New Hampshire
Citizen Lake Monitors Survey

The communication and influence of citizen science in lake communities

A report published on behalf of the New Hampshire Lakes Lay Monitoring Program and the New Hampshire Volunteer Lakes Assessment Program (NHDES)

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Acknowledgements

Thank you to all who took the time to fill out this survey. Your high response rate speaks for the dedication and passion that citizen lake monitors bring to the protection of New Hampshire's lakes, watersheds and wildlife. New Hampshire is certainly lucky to have you!

I would also like to express my gratitude to those who helped design, provide input and review the questions, structure and reporting of this survey. These include Jeff Schloss, Director of the Lakes Lay Monitoring Program at the Cooperative Extension Program of the University of New Hampshire, who supervised my work on the project; Sara Steiner, who coordinates the New Hampshire Volunteer Lakes Assessment Program with the New Hampshire Department of Environmental Services; Bob Craycraft, coordinator of the New Hampshire Lakes Lay Monitoring Program; and Dr. Mimi Becker, my mentor, graduate school adviser and director of the program for the Integration of Decision Making and Ecosystem Sciences (TIDES) in the University of New Hampshire Department of Natural Resources. I would also like to thank Hannah Johnson for her helpful proofreading and suggestoins.

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Q: What, if any additional monitoring needs do you perceive for your lake? (Survey Question)

A: "more info on … the factors that make the values change." (Survey respondent)

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Executive Summary

The two established volunteer lake monitoring programs in New Hampshire (NH), the New Hampshire Lakes Lay Monitoring Program (LLMP) and the New Hampshire Volunteer Lake Assessment Program (VLAP), engage citizens in the monitoring of their local lakes to determine water quality status and trends. The LLMP, a program run jointly by the Cooperative Extension Program of the University of New Hampshire (UNH) and the UNH Center for Freshwater Biology, was formed in 1979 and coordinates 215 volunteers on 34 lakes. VLAP, a program of the NH Department of Environmental Services (NHDES), coordinates 500 volunteers on 140 lakes. Together the programs coordinate over 700 volunteers on 174 lakes in New Hampshire. Both programs encourage their participants to communicate lake monitoring results to their local officials and to mentor their community on stewardship of their lakes and watersheds. To better understand the distribution, communication and influence of lake monitoring in lake communities, the LLMP and VLAP conducted a joint survey in late spring and early summer of 2013, asking their lake monitors and lake association participants to share their thoughts and feedback on the subject. This report describes the survey and presents its findings, conclusions and recommendations.

Objectives

The primary objective of the lake monitoring survey was to better understand if and how the LLMP/VLAP lake monitoring data and programs reached and influenced decisions, attitudes and behaviors in lake communities. A secondary objective was to shed light on the potential and challenges for citizen science to inform decisions and behaviors. Sharing of quotes from respondents in the final appendix of this report intends to deepen understanding of respondent's experiences and perceptions, and to stimulate further discussion on the effective communication of citizen science in New Hampshire's lake communities.

Methods

The survey was designed with 30 open-ended and non-guided questions, 26 multiple choice and 7 mixed multiple choice with a text option. The 63 ended questions focused on five areas: respondent experiences and concerns, their interactions with and perceptions of local government and the broader community, collaborations, and program feedback on communications, monitoring needs and training. Approximately 315 LLMP/VLAP participants were invited by email to participate in the survey. The UNH Institutional Review Board for the Protection of Human Subjects reviewed and approved survey methods. As a pre-requisite to participation, respondents read and agreed to a letter of informed consent. Participation was anonymous. Survey respondents had the option of responding online or by postal mail. Responses were collected and analyzed using Qualtrics survey software and further tabulated and categorized for qualitative analysis in Excel. The survey remained open for responses from May through July 2013.

Results

About the Respondents

A total of 123 respondents participated in the survey, all online, representing a 40% response rate. Over a quarter of the respondents in both programs had participated for 15 years or more with the monitoring programs. Respondents were moreover evenly distributed in terms of years monitoring with approximately one quarter having monitored less than five years. Half of all survey respondents said they engaged with local officials and their community on lake issues, and a little over half participated with voluntary or appointed committees in their communities. About 40% of the respondents were retired and a third had a background as educators.

Just over half of the respondents monitored with additional programs. One-third of these respondents were involved in state programs to prevent the spread of invasive aquatic species, with most mentioning the state Lake Host and Weed Watcher programs. Respondents also monitored rivers and watersheds, loons, wildlife and backyard birds. In addition, the respondents reported 132 examples of their supporting environmental and community organizations based or active in New Hampshire, predominantly with a community or regional focus.

A majority of respondents named an individual lake as the lake or watershed issue they most engaged with, with many going on to name issues that for the most part related to land use, runoff, or invasive aquatic species. Over half of the monitors said they became more active on lake and conservation issues since beginning their monitoring experience.

Reaching Local Government and the Community

Approximately one-third of respondents reported that they began interacting or engaging with local government after they had begun participating with the lake monitoring programs. Respondents commented that the monitoring information provided credibility and confidence when approaching decision makers and helped maintain community interest in the lake environment.

Half of the respondents said local officials requested their input for lake and watershed decisions, for guidance, interpretation and education, and to clarify water quality and trends. Local officials referred to the monitoring data when adopting shoreline, zoning, watershed, and conservation ordinances, as well as master plans and easements, road and septic system improvements, and funding of monitoring, remediation and restoration projects. Responses did not always specify how the lake monitoring data had influenced those outcomes. Close integration of lake monitoring programs with lake associations often made it hard to distinguish the impact of the data from the advocacy efforts of its communicators.

Differences in how lake communities and local officials responded to lake monitoring and stewardship information appeared to be at least partly due to the values and awareness of their communities, the importance of the lake to the community and local economy, and relationships with the community and local officials. Respondents attributed property values, taxes and local economy, a crisis response, and a desire to avoid costs among the main factors motivating local government and community stewardship of the lakes. Non-monetary values were more disperse, including quality of life, health, future generations, community pride, ownership, recreation, aesthetics, and seeing positive results from stewardship efforts.

Cultivating relationships, trainings and education helped improve government responsiveness to lake information. The Conservation Commissioners emerged as the most likely partners for lake

protection, while Planning Board officials were most frequently noted as the local officials requesting input. Town Selectmen were viewed as either allies or obstacles, and mostly with ambivalence.

Approximately sixty percent of the respondents reported that they had presented lake monitoring information or mentored others in their community on lake stewardship practices. Lake association meetings, including those of neighborhood and road associations, were the most consistently mentioned way of sharing lake information to the community.

Other means of distributing lake information appeared more variable, differing across communities. Some respondents reported posting lake monitoring reports in Town Halls and on lake association and municipal websites. To a more varied degree, respondents distributed monitoring information to libraries, schools and local organizations, in newsletters and during town events. One respondent requested the lake programs provide guidance on where to distribute lake reports.

Poor compliance and enforcement of the Shoreland Protection Act, the only piece of legislation named by respondents in the survey, was a frequently mentioned source of frustration. Respondents said residents in their lake communities hesitated to report shoreline violations, wanting to maintain good relations with their neighbors. They also said developers ignored regulations and local officials did not intervene. An anonymous reporting scheme was suggested by one respondent. Others said education of shoreline residents and property owners should be a priority. Respondents perceived shoreline residents as a particular group on account of their direct impacts on the lakes.

About one-quarter of the respondents said local schools had used lake information in elementary and high school classes and projects, or in undergraduate research. Respondents engaged students in lake stewardship projects and recruited them in volunteer projects. Approximately half of the respondents did not know if their schools used monitoring information.

Collaborations

Approximately one-quarter of the respondents and their associations reported that they had collaborated with peers on other lakes. The collaborations provided opportunities for respondents and their associations to share knowledge and learning and to maximize resources by sharing equipment and organizing joint trainings and other activities.

Program Feedback

Respondents requested electronic versions of lake reports for personal access and for wider distribution. They also voiced a preference for email as the means of receiving direct communications from the lake monitoring programs. A few respondents asked for data in real time as it became available, rather than waiting for annual or biennial reporting. There was an even split between respondents who wanted comprehensive lake reports and those preferring simpler reporting in layman's terms. One respondent suggested stand-alone, non-technical fact sheets summarizing longer reports to distribute to lakeside residents as an education tool.

Regarding monitoring for new parameters, respondents expressed interest in trend analyses, lake comparisons, and monitoring social indicators. About one-fifth of the respondents voiced interest in further trainings to develop skills and knowledge on advocacy, PowerPoint presentations, lake and conservation science issues, and stewardship techniques.

Conclusions and Observations

- The active community engagement of the respondents and the retention and steady recruitment of the lake monitoring programs indicates a stable, committed and knowledgeable base of citizens that adds to the stewardship and decision-making capacity of lake communities.
- The extended monitoring of invasive species, rivers, watersheds and wildlife by the majority of respondents provides additional capacity to programs that extend beyond their lake communities.
- The lake monitoring programs appear to motivate and support civic engagement. Many respondents reported their level of engagement in the community and interaction with decision makers increased during, after or as a result of their participation in the programs.
- These survey provides some evidence that the lake monitoring information informs decisions in many communities. Over half of the respondents said their town officials had actively requested lake information, and many provided examples of resulting ordinances, master plans, zoning, and management decisions. Not all respondents shared this experience, however, indicating that in many communities this potential had yet to be realized.
- Building relationships with local government and the community increased the receptiveness to lake information, according to some respondents. Program encouragement and support, with peer-to-peer sharing of experiences and ideas, could help monitors who want to build these relationships. Conservation Commissioners emerged as potential allies when first engaging with town officials.
- Lake associations were the most consistently reported means of delivering lake information in the communities, after which paths of communication varied. While communities differ and no one size fits all, more delivery strategies could make pathways for information distribution more predictable.
- Respondents voiced less certainty on whether lake information had changed stewardship practices in the broader community, perhaps partly because changes in behavior and values stand out less prominently than town decisions. Identifying indicators to track changes in how communities receive and respond to lake stewardship information would help future assessments.
- Two areas, schools and collaborations, emerged as potential opportunities for further exploration and where the lake monitoring programs could potentially lend support.
- A desire for better improved shoreline stewardship and compliance with shoreland regulations emerged from many responses and could be a topic for further shared learning.
- Digital communications emerged as a strong preference. Respondents asked for online posting of lake data, reports and archives and use of email between the program and volunteers.
- The suggestion of stand-alone factsheets summarizing lake reports for distribution to shoreline residents, town officials and others in the community could also resolve the split among respondent preferences for simpler versus more technical reporting.
- Further tracking on the use of lake monitoring information in the community would help future evaluations on the integration of monitoring data in local decisions. Interviewing town officials and other members of the communities could provide insights to overcome communication barriers.
- Finding training opportunities for interested participants would support those respondents who wish to develop skills in presenting and communicating lake information in their communities.
- Further discussions are likely to generate ideas that lead to new pathways of integrating the science of the citizen lake monitoring programs into the decisions of New Hampshire's lake communities.

1. Introduction

Citizen science differs from traditional scientific research models by engaging citizens directly in the scientific research process. While this engagement typically involves volunteers helping collect data that researchers might not otherwise be able to get on their own, citizen science can also involve citizens in the development of research questions, study design, or interpretation of results. The goals of a citizen science program can also extend to social outcomes. For example, a citizen science program might envision that the involvement of citizens in local environmental monitoring will contribute to a more informed stewardship of their natural resources and environment.

In the state of New Hampshire, two established volunteer lake monitoring programs, the NH Lakes Lay Monitoring Program (LLMP) and the NH Volunteer Lake Assessment Program (VLAP) engage citizens in the monitoring of their local lakes. The programs assess lake water quality status and trends, and identify factors that may impact their condition. The University of New Hampshire (UNH) Cooperative Extension and the UNH Center for Freshwater Biology established the LLMP in 1979 to address the water quality interests of local lake associations. With a participatory research model and responding to issues on a local and regional level, the LLMP coordinates 215 volunteers on 34 lakes. Similarly, the VLAP is a cooperation between the New Hampshire Department of Environmental Services (NHDES) and volunteer monitors and lake residents. VLAP has been in existence since 1985 and currently engages approximately 500 volunteers in 143 lakes. In total, over 700 LLMP and VLAP volunteers monitor 174 lakes in New Hampshire. Volunteers from both the LLMP and VLAP programs collect water samples in their local lakes. The LLMP/VLAP programs coordinate and provide analytical services, guidance, resources and interpretation, as well as publishing annual or bi-annual reports on conditions and trends in lake water quality.

On top of their environmental monitoring objectives, the LLMP/VLAP programs also aim to improve lake stewardship by fostering community understanding of the environmental and conservation issues that affect their water resources and of the stewardship needed to maintain a healthy lake environment. Both programs encourage lake associations and monitors to distribute lake monitoring results and to serve as mentors in their communities, informing decisions and influencing behaviors and attitudes that affect the quality of their lakes.

In the spring and early summer of 2013, the LLMP and VLAP conducted a joint survey to better understand how the citizen lake monitoring information was distributed and received in lake communities. To answer that question, the programs turned to their monitors and participating lake association members and asked if they would share their experiences and thoughts. This report presents the responses of 123 lake monitors and lake associations on the use, distribution and influence of citizen science in their communities, followed by observations and recommendations emerging from the results. An appendix contains a more detailed summary of the results each individual question, including representative quotes from the monitors themselves. It is hoped that this report will help generate further benefits that will maximize the benefits and influence of citizen science in lake communities.

2. Survey Objectives

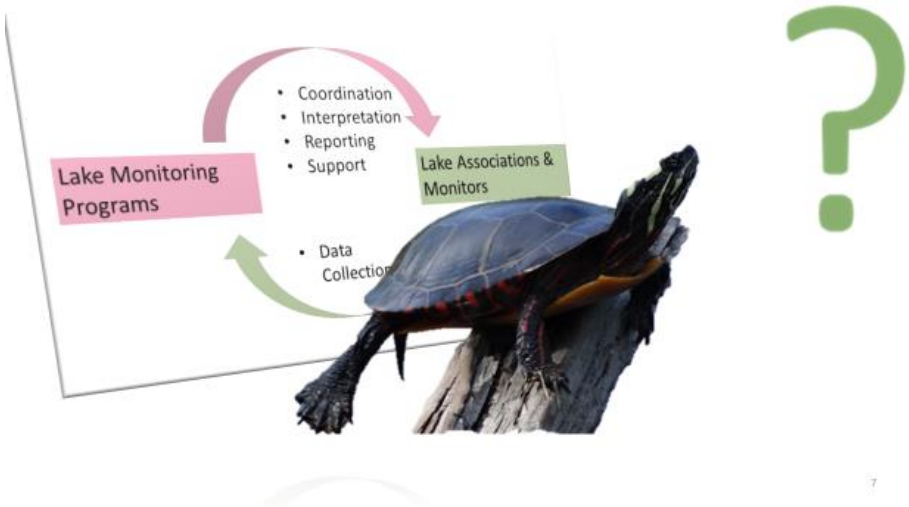
The *NH Citizen Lake Monitors Survey* aims to provide feedback from program participants that will help the two New Hampshire citizen lake monitoring programs evaluate how and to what degree citizen lake monitoring data reaches and influences the decisions and stewardship in lake communities. In so doing, the survey also seeks to shed light on the role that citizen science can play in environmental decision making.

Key question

Does the citizen lake monitoring science reach and inform decisions in lake communities and, if so, how?

To answer these questions, the survey focuses on five themes of interest. The first set of questions inquires about monitoring, environmental and community involvement of the respondents, and how these factors may be interrelated. The second set focuses on understanding how lake monitoring data is distributed, used and responded to by local governments. The third set of questions asks how lake monitoring information reaches and is used to mentor community stewardship behaviors and attitudes. The fourth set of questions looks for information about collaborations between monitors and lake associations across different lakes. The final set of questions requests feedback on LLMP/VLAP program communications, reports, and training needs.

Inclusion of direct comments from survey respondents in the final appendix of this report (omitting identifying information) further intends to bring life and a more intuitive understanding to the survey results. The comments of respondents represent an exchange of insights and experiences that may further serve to generate ideas and discussion for the effective communication of citizen science in New Hampshire's lake communities.



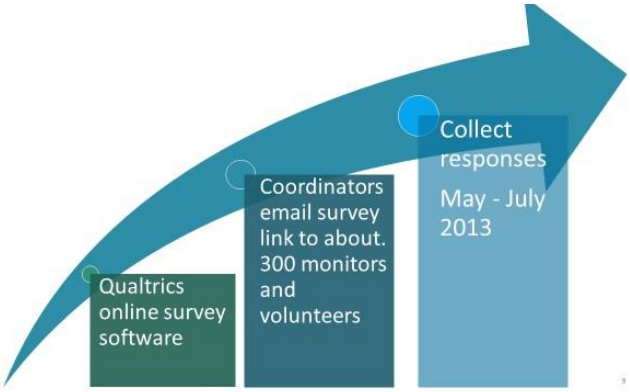
3. Methods

Originally conceived as an LLMP project in the fall of 2012, the *NH Citizens Lake Monitors Survey* was expanded that winter to include VLAP participation and input. In February 2013 the survey was reformatted from the Form Builder software program into Qualtrics survey software after UNH changed its survey platform and bought access into the online program.

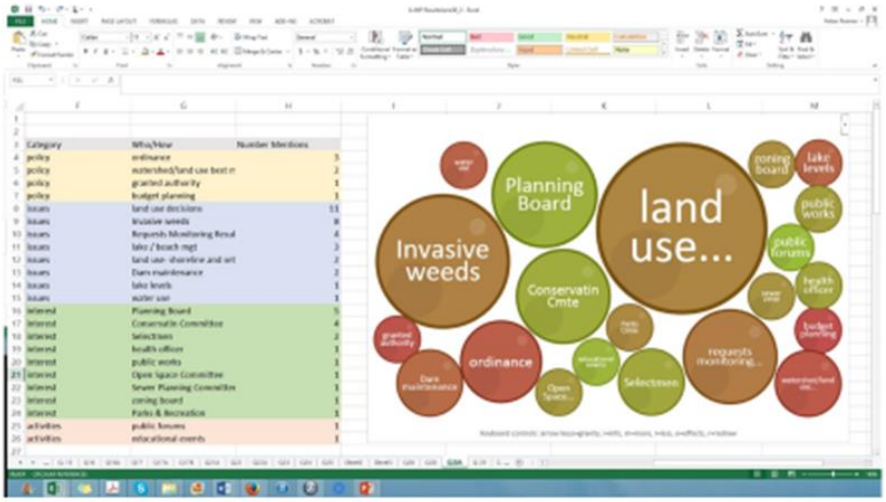
The survey was designed as a mix of 30 open-ended and non-guided questions, 26 closed multiple choice questions, and 7 multiple-choice with an "Other" option under which respondents could input short text. Questions were divided in five parts focusing on respondent backgrounds as monitors, engagement with local government, community stewardship, collaborations, and program feedback.

The UNH Institutional Review Board (IRB) reviewed and approved the survey design as complying with requirements for ethical research of human subjects. The survey included a letter of informed consent (Appendix A) for respondents to confirm in order to participate. Respondents did not identify themselves and could choose to complete the survey online or send by post.

In May 3013, LLMP and VLAP coordinators sent approximately 300 participants in the lake monitoring programs an email containing an invitation and link to join the survey. A few coordinators monitoring in larger lakes also forwarded the invitation to their volunteers, creating a small group of self-selected participants among respondents. The survey remained open until the end of July 2013.



Responses were collected and using Qualtrics Survey Software, while open-ended responses were further tabulated and categorized in Excel for qualitative analysis (Figure 1).



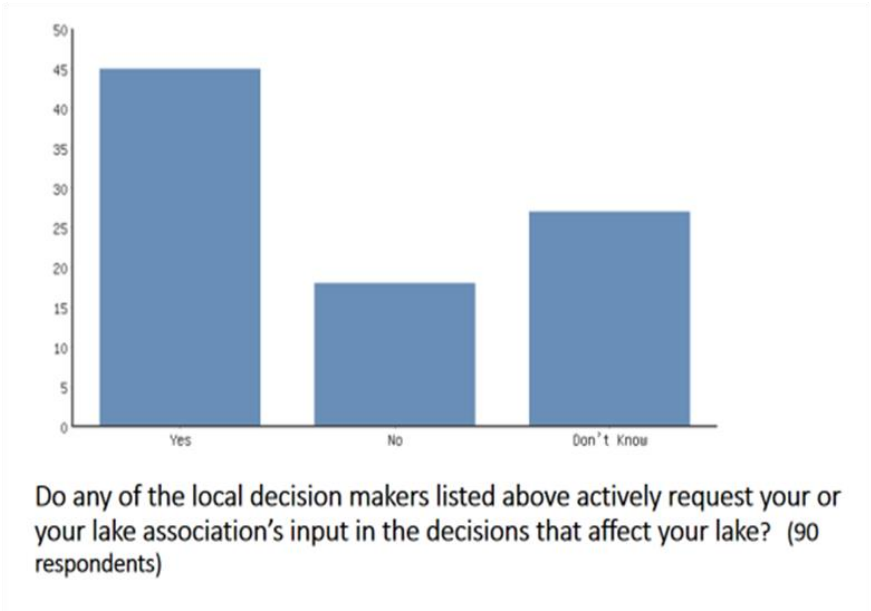


Figure 1 - Examples of survey quantitative and qualitative analyses. The top chart shows the analysis of an open-ended question asking respondents when their decision makers had requested lake monitoring data and information (above). The lower chart shows output from the Qualtrics survey software displaying a quantitative breakdown of respondents answering whether their decision makers actively requested their input.

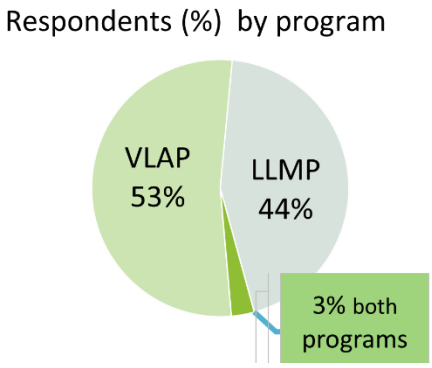
4. Results

4.1 About the Respondents

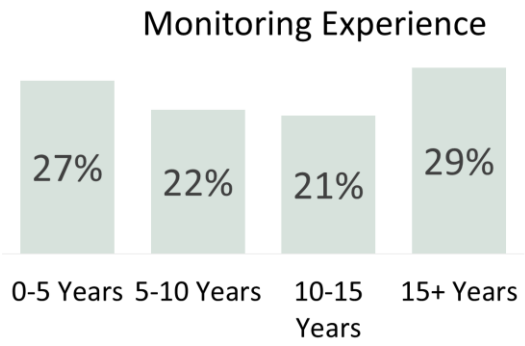
The survey received responses from 123 participants, representing an approximate 40% response rate. All respondents chose to fill in the survey online. Of these, 46% of the respondents were from the LLMP and 53% from VLAP. Three respondents participated in both programs. Responses were analyzed in aggregate as no statistically significant difference was found in the quantified responses to multiple choice questions, outside of a single question that had a slight difference regarding specifics of individual program feedback.

``=Half of the respondents participated with voluntary or appointed community committees. Slightly less than half of the respondents were retired. Almost one-quarter of the respondents had a background as educators. Other respondents included business owners, a president of a home owners association, property owners and residents, and were professionals in chemical health safety, biology and engineering.

``***Monitoring Experience*** - Over one-quarter of the respondents had volunteered with their programs for more than 15 years (31 respondents, or 29%). Those with 5-10 years, 10-15 years, and 0-5 year's participation in the programs were fairly evenly divided. There were 6 respondents having less than 2 years' experience with the programs. About half of respondents described themselves as lake monitors, one-third as lake or watershed association officers, and a little over one-tenth coordinated activities with the lake monitoring programs in their communities (15 or 10%).



About one-half (57) of all survey respondents participated in other monitoring programs. Close to one-quarter participated in more than two other citizen monitoring programs. Most of these programs involved invasive weed monitoring, mainly with the NH DES sponsored Weed Watchers (44), Lake Host (18) programs, or both (14). Others monitored river and streams, or tributaries, in programs that included the NHDES Volunteer River Assessment Program, River Runners and the NH Rivers Council, as well as Individual River and watershed programs. Lake monitors also participated in loon, wildlife, and backyard bird and boat censuses.



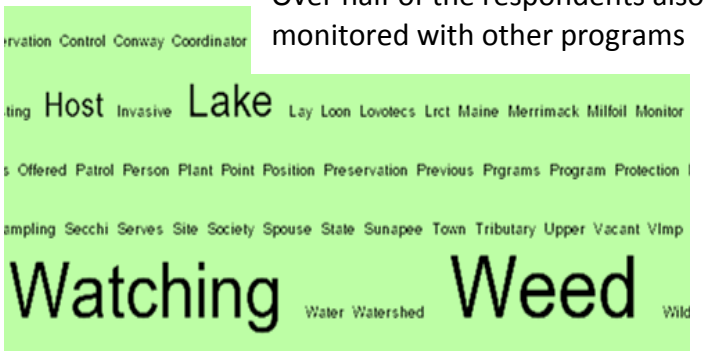
Out of 100 respondents, a little over half (56) said that since joining the lake monitoring programs they

had increased their involvement in lake or conservation issues. Many respondents elaborated saying that since they joined the LLMP/VLAP, they had increased their involvement by becoming more active with their lake association, by acting as general mentors in their lake communities, or by assuming new roles in their local government and community and conservation organizations. Others sought out learning opportunities, recruited others in activities, learned new stewardship or generally increased their awareness of activities and impacts on the lake. One learned new gardening skills and introduced them into the lake community.

Affiliations - Two-thirds of respondents supported 173 memberships in community and environmental organizations. Of these, 128 organizations were based and active in New Hampshire. Close to half of the memberships supported groups active at a community level. Respondents mostly named organizations focused on water (lake, watershed, river, fish and loons), conservation (e.g., land trusts), or bird and wildlife.

Lake Concerns and Activity - Respondents engaged with a total of 90 lakes. Some respondents were active on more than one lake. Larger lakes had more than one respondent. Three large lakes had 13, 6 and 5 respondents each.

Over half of the respondents also monitored with other programs



Out of 93 respondents, over half named their individual lake as their main lake or watershed issue (49). Many respondents also said they worked on issues specific to water quality, invasive aquatic species, and land use and watershed issues, such as tree planting, and road salt reduction efforts. Respondents also engaged in lake management issues relating to dam maintenance, lake levels, safe boating, wildlife protection, loon preservation, lead sinkers, fisheries management and stocking.

Most of 97 respondents named more than one concern when asked to identify the most important issues in their lakes. Top lake issues, according to number of mentions, were water quality issues related to land use, lakeshore and watershed stewardship (62), followed by invasive species (38), safe and environmental friendly boating (14), lake levels (6), fish stocking methods (1), protection of wildlife and habitat, and climate change. Water quality concerns were predominantly interrelated issues concerning land use, shoreline protection and stewardship, watershed scale management, run off and erosion, development, fertilizers and nutrients, and septic systems. Additional water concerns included health and the use of lake water, acid rain, bacteria, and mercury in fish.

Respondents engaged with a total of 90 lakes. Most named their individual lake as their number one lake or watershed issue.

Respondents also named social issues among their top lake concerns, most frequently education of the public in general, and of lake shore property owners, residents, and boat users in particular. Policy concerns were enforcement, compliance and strengthening of existing regulations regarding the Shoreline Protection Act (6) and lake limits on boat speeds and horsepower. Funding of invasive weed programs (3) and the need for greater state support

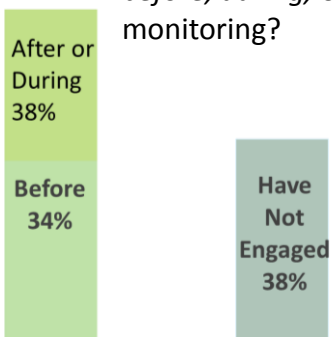
of lake protection efforts (2) were also mentioned. One respondent said that respect for people, as well as the environment, was a top lake issue.

Respondents also gave examples of *how* they addressed these issues, often taking roles as advocates, monitors and stewards. Respondents acquired grants, managed projects, educated their communities on watershed best practices, engaged with their conservation commissions, coordinated volunteers, advocated for town funding and matching grants for their lakes and watersheds. They also shared information in discussions with their neighbors and town officials, attended meetings, wrote letters, tested water and delivered samples and supplies, cleaned their shores, removed trash, yard sales, organized annual meetings and picnics, posted notices of events, forwarded newsletters from the state and other associations, and advocated legislation and enforcement.

4.2 Reaching Local Government

Experience with Local Government - At the time of the survey, 18 respondents were currently serving positions in local government departments or committees. Several held more than one position. Positions were mainly with the Conservation Commission (10), but also Planning Board (4) and Zoning Board (4), as well as the Budget Committee (1) and other local, state and regional offices and advisory committees.

Did you start engaging with local government *before, during,* or *after* monitoring?



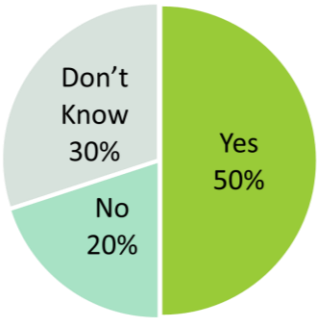
A little over one-quarter of 97 monitors said that their involvement with local government had begun during or after their experience with the lake monitoring program. One-third already had some involvement preceding their monitoring experience, while a little over one-third of the respondents had not engaged with local government.

Of the 97 respondents answering the question, two-thirds had engaged with decision-makers in their local government or community on lake issues. One half of 102 respondents had personally presented lake monitoring information to town officials. Respondents had primarily engaged on lake issues with their Selectmen, Conservation Commissioner, and members of their Planning Boards and Zoning Boards, as well as the town Budget Committee, Town Administrator, Public Work Officer and others.

In multiple choice responses respondents said they engaged with local government mainly through participation in public and town meetings, writing letters, commenting on town proposals, and informal discussions. In open-ended questions, the respondents also said they had shared data and presented information (10), requested funds (7), and prepared warrant articles (3), as well as serving in governmental positions. Respondents also said they kept an eye out for and reported local problems in their lake, managed town resources, such as the town boat launch, or worked with decision makers to fix problems affecting water quality.

Distribution of Lake Information - Respondents were evenly split between those who had personally presented monitoring data to local decision makers and those who had not. Out of the 98 respondents, two-thirds said their lake associations had presented local officials with lake reports, while only about ten percent said their associations had not. A quarter of the respondents did not know if their associations gave lake information to local officials.

Did town officials actively request input from you or your lake association?

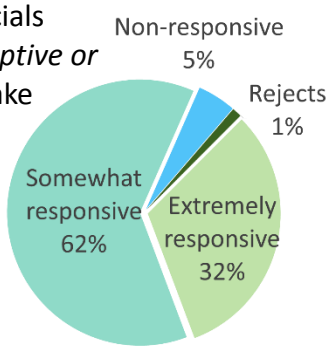


Requesting Input - Towns had requested information when fulfilling local, state or federal requirements, in response to public pressure, elections, and when the town was considered central to its community and economy. Half of the 90 respondents to the question said that their local decision makers actively requested their or their lake association's input on decisions affecting their lake and watershed. Input was primarily requested on decisions relating to land use, invasive species, and lake and beach management. One-third of the respondents did not know, while one-fifth of the respondents said their officials had not requested input.

Local Government Responses - Two-thirds of 85 respondents said their decision makers were "somewhat responsive" to lake information. One third found their decision makers to be "extremely responsive". Only three respondents said their decision makers were "non-responsive", and 1 that they "reject" lake information. When asked if they were satisfied with by how their decision makers responded to water quality and conservation issues, 93 respondents replied as follows: one-half were "satisfied", one-quarter of the respondents were "dissatisfied", and the other quarter had "no opinion".

Across questions, respondents indicated that the LLMP/VLAP programs provided them with tools and information that increased credibility when approaching local officials. Commenters said the lake programs increased awareness of local decision-makers, property owners and lake users, leading to better educated decision making and more people in the community keeping an eye on lake related activities. Some respondents said that the citizen monitoring lake information influenced greater compliance with shoreline regulations in their towns. Others noted instances when the programs provided the community with the knowledge and awareness to intervene and prevent or remedy problems or initiatives that would adversely affect the lake or watershed environment.

Most respondents found their town officials *somewhat receptive or responsive* to lake information

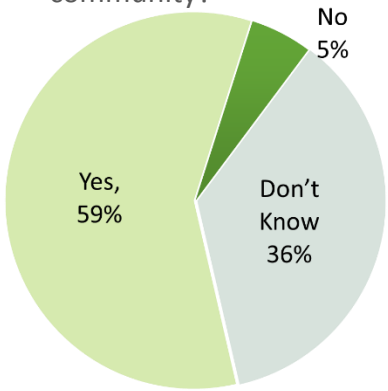


Informing Decisions – Over half (59%) of 94 respondents said that the LLMP/VLAP lake programs had made a difference in their local government's decisions on water quality, planning and conservation. One-third of the respondents did not know if the lake monitoring information had made a difference on local officials' decisions, while 5 respondents doubted or said not.

Towns referred to lake information at those moments when they had to prepare and make decisions on budget, ordinances and other regulations, or make lake or land management decisions.

Respondents also said that the local government had used the LLMP/VLAP information to clarify water quality status and trends. Lake monitoring data was credited for influencing support for septic control, road improvement and salt reduction, runoff control, or invasive weed prevention and removal, and land use projects. As well, respondents said the lake information had influenced 19 municipal policy decisions, such as ordinances, and town voter decisions.

Has the LLMP/VLAP made a difference in the decisions on water quality, planning and conservation in your lake community?

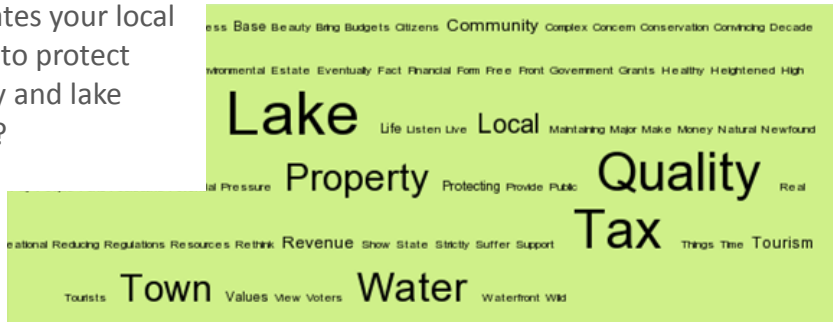


Respondents said local officials could be more proactive in protecting water quality by funding lake protection programs, by enacting and enforcing regulations and standards, and by becoming more knowledgeable and aware. Several respondents said their officials could be more proactive enforcing the state Shoreline Protection Act, with one respondent recommending an anonymous reporting system for shoreline violations in the community. Resource needs were mentioned for volunteer intensive invasive weed and eradication programs. Several respondents said their local governments should address septic system performance. Others were concerned about regulations and standards for development, zoning, buffering. A number called on the State of New Hampshire to take greater role and provide greater assistance.

Values and Motivations **-** Taxes and property values, as well as economic interests, were the most frequently mentioned factors motivating local officials to protect water and lake stewardship. Desire to avoid costs or a crisis (e.g., invasive species, degrading water quality or a cyanobacteria bloom) were also said to motivate officials. In other words, these respondents said their local officials were only receptive to water quality protection when they considered its relationship to economic values.

When lakes were seen as central to the community, respondents said their local officials were extremely responsive. This could be either because of the economic importance of a lake to an industry like tourism, or because of recognition of it as resource that enhanced quality of life in the community. A few respondents said local decision makers were motivated by their personal inclinations as property owners and citizens, as well as by idealism.

What motivates your local government to protect water quality and lake stewardship?



Remarks by several respondents in the survey remind that citizens are also decision makers in the local government. Persistence, public pressure, re-election, and an engaged community were cited as factors that motivate public officials to respond to water quality protection needs. On the other hand, a few respondents also commented that local officials also have to balance the lake information against budgetary or human resource limitations, or safety concerns (e.g., ice and road salt), limiting their responsiveness to water quality concerns.

Building relationships with lake associations helped increase the receptiveness of local officials to lake information in the communities of some respondents. Encouraging a town's Road Agent to participate in a NH Lakes Association workshop on road salt improved receptiveness in one community. Respondents gave examples of taking officials out on monitoring field trips, inviting them to attend lake association meetings and other outreach efforts.

Based on responses across questions, Conservation Commissioners were the local official most consistently described as receptive to lake information. Planning Board members were the local officials who respondents most frequently said had requested input, although how Planning Boards responded to the lake information was less certain. While some respondents were very happy with some of their Selectmen, others were dismayed. Respondents commented on the power of the Selectman in the community, often with ambivalence due to the uncertainty of their tenure.

4.3 Reaching the Broader Community

Mentoring Lake Stewardship - Out of 86 respondents, a little over half (58%)of the respondents had presented information or mentored others on how to practice lake friendly living, while a little under half said they had not done. The primary means cited for sharing lake information was at the lake, road and neighborhood association meetings and in discussions with neighbors and lakeside property owners and residents. Many respondents shared lake information in town meetings, special events, educational forums, and schools. Others communicated by writing newsletters, educational brochures and leaflets, published website articles, and sent out emails and mailings, or posted video clip. One respondent had organized a door-to-door education campaign, and another had enlisted support for a neighborhood covenant for lake-friendly property practices.

58% of the respondents had presented lake information or mentored others in their community on lake friendly living

VolunteerLakeAssessmentProgram_NHDES

Photo: VLAP

Sharing Monitoring Data - 60 respondents said that either they or their lake associations had presented lake monitoring data to their lake, road, or neighborhood associations, with schools, social media, businesses, youth groups, recreational groups, or churches.

Gregg Lake Association (2013)

Providing information on the distribution of lake reports in the broader community, most of 67 respondents said that reports were given to their local lake/neighborhood/road associations (35) or shared with neighbors, friends or co-workers (26). Lake reports were further distributed most consistently to town offices (25), libraries (14) and schools (11). Lake information was also published on lake association websites (15), on Town websites

Lake association meetings stood out as the most consistent way of sharing monitoring and stewardship information with the community.

(2), and in a town annual report. Other lake reports were displayed in a NH Fish & Game kiosk, in local businesses, recreation clubs, or communicated via newspaper articles, press releases or social media. Other respondents posted the information on the in garden clubs, or presented the lake information at community events, like Old Home Days.

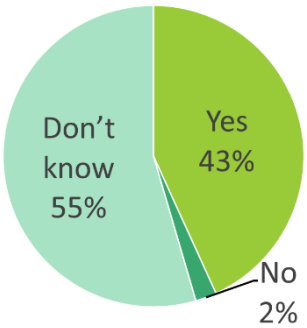
Perivier, H. (2013)

Lake Information was otherwise distributed in a diversity of ways that varied with community.

Community Response - Community members or bodies reviewing or using the lake information most frequently were lake associations (37), followed by friends/neighbors/co-workers (15), and schools (11). Other individual examples included a church, recreational clubs, and local businesses.

Many respondents commented about the influence of the monitoring data responses in general terms. These respondents said the lake monitoring reports influenced community support and participation in lake protection. Others said the lake information strengthened community capacity by providing a tool to educate and engage others, maintained community concern, creating a ripple effect that extended from the lake association through the community, and that it encouraged citizen engagement in local government.

Other respondents gave specific examples of how the lake monitoring information had been used in the community, although sometimes in unexpected ways. For example, fishermen referred to the lake information to locate temperature gradients where the fish might be hiding. Realtors used lake data for promotional purposes and property owners to promote real estate sales. More often the members in the community used the information for health, lake management or stewardship. One community referred to the lake reports in their look out for algal blooms. Residents in another lake referred to lake reports as an indication of whether water was safe for use around the household. Respondents also gave examples of the data informing local government decisions and town voters.



Have lake data and reports influenced community and active participation to protect water quality and your lake?

However, despite these examples, the greater number of respondents said they did not know if the lake monitoring information influenced support in their community for lake protection (48 or 55%), while three respondents said it had not. Respondents voiced frustration over lack of follow-up following association meetings. Others associated absence of a lake association or no public access to a lake with community lack of interest in the local lake.

Values and Motivation - Property values, tax revenues and economies motivated community attitudes and stewardship, according to a third of 75 respondents. Some respondents said it took bad news or a crisis, like a cyanobacteria bloom or an infestation of invasive aquatic weeds, to motivate

behavior. Health, recreation and aesthetic values of the lake were also recognized as motivating community attitude and behaviors for lake stewardship. Conservation and stewardship of the lake were also motivated by a desire to protect the value of the lakes for future generations, either for a family or for the community. Respondents also said that education and seeing the positive benefits of acting as a steward also motivated members of the community.

Schools - Out of 89 respondents, one-quarter said that their schools had used lake monitoring information, while slightly fewer number of respondents said their local schools had not. A little over one-half of the respondents did not know if their community schools had used the lake monitoring information. Lake information and program activities had been used from 5th grade through high school and in undergraduate research studies, including field trips, curriculum projects and class presentations and also engaging students in lake and watershed stewardship projects.

Photo: VLAP

4.4 Collaborations

Respondent and Lake Association Collaborations - While a little over one-third of the survey respondents and their lake associations had collaborated with their peers from different lakes, roughly two-thirds of either group had not or did not know.

A third of the respondents said they or their lake associations had collaborated with peers across lakes, sharing resources, ideas and experiences.

Collaborations were motivated by watershed issues and invasive species, by interconnected water bodies, or lakes shared across or within municipal boundaries. Peer-to-peer training and mentoring were the most common types of collaboration described, along with sharing resources, data and educational materials, or supporting or attending each other's activities and meetings. Respondents gave examples of joint Lake Host trainings, demonstrations and field trips, including a joint tour of stormwater projects. Others collaborated on a joint grant and acquired a diver-assisted harvester boat for invasive weed removal. Another mentioned participation in the national Secchi Dip-In.

The lake associations and monitors also collaborated with watershed and regional organizations. Watershed collaborations included a watershed survey, watershed protection plan, a state river nomination program, a watershed ordinance and watershed restoration projects.

State lake associations (the NH Lake Association and the Maine Lake Congress) were cited by several respondents as providing platforms for between lake collaborations. Others talked about collaborations with other types of institutions and organizations. One association donated land to a local land trust.

Municipal Collaborations - A quarter of 88 respondents said their town collaborated with other towns on lake and watershed issues. Two-thirds did not know, while 14% respondents said their towns had not engaged in municipal collaborations to protect lakes and watersheds

Towns had collaborated on regional planning, watershed, river, or in lake management and restoration. The town of one respondent had worked with the neighboring community to remediate pollution from a leaking septic treatment facility. Other communities shared share monitoring costs. Towns also cooperated on milfoil eradication, including the above mentioned purchase of a milfoil suction machine.

Cross Border Impacts - More than half (57%) of 86 respondents did not know if actions on their lake had affected the lakes and watersheds of other communities. About one-quarter of the respondents said that said that actions on their lakes affected the lakes and watersheds of other communities. 17 respondents said actions on their lake had not affected the lakes and watersheds of other communities. There was an error in the online survey and so no responses were obtained regarding how respondents perceived other lakes and watersheds to affect their own.

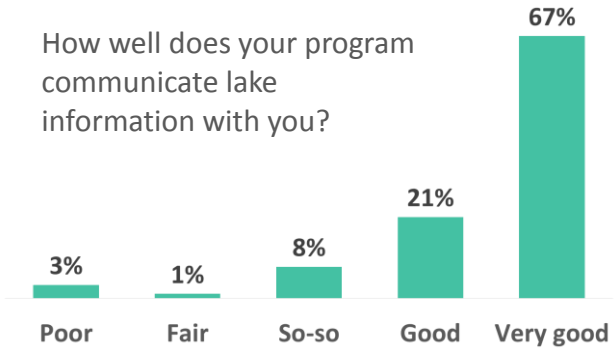
Just under half (45%) of 89 responses did not know if actions in neighboring communities affected their lakes. About one-third of the respondents said that actions in neighboring communities had not impacted their lake, while one-quarter said they had made impacts.

Respondents said neighboring communities were sources of both positive and negative impacts. Weed watching and Lake Host activities in neighboring towns were perceived as positively impacting a respondent's lake by protecting them from invasive species. On the flip side, the lack of invasive species prevention efforts in neighboring communities worried other respondents. Stronger watershed standards in one community were perceived as impacting neighboring towns positively. The unharmonious regulations of two neighboring towns on the same lake caused one respondent concern. Mercury contamination of a lake from incineration emissions from another community was mentioned by one respondent, serving to remind of the potential for long distance impacts between communities.

4.5 Program Feedback: Communications, Monitoring and Training

When 87 respondents rated how well their program communicated lake information to them, Responses were "Very Good" (67%), "Good" (21%), "So-So" (7%)," Fair" (1%), and "Poor"(3%). Five respondents had no feedback. Ten gave positive feedback on the current level of program communications and indicated no improvements were needed

The most frequent suggestion for improving communications was for increased and timelier access to lake monitoring data and reports by having lake reports and data posted online. A number of respondents requested that monitors receive copies of lake reports. Others wanted to see a wider distribution of the reports and copies in the community. One respondent requested guidance on how best to distribute the reports.



Respondents also suggested a communications protocol to implement in the case of an unforeseen event or change of conditions on their lake. A few respondents called on New Hampshire to reinstate full state funding of its lake monitoring program.

Lake Reports

When asked how LLMP/VLAP could improve lake reports, many respondents commented favorably on the current lake reports, while 5 had no feedback.

Many respondents requested that reports be made available in electronic formats that they could access for their own use and distribute more widely, for example to post online, send by email or use in PowerPoint presentations. Others thought that the reports could be made more visible in the community. A number of respondents also asked for a quicker turnaround or more frequent reporting.

Respondents were split between those preferring technical reports and those who wanted reports in simpler layman's terms..

A few suggested stand-alone report summaries they could distribute to neighbors and lake-side residents.

Respondents were evenly split between those who preferred comprehensive data and analysis and those wanting more compact reports in layman terms. Among those wanting more comprehensive analysis, was one respondent who said the technical analysis in a lake report had been instrumental in receiving continued town financial support by demonstrating how the initial expenditures had provided positive results. Other respondents however were frustrated by too much technical detail that they and others in the community found dense and hard to understand. As a possible solution to this divergence in preferences, five respondents said it would be useful to have a non-technical summary that would be backed by a fuller data and analysis. This was in line with requests to have a brief and non-technical summary of the monitoring data that could be given to property owners, used in newsletters, or posted on websites. A number of comments asked for more analysis of data, including trend analyses and comparison to other lakes.

Program communications

Out of 72 respondents, 71 preferred receiving communications from the lake monitoring programs by email or on a website. Of these, 10 respondents said either email or postal service was acceptable. When it came to bulky documents, many respondents asked for both hard copies and electronic versions. A couple of respondents preferred receiving information in person via workshops and meetings.

Monitoring and Training Needs

When asked about additional monitoring needs for their lake, 9 out of 44 respondents said that no additional monitoring was needed, while two did not know. The other 33 respondents had suggestions for additional monitoring. 20 respondents suggested monitoring for additional parameters, including nitrogen and other nutrients, leaking septic systems, sources of erosion and sediment, indicators of cyanobacteria, new invasive species, toxic chemicals such as metals, MBTE and pharmaceuticals, mercury in trophic levels, and chlorides. Remote sensing for phosphorous, chlorophyll and transparency in hard to access areas was also suggested. Respondents also proposed a thorough 10 year baseline study and cross lake comparisons.

Other monitoring needs mentioned by respondents included additional funding, monitoring equipment to test for chlorides, and more volunteers to support people-intensive Lake Host and other invasive aquatic weed programs. One respondent suggested involving more youth from the community.

Five respondents asked for annual state biologist lake visits, rather than every other year. One called to lobby the NH legislature to release more resources. One comment recommended monitoring for social indicators was needed “to find out…what are the factors that make the values change.”

Twenty-eight respondents said they would like more training to address water quality and stewardship issues with local government. Respondents who did not want more training explained that they were satisfied with existing training or could not take on more due to personal time constraints. Other respondents expressed interest in advocacy training, grant writing, preparing power point presentations, monitoring methods, and stewardship techniques to stay ahead of potential threats, reduce runoff and preserve pond life.

5. Comments about the Survey

This was a non-random survey and so does not claim to represent the views or experiences of the entire population of monitors with the lake monitoring programs, but only those who chose to respond.

The repetitive and open-ended aspect of the survey provided a self-validation mechanism in the reconfirmation of responses. Repetition of closely related questions reinforced associations and responses. This self-validation also helped remove potential personal biases that could be introduced in the analysis of the open-ended questions. The iteration of the open-ended questions further gave respondents opportunities to introduce related pieces of information throughout the survey that might otherwise have been omitted. On the other hand, the length and repetition of the survey was no doubt tiring for respondents and appear to have led to responder fatigue. Fewer respondents were answering open-ended questions towards the end of the survey and respondents referred to their answers in previous questions. The varying response rates to individual questions complicates comparisons between questions.

This was not a demographic survey. However, future inquiries along this topic would benefit from knowing if respondents are shoreline property owners or residents, seasonal or full-time residents in the community. Questions regarding gender, age groups, and additional professional breakdowns would also provide a fuller profile of New Hampshire's citizen lake monitors..

6. Conclusions and Observations

Capacity Building - This survey provides evidence that the citizen lake monitoring programs help build and maintain community capacity to address lake, watershed and conservation issues. This observation is reflected by the high retention rate of the programs, which contributes to a stable base of citizens engaged in the protection of lakes and watershed, and by the high level of community engagement of their participants. The survey results also indicate that the monitoring programs may motivate many monitors and lake association members to take their first steps in civic engagement. Close to one-quarter of all survey respondents said that they first became involved with local government during or following their experience with the lake monitoring programs. In addition, approximately half of the respondents said they had become more involved in conservation and lake issues since joining the lake monitoring programs. Respondents commented lake monitoring information provided credibility and confidence when approaching decision makers, as well as maintaining interest and awareness in the community.

The capacity supported by the lake monitoring programs, moreover, appears to extend beyond community boundaries. Over half of the respondents also monitored rivers, watersheds, loons and other wildlife. One-third of all survey respondents participated in programs to prevent the spread of invasive species in the state. The survey participants combined to represent 90 lakes in New Hampshire. Many of the respondents tended to more than one lakes, and several respondents monitored the same lake, adding up to what can be considered a total of 123 “lake unit” efforts. Altogether, survey respondents reported 173 memberships with environmental and community organizations, with 128 supporting organizations based and active in the state of New Hampshire.

Communication and Informing - Respondents provided many examples of the citizen lake monitoring information informing decisions in their communities by influencing policies, projects, and expenditures. Local officials had referred to LLMP/VLAP information when making decisions on lake and land management, town budgets, preparing ordinances, regulations, best management plans, water levels, beach management and fish stocking. Lake monitoring data also influenced support for runoff and erosion control, septic system replacements, road improvement and salt reduction, dam removals, invasive weed prevention and extraction, and land use and restoration projects. Over a third of all survey respondents said that their town officials actively requested their or their lake association’s input when making decisions that would affect the lake and watershed. Town officials looked to their lake associations for guidance and interpretation, to clarify the status and water quality trends of the lake, education on lake issues, and for help in complying with local, state and federal regulations. Voters had also referred to lake monitoring information in several communities, influencing voting outcomes in the local democracies.

With that said, it was not always clear in many of the examples exactly how the LLMP/VLAP information influenced the decision outcomes. The lake associations and the LLMP/VLAP programs were closely meshed, making it hard to tell to tell whether it was the monitoring data or the public advocacy that most motivated local officials. This in itself could be an indicator of the integration of the citizen science programs with those community organizations that have the greatest interest in their local lakes. Tracking how local officials and the community receive and respond to the lake information would help future evaluations of how monitoring data is used and received.

The reception of lake monitoring information by local governments varied according to respondents and across survey questions. These questions involved the perceived responsiveness of local decision makers and the community, satisfaction with that response, and perceptions of whether

the lake monitoring information had made a difference in local decisions and community stewardship. Close to two-thirds of the respondents said their decision makers were “somewhat responsive" and one-third said “extremely responsive”. About half of the respondents said they were satisfied by local government response, one quarter were dissatisfied and one quarter did not know. More respondents said lake information had made a difference in local government water quality decisions than in influencing community support and participation in lake protection. One possible contributing factor may be that tracking changes in the community are less distinctly visible than public decision making, indicating a possible need for indicators that would help future tracking of changes in community behavior, practices, attitudes and values.

Differences in lake communities and local officials responsiveness to lake information appeared to be at least partly due to differences in the availability of resources to monitors and their associations, community values and awareness, the importance of the lake to the community and local economy, and in relationships that monitors and lake associations had with the community and its decision makers. Respondents attributed property values, taxes and local economy, a crisis response, or a desire to avoid costs among the main factors motivating local government and community stewardship of the lakes. Non-monetary values were more disperse, including quality of life, health, future generations, community pride, ownership, recreation, aesthetics, and seeing stewardship yield positive results. Respondents perceived shoreline residents as a particular group on account of their direct impacts on the lakes, either negatively or positively.

Building relationships, public pressure, training and education appeared to improve responsiveness of town officials in some communities. Respondents gave examples in which they cultivated relationships by taking town officials on monitoring trips and inviting them to lake association meetings. One respondent engaged a road agent in a NH Lakes Association training with positive outcome. Other respondents educated their officials in presentations and other means. Throughout the survey Conservation Commissioners appeared to be the most likely partner in local government. Planning Board members were reported as those officials that most actively requested input for decisions, although not always heeding it. Selectmen were more variable as either allies or opponents and perceived with greater ambivalence. Interviewing local officials and members in the community on their perspectives and values could provide information to help plan for more effective communications, as well as helping future evaluation.

Approximately half of the respondents had delivered lake information to their decision makers and had mentored others in their community on how to practice lake stewardship. The primary venue for presenting lake monitoring information to the community was at lake, neighborhood or road association gatherings and at Town meetings. Respondents most frequently posted the lake reports in town halls, lake association websites, and to a lesser degree libraries and schools. The diversity of examples revealed many innovative ways of getting the lake information out into the community, but also suggested an overall uncertainty. Guidance and suggestions in where and how to deliver lake information from the monitoring program, as well as sharing of ideas between monitors and associations, could help ensure a more consistent and certain delivery.

***Protecting the Shoreline* -** Shoreline protection presented particular challenges to monitors. The fact that the Shoreland Protection Act was the only piece of legislation specifically named in the survey highlights the importance of this policy in the minds of the respondents. Many expressed frustration in their community’s poor compliance and enforcement with the law. According to these respondents, residents in their lake communities hesitated to report shoreline violations because they feared to stir up ill will with their neighbors. An anonymous reporting scheme was suggested as a potential solution to

this dilemma. Other respondents said educating shoreline residents and property owners should be a priority.

Opportunities with Collaborations and Schools - Both collaborations between monitors and associations on different lakes and outreach to schools and colleges appear to offer promising and relatively untapped areas of engagement. Collaborating gave respondents a chance to share knowledge and learned experiences and to combine resources for monitoring, training and other activities. Engaging schools provided opportunities to introduce young people to lake science and conservation, as well as to engage them as volunteers in community lake and conservation stewardship programs.

Program Feedback - This survey found that lake monitors and lake associations have moved into the world of online communications. Respondents requested that the programs publish monitoring data and reports in electronic format so that they could access and distribute them more widely. Respondents overwhelmingly preferred email for routine communications with the programs. A number of monitors also requested that the programs upload monitoring data in real time. A few indicated their desire to have greater ownership of the data to do their own analyses. One respondent suggested a communications protocol to respond to a change in lake condition.

Respondents were split between those preferring comprehensive lake reports and those preferring compact reports in non-technical terms. As a potential solution to this dilemma, several respondents recommended having comprehensive reports accompanied by stand-alone, non-technical summaries that could serve as fact sheets for distribution to local officials, lakeside property owners, and others in the community. In addition to testing for other parameters, respondents expressed interest in trend analyses and lake comparisons. 28 respondents were interested in further trainings in advocacy, PowerPoint presentations, lake and conservation science and issues, and stewardship techniques.

A summary of points made above is provided below and included in the Executive Summary.

- The active community engagement of the respondents and the retention and steady recruitment of the lake monitoring programs indicates a stable, committed and knowledgeable base of citizens that adds to the stewardship and decision-making capacity of lake communities.
- The extended monitoring of invasive species, rivers, watersheds and wildlife by the majority of respondents provides additional capacity to programs that extend beyond their lake communities.
- The lake monitoring programs appear to motivate and support civic engagement. Many respondents reported their level of engagement in the community and interaction with decision makers increased during, after or as a result of their participation in the programs.
- These survey provides some evidence that the lake monitoring information informs decisions in many communities. Over half of the respondents said their town officials had actively requested lake information, and many provided examples of resulting ordinances, master plans, zoning, and management decisions. Not all respondents shared this experience, however, indicating that in many communities this potential had yet to be realized.
- Building relationships with local government and the community increased the receptiveness to lake information, according to some respondents. Program encouragement and support, with peer-to-peer sharing of experiences and ideas, could help monitors who want to build these relationships. Conservation Commissioners emerged as potential allies when first engaging with town officials.

- Lake associations were the most consistently reported means of delivering lake information in the communities, after which paths of communication varied. While communities differ and no one size fits all, more delivery strategies could make pathways for information distribution more predictable.
- Respondents voiced less certainty on whether lake information had changed stewardship practices in the broader community, perhaps partly because changes in behavior and values stand out less prominently than town decisions. Identifying indicators to track changes in how communities receive and respond to lake stewardship information would help future assessments.
- Two areas, schools and collaborations, emerged as potential opportunities for further exploration and where the lake monitoring programs could potentially lend support.
- A desire for better improved shoreline stewardship and compliance with shoreland regulations emerged from many responses and could be a topic for further shared learning.
- Digital communications emerged as a strong preference. Respondents asked for online posting of lake data, reports and archives and use of email between the program and volunteers.
- The suggestion of stand-alone factsheets summarizing lake reports for distribution to shoreline residents, town officials and others in the community could also resolve the split among respondent preferences for simpler versus more technical reporting.
- Further tracking on the use of lake monitoring information in the community would help future evaluations on the integration of monitoring data in local decisions. Interviewing town officials and other members of the communities could provide insights to overcome communication barriers.
- Finding training opportunities for interested participants would support those respondents who wish to develop skills in presenting and communicating lake information in their communities.
- Further discussions are likely to generate ideas that lead to new pathways of integrating the science of the citizen lake monitoring programs into the decisions of New Hampshire's lake communities.

7. Final Remarks

The NH Lake Monitors Survey has found that the LLMP/VLAP lake monitoring programs support and maintain a cohesive group of citizens who engage with their local governments and mentor their neighbors, benefiting New Hampshire and its lake communities. In addition, the survey results show that the lake monitoring data informs decisions in many lake communities. Local officials consulted lake monitoring results and requested input from monitors and their associations when developing ordinances and zoning regulations, funding and implementing invasive weed prevention, pond restorations, watershed master plans, dam removals, road and septic improvements, and in many other examples. Based on survey responses, this report has made suggestions towards the delivery and influence of the lake monitoring information in lake communities. Recommendations focus on program guidance, across lake collaborations, building relationships, engaging schools, addressing shoreline challenges, lake report contents and formats, as well as interviews of local decision makers and members of the community, and tracking their future use of lake monitoring results. Direct quotes from respondents, included in the final appendix of the report, best convey the thoughts of the lake monitors and association members who participated in this survey. The author of this report hopes that this survey will encourage discussion on how to further realize the potential and benefits of citizen lake monitoring in New Hampshire's lake communities.

Appendix A - Consent Agreement

Dear Lake Association Members and LLMP / VLAP Volunteers,

The New Hampshire Lakes Lay Monitoring Program (LLMP) at the UNH Center for Freshwater Biology and the DES New Hampshire Volunteer Lake Assessment Program (VLAP) are together evaluating how well New Hampshire's lake citizen monitoring programs are influencing the decisions that affect our lakes and watersheds. To answer this question, the LLMP and VLAP programs turn to you, citizen monitors and lake association members who are closest to New Hampshire's lakes, and ask your help by filling in the attached survey.

Please take a few moments to read the information below. The survey includes a mixture of both specific and open-ended questions asking about your experience with LLMP and VLAP, your local government and community organizations. We estimate that completing the survey will require about 30 minutes of your time. After choosing to participate, you may continue and submit your responses online. If you prefer, you may also request a hard copy that you can return by mail. So as to be able to compile your results in a timely manner, please send in your answers as soon as possible and no later than May 31.

My name is Helen Perivier and I am a graduate student studying with the UNH Department of Natural Resources and Environment. I will be the person collecting and compiling the responses. Between the LLMP and the VLAP, we will send the survey to approximately 150 citizen lake monitors. These questions have been developed together with Bob Craycraft and Jeff Schloss at the LLMP and with Sara Steiner, DES coordinator of the VLAP; however, I will be the researcher doing initial data analysis and reporting. The results may be used in program and academic reports, presentations, and publications.

This is a voluntary survey and neither the LLMP nor the VLAP can offer any compensation for your participation. However, the programs do hope that this evaluation will result in an improved delivery of resources in your lake community. Please note that participants must be at least 18 years of age. The LLMP and VLAP staff and I will protect the anonymity and confidentiality of participants to the extent legally permitted. For those responding by mail, the information you provide will be stored in a secure location. Online participation is not expected to present any greater risk to personal privacy than encountered in everyday sending and/or receiving information over the Internet. However, all reasonable efforts have been undertaken to minimize any privacy risks. Data will be reported only as grouped results or anonymous quotes.

If you have any questions about this survey and its procedures before, during, or after the study, you may contact me at helen.perivier@unh.edu, or by calling or writing me at the address below. You may also contact my faculty adviser, Dr. Mimi Becker, at the same mailing address, by email (mimi.becker@unh.edu) or telephone (603) 862-3950. If you have questions about your rights as a research participant, please contact Dr. Julie Simpson in UNH Research

Integrity Services at (603) 862¬2003 or julie.simpson@unh.edu to discuss them. At the end of the survey there is also a space where you may also ask any questions regarding the survey and its procedures and to request a summary of our findings.

The LLMP and VLAP programs value your input. Thank you on behalf of the NHDES and the Center for Freshwater Biology for your commitment to the protection of New Hampshire's lakes!

Helen Perivier

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University of New Hampshire
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Appendix B - List of Questions

PART ONE – INDIVIDUAL BACKGROUND

Q 1 To participate in the study, please indicate your consent.

Q 2 With which program do you volunteer?

Q 3 For how long have you been a monitor or lake association member?

Q 4 How would you describe yourself? [1]

Q 5 Do you participate in other monitoring programs?

Q 6 If so, which ones?

Q 7 What lake or watershed issues do you engage in?

Q 8 Do you belong to other community or environmental organizations?

Q 9 If yes, which ones?

Q 10 If yes, did you join before your LLMP/VLAP experience?

Q 11 Have you become more involved in lake or other conservation issues by being a citizen lake monitor or lake association member?

Q 12 If Yes, how has your involvement increased? Please explain how and why. If you answered No, please explain whether you would like to be more involved in the future and how.

Q 13 Before your involvement with the LLMP/VLAP, were you a member of any of the following [local government departments/officers]? (check all that apply) [2]

Q 14 Are you currently a member of any of the following? (check all that apply) [2]

Q 15 Did you start participating with local government before, after or during your LLMP/VLAP experience?

Q 16 What lake(s) are you involved with?

Q 17 What do you think is the most important issue(s) for the protection of your lake?

PART TWO – LOCAL GOVERNMENT

Q 18 Have you personally presented monitoring data and other LLMP/VLAP reