

KEZAR LAKE SHORELINE SURVEY | MEMORANDUM



TO: Glenn Pogust (Town of Sutton), Kyle Hubbard, and Polly Perkins (KLPA)
FROM: Christine Bunyon, FB Environmental Associates (FBE)
SUBJECT: Kezar Lake Shoreline Survey Results - PUBLIC
DATE: January 16, 2026

FB Environmental Associates (FBE) was contracted by the Kezar Lake Protective Association (KLPA), and the Town of Sutton, NH to conduct both a shoreline survey of Kezar Lake and a watershed survey (with Horsley Witten Group), as part of the development of a watershed-based management plan (WBP) for the lake. These two surveys are conducted with different viewpoints. The shoreline survey is conducted via a boat looking at the shoreline, and the watershed survey is conducted via foot/in cars looking at the land from the roadways. Having different perspectives helps illuminate different types of nonpoint sources of pollution that may be impacting Kezar Lake. This memo covers the Shoreline Survey.

METHODOLOGY

The Shoreline Survey was completed on June 25, 2025, by FBE Project Manager, Christine Bunyon, and members of the KLPA. Boating assistance for surveying parcels with lake frontage was provided by the KLPA as well. FBE documented the shoreline for each parcel using a scoring system that evaluates the condition of the vegetated buffer, presence of bare soil, extent of shoreline erosion, distance of structures to the lake, and slope (Table 1). The vegetated buffer, exposed soil, visible erosion scores were summed to generate a "Shoreline Disturbance Score" (range of possible scores is 3 to 12), and the setback distance and slope of the land scores were summed to generate a "Shoreline Vulnerability Score" (possible score of 1 to 6). Scores are identified for each shoreline parcel or shoreline parcels with the same owner. High scores indicate poor or vulnerable shoreline conditions. Shoreline conditions are evaluated on a per-parcel basis, with scoring based on the percentage of the full length of each parcel's shoreline which is impacted. Because of this approach, the same shorefront home would score better on a parcel with a long shoreline that was mostly natural buffer compared to on a parcel with a short shoreline that consisted mostly of the developed area, even if the linear distance or area of impact were the same. Photos were taken at each parcel and were cataloged by tax map-lot number. These photos will provide the Steering Committee with a valuable reference tool for assessing shoreline conditions over time. It is recommended that a shoreline survey be conducted in mid-summer every five years to evaluate changing conditions.

FBE used the EPA Pollutant Load Estimation Tool (PLET) to estimate pollutant loadings based on Shoreline Disturbance Scores. These estimates incorporate the bank stabilization metrics in PLET for sands, loamy sands, in lengths of 50 ft, 100 ft, or 200 ft (length) by 3 ft (height) and moderate lateral recession rate of 0.1 ft/yr. For more information on the EPA PLET model, please refer to EPA's [PLET Model Documentation](#). Standardized model inputs were selected based on the above scores, therefore loading results should be treated as planning-level estimates.

Table 1. Scoring system scores and descriptions for each metric.

Metric and Score	0	1	2	3	4	5
Condition of vegetated buffer	<i>Not used</i>	Excellent - all natural vegetation	Good - some trees and shrubs, some bare	Moderate - a few small trees/ shrubs, some lawn	Minimal - mostly lawn, some shrubs	No buffer, all lawn/ bare
Amount of exposed soil	<i>Not used</i>	No exposed soil	Minimal exposed soil	Fair amount of exposed soil	Large amounts of exposed soil	<i>Not used</i>
Amount of visible erosion	<i>Not used</i>	No erosion visible	Some erosion visible	Moderate to severe erosion	<i>Not used</i>	<i>Not used</i>
Setback distance	No structure	More than 150ft from shore	75-150ft from shore	Less than 75ft from shore	<i>Not used</i>	<i>Not used</i>
Slope of the land	<i>Not used</i>	Little to no slope: 0-10 degree grade	Moderate slope: 10-45 degree grade	Steeply sloped: >45 degree grade	<i>Not used</i>	<i>Not used</i>

