Town Administrator lead*)
14. Town boards must be familiar with the NLRA Newfound Watershed Management Plan and work with NLRA to complete implementation steps as appropriate for Bristol. (*Select Board lead*)
15. While the LWQSG was not charged with considering the protection of the Town's water supply it was agreed that it is wise to seriously and quickly consider further protection of the Bristol town well water supply by protecting or conserving the surrounding land. (*Conservation Commission, Select Board lead*)
16. The Town should start a program working with the State and private contractors to determine where it is possible to minimize the use of salt, while maintaining public safety. Bristol should consider hosting a Green Snow Pro training. It is noted that most of the use of salt near the lakefront is due to NHDOT maintaining State roads. (*Select Board lead*)

END

Newfound Lake Water Quality Study – Town of Bristol Conservation Commission

Scope of Work

Objective: To determine the current and, if possible, future trend of water quality in Newfound Lake in the Town of Bristol and to provide solid information for future considerations on protective measures.

Reason: There is a perception noted by the Conservation Commission that Bristol residents identify past inadequate, inaccurate or unclear information regarding the water quality, or threat to water quality, of Newfound Lake and use this information to advise Bristol taxpayers on how best to protect the lake in the Town of Bristol. This would include information guiding decisions on the need for expenditures for a sewer at the lake, changes to building ordinances and Best Management Practices. There is a need to clearly identify what, if any, water quality issues exist in the Bristol portion of the lake.

Scope of Work:

- Create a special committee (Committee) under the Bristol Conservation Commission of a manageable size to work effectively, consisting of:
 - Any members of the Conservation Commission interested [at least 2]
 - A representative of Newfound Lake Region Association [NLRA]
 - 2 representatives solicited from Bristol residents/taxpayers showing interest in the study [as approved by the Bristol Conservation Commission]
- Other input may be solicited from additional parties, such as the Bridgewater or Alexandria Conservation Commissions, as needed.
- Collate and review all pre-existing information, including but not limited to: University of New Hampshire, Newfound Lake Region Association, Newfound Watershed Master Plan, town of Bristol Master Plan, N.H. Department of Environmental Services (NHDES), and any information produced by engineering studies previously paid for by the Town. The Committee shall be receptive to also include any additional information that becomes available.
- Determine existing lake quality and, if possible, future trends.
- Determine, if possible, recommendations on how to manage, minimize or correct water quality issues.
- Compare findings with Bristol Master Plan and NLRA Master Plan to assure consistency.
- Produce a written report outlining the Conservation Commission's findings and recommendations for the "way forward". Present report in DRAFT format to the Select Board for comment and approval, including any suggested steps for protecting Newfound Lake.

Other :

- **Meetings:** Meetings will be noticed and held as is standard for other Town committees. Public attendance will be allowed and the public will be able to provide comments at a specific time during meetings.
- **Time Frame:** Approximately 8 months from the first meeting of the sub-committee. It is planned to begin during early September after the vacation season.
- **Anticipated Costs:** The intent is to have no cost for this workgroup to conduct the effort, as follows:
 - All participation on this Committee is on a volunteer basis.
 - It is anticipated that NHDES assistance will not incur any costs, except for copies, if needed.
 - There may be costs associated for obtaining copies of documents to be reviewed.
- **Additional work for Town employees.** Land Use staff will assist with reviews of incoming e-mail and forward to the Commission.

If interested in this project , please e-mail to landuseadmin@bristolnh.gov

Carroll Brown, Jr.
Bristol Conservation Commission Chair