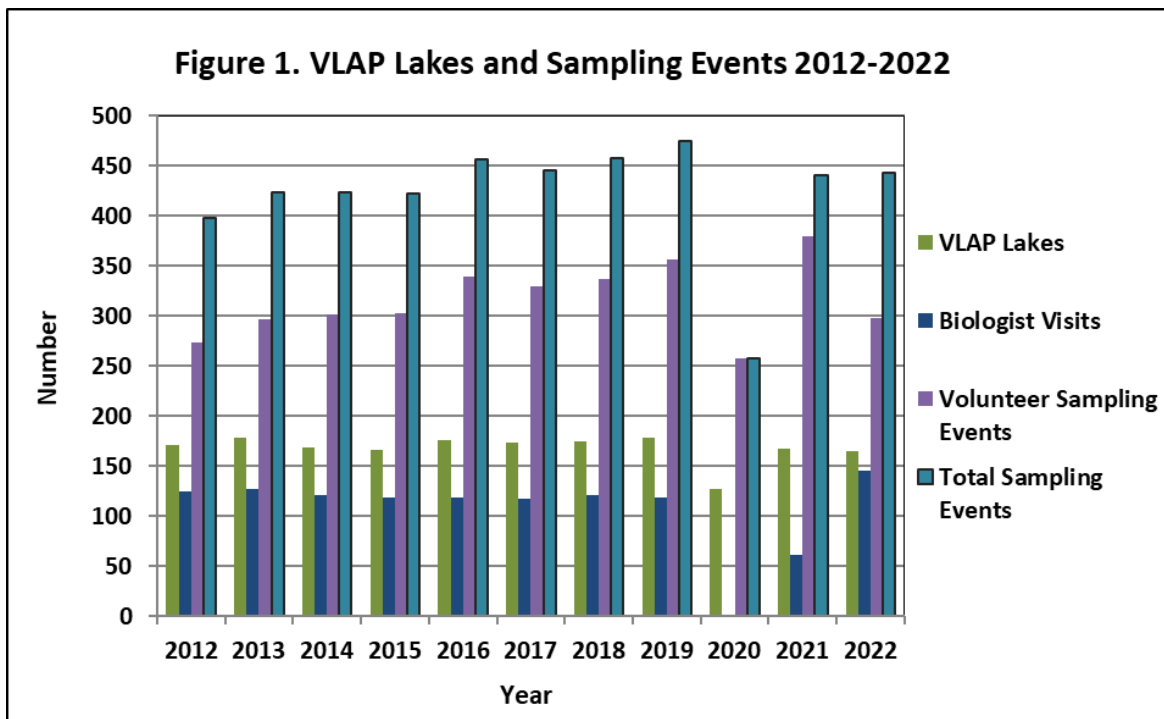


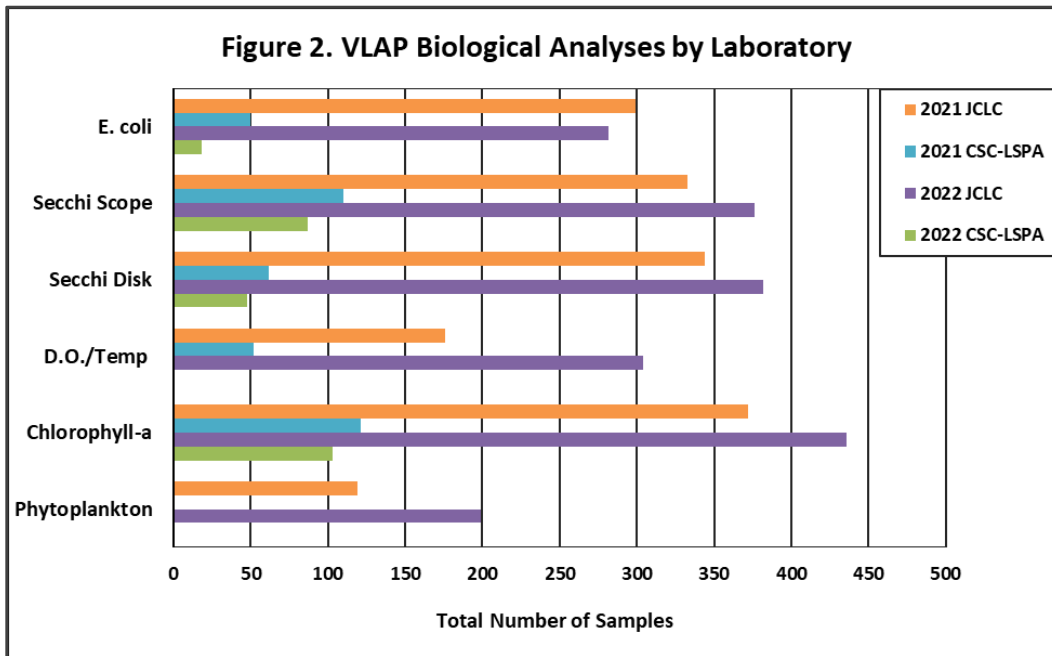
2022 VLAP Season Overview

The Volunteer Lake Assessment Program (VLAP) experienced a more normal 2022 sampling season coming off the COVID protocols initiated in the 2020 and 2021 sampling seasons. The Jody Connor Limnology Center (JCLC) and Colby Sawyer College-Lake Sunapee Protective Association (CSC-LSPA) satellite laboratory served approximately 170 lakes similar to 2021. VLAP biologists conducted 145 biologist visits in 2022 which is the highest number of biologist visits conducted in over ten years. The enhanced biologist visit schedule was to make up for audits not conducted due to COVID. Starting in 2023, we expect biologist visits to return to normal.

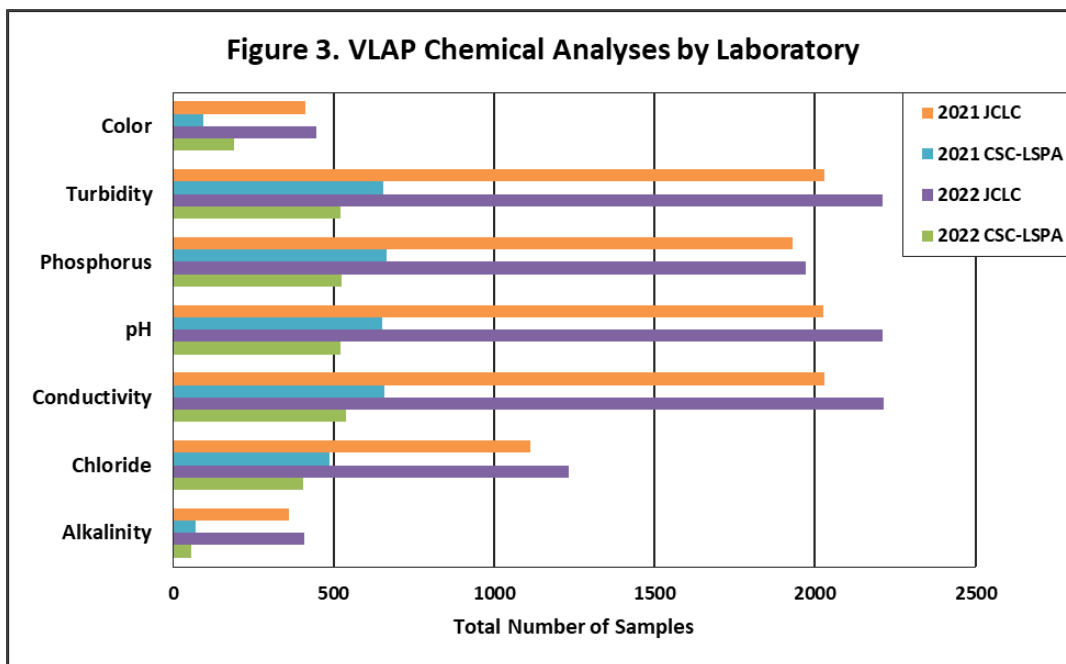
The total number of lakes monitored in 2022 remained slightly less than normal but VLAP welcomed several new and returning lakes. VLAP accepted three new lakes in 2022 which is a first for the program in over five years. Those lakes were Lyford Pond in Canterbury, Opechee Lake in Laconia and Silver Lake in Hollis. We also welcomed back Baxter Lake in Farmington and Pillsbury Lake in Webster.

Approximately 300 sampling events were conducted by volunteers in 2022 which was a decrease from 2021 due to the increased number of biologist visits. A total of 145 biologist visits were conducted which is the highest number in over ten years. The total number of sampling events remained stable with 2021 and represented a seven percent reduction in monitoring over the peak experienced in 2019. VLAP hopes to offer a normal biologist visit schedule in 2023 starting with lake names A-L as well as accepting additional new lakes into the program.





Figures 2 and 3 provide a summary of VLAP sample parameters analyzed by the JCLC and Colby Sawyer College-Lake Sunapee Protective Association (CSC-LSPA) satellite laboratory for the 2021 and 2022 sampling year. Approximately 15,000 sample results were generated by VLAP in 2021, and approximately 15,700 sample results were generated in 2022. The 2022 results generated represents 97 percent of the total results generated in our busiest sampling season of 2019.



Annual data collection is essential in establishing long-term water quality trends. These trends help determine whether water quality is getting better or worse and aid in watershed management decisions to protect and restore waters. Trend analyses are performed on VLAP lakes with ten or more consecutive years of data collection. In 2022, trend analyses were performed on approximately 168 lake

deep spots for the following parameters: chlorophyll-a, transparency, total phosphorus, pH, and conductivity to determine if water quality improving, stable or getting worse over time.

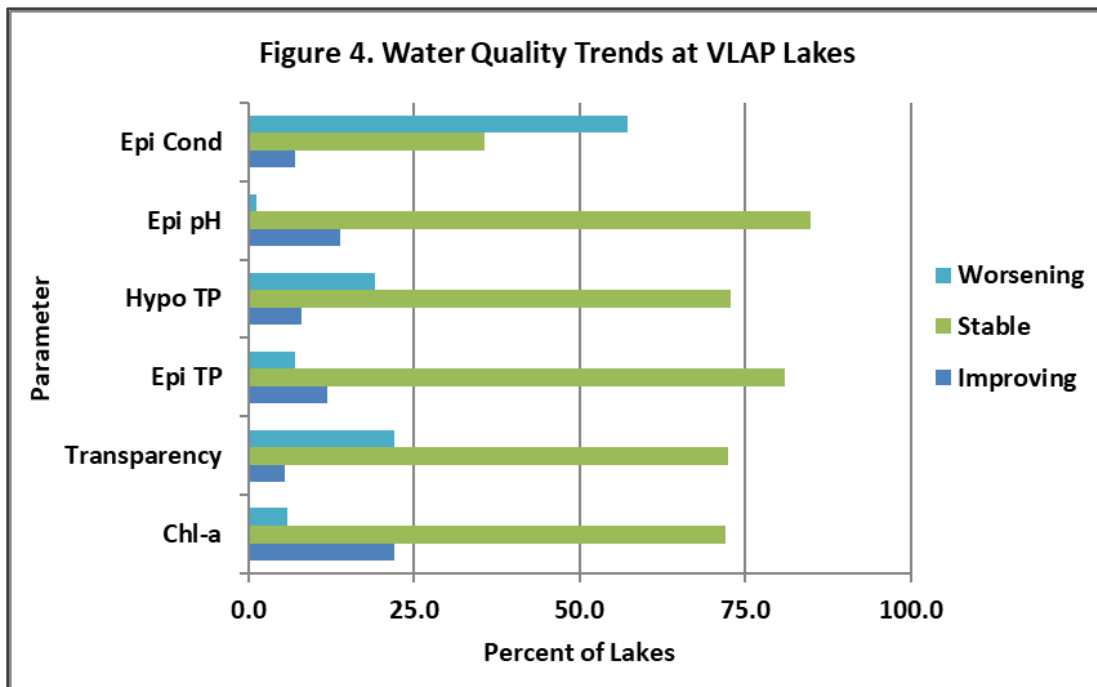


Figure 4 indicates the percent of lake deep spots with improving, stable or worsening trends in 2022. All parameters combined, 70 percent of lakes have stable conditions, meaning water quality has not changed significantly over time while 11 percent have improving conditions, and 19 percent have worsening conditions. However, when looking at specific parameters, epilimnetic (upper water layer) conductivity shows a worsening trend at approximately 57 percent of lakes, approximately 22 percent of lakes show worsening trends for transparency or water clarity, and approximately 19 percent of lakes show increasing (worsening) levels of hypolimnetic phosphorus. The use of road salt as a de-icing agent for roads, parking lots and driveways has contributed to the increased conductivity levels in our lakes. The worsening lake clarity trends may be linked to increased algal growth in some lakes, but also an increase in dissolved organic matter flushed in during high intensity precipitation events. The worsening lake clarity trends are cause for concern as lake clarity is linked to recreation, tourism and property tax revenues. The worsening hypolimnetic phosphorus trends are a concern and likely being driven by climate change with longer periods of summer thermal stratification and hypolimnetic anoxia leading to more severe internal phosphorus loading. Internal phosphorus loading can be a driver of cyanobacteria blooms and may be contributing to the increase in cyanobacteria bloom occurrence.

The good news is that most lakes show stable and improving trends for epilimnetic phosphorus and chlorophyll levels, and 14 percent of lakes have increasing (improving) pH trends which highlights the state's recovery from historical acid deposition through rainfall and the importance of the Clean Air Act.