RESULTS

A total of 48 parcel groups were evaluated along the shoreline of Kezar Lake in Sutton, NH. Parcels with different tax map IDs but the same owner were evaluated together as many shoreline properties are split by Penacook Road or Keyser Street and have different IDs but the same owner. A Shoreline Disturbance Score (the sum of the vegetated buffer condition, amount of exposed soil, and amount of visible erosion scores) of **7 or above** indicates shoreline conditions that may be detrimental to lake water quality. Thirty-four (34) parcels (about 71%) received relatively good disturbance scores (scores 3-6). The average Shoreline Disturbance Score for the entire lake was 5.77 (Table 2). About 29% of the shoreline (or 14 parcels) scored 7 or greater. Three (3) parcels (about 6%) have a Shoreline Disturbance Score of 9 or higher (Figure 1). These shoreline properties tended to have inadequate buffers, evidence of bare soil, and shoreline erosion¹. The average Shoreline Vulnerability Score, which is the sum of the setback distance and slope of the land scores, was 3.38 (Table 2). About 54% (or 26 parcels) scored 4 or greater (Figure 2). A vulnerability score of **4 or greater** indicates that the parcel may have a home less than 150 feet from the shoreline and a moderate or steep slope to the shoreline. Parcels with a vulnerability score of 4 or greater are more prone to erosion issues whether or not adequate buffers and soil coverage are present. One parcel received a maximum vulnerability score of 6 and nine (9) parcels (about 19%) received a vulnerability score of 5 and are likely prone to erosion issues. Parcel-specific results are held within the Kezar Lake WBP Steering Committee and are not publicly available.

FBE then used the EPA PLET model to estimate pollutant loadings based on Shoreline Disturbance Scores. Standardized model inputs were used to represent different scores, therefore loading results should be treated as gross estimates. The pollutant loading estimates are based on the Shoreline Disturbance Scores. The 14 parcels with elevated disturbance scores (greater than 7), are contributing an estimated **5.41 kg of phosphorus annually**. Remediation efforts on all properties using a 50% Best Management Practices (BMP) efficiency rate could result in an **annual reduction of 2.70 kg of phosphorus**. This moderate amount of phosphorus load from

¹ Shoreline erosion can be from or exacerbated by natural phenomena or human-related activities. Natural phenomena typically include the orientation of the parcel to prevailing winds and subsequent greater wave action, composition of the shoreline bank (whether highly erodible soil material or hardened rocky or bedrock outcroppings), and winter ice damage. Human-related activities typically include motorboating (which generate wakes whose wave energy is dissipated by the shoreline) and shoreline development (which includes retaining walls, beaches, access points, etc.).

these properties will be incorporated into the WBP with estimated loads from additional sources such as the watershed survey sites, and the lake loading response model.

In summary, the overall average shoreline condition of Kezar Lake is good (average disturbance score below 7). Improvements can be made to combat erosion issues with 14 properties (29%) needing to address erosion issues that are impacting the lake. Kezar Lake may be generally prone to erosion issues because many homes are located on moderate to steep slopes (average vulnerability score is 3.38). Additionally, the closeness of Penacook Road and Keyser Street to the lake increases the potential for erosion from the road surfaces and shoulders to enter Keyser Lake. These two perimeter roads were surveyed during the Watershed Survey as part of the WBP development.

Table 2. Average scores for each evaluated condition criterion and the average Shoreline Disturbance Score and average Shoreline Vulnerability Score for Kezar Lake. Lower values indicate shoreline conditions that are effective at reducing erosion and keeping excess nutrients out of the lake. Note: the numbers in parentheses are the range of possible scores for that variable.

Evaluated Condition	Average Metric Score	Average Shoreline Score
Buffer (1-5)	2.44	Shoreline Disturbance Score (3-12) 5.77
Bare Soil (1-4)	1.81	
Shoreline Erosion (1-3)	1.54	
Distance (0-3)	1.65	Shoreline Vulnerability Score (1-6) 3.38
Slope (1-3)	1.73	

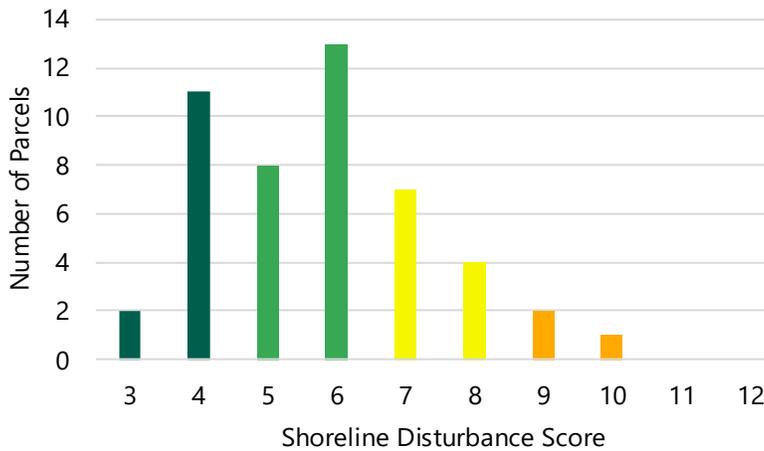


Figure 1. Histogram showing the number of parcels by Shoreline Disturbance Score. The possible range of Shoreline Disturbance Scores is 3-12. A score of 7 or above indicates shoreline conditions that may be detrimental to lake water quality

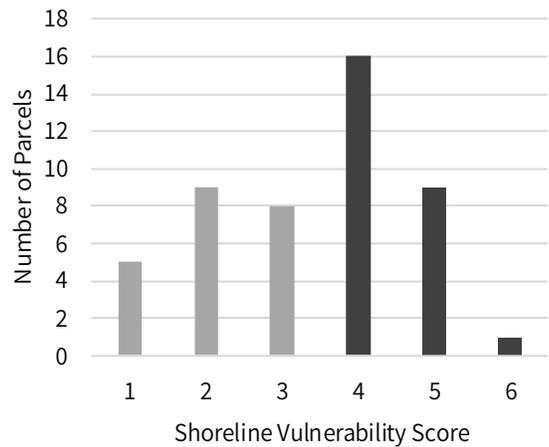


Figure 2. Histogram showing the number of parcels by Shoreline Vulnerability Score. The possible range of Shoreline Vulnerability Scores is 1-6. A score of 4 or above indicate a parcel may be more prone to erosion issues whether or not adequate buffers and soil coverage are present.

NEXT STEPS

The information obtained from this survey will be used to plan next steps for improving the shoreline of Kezar Lake and further inform the Watershed-based Management Plan. Prioritizing implementation and outreach efforts from the results both the shoreline and watershed surveys will be identified in the Action Plan of the WBP. The survey and database highlight areas that are possibly contributing to polluted runoff, and the shoreline scores should be used to prioritize areas of the shoreline for remediation. Recommendations largely include improving shoreline vegetated buffers and reducing concentrated runoff pathways to the lake. Encouraging landowners to plant and/or maintain vegetated buffers as a BMP along their shoreline, particularly in areas of bare soil, will help mitigate erosion and reduce sediment and nutrient loading to the lake.

RECOMMENDATIONS

Generally, landowners should be encouraged to revegetate their shoreline buffers with native plants, avoid large grassy lawns, increase mower blade heights to 4 inches, and avoid bringing in sand to replenish beaches. Beach replenishment should be conducted in accordance with [NHDES regulations](#). Woody vegetation with deep rooting structures stabilizes banks and intercepts water flow, allowing it to spread out, slow down, and be filtered by the soil.

- Plant native shrubs along shoreline such as: blueberry, pussy willow, elderberry, viburnums, dogwoods, winterberry, buttonbush, pepperbush, serviceberry, and swamp azalea. Digging small holes with hand-held tools for shrubs and plants along the shoreline represents minimal temporary impacts from exposed soil and is therefore consistent with DES guidelines for shorefront protection and management guidelines.
 - NHDES list of [Native Shoreland/Riparian Buffer Plantings for New Hampshire](#)
 - UNH Cooperative Extension list of [Native Plants of New Hampshire](#)
- Use survey results to target future implementation efforts on residential shoreline properties.
- Locate willing volunteers to “demonstrate” what an ideal shoreline buffer looks like and how it functions.
- Encourage shoreline property owners to participate in the [LakeSmart program](#) through NH Lakes.
- Continue to monitor for bare soil, shoreline erosion, and slope conditions.
- Re-survey the lake in 5-10 years when updating the watershed plan.
- For future projects, site-specific recommendations should be made for each lot with engineered designs when needed.

Examples of adequate vegetated shoreline buffers:



Examples of shoreline properties with great vegetated buffers consisting of multi-story canopy (trees and shrubs) and no exposed soil). Photo not from Kezar Lake for homeowner privacy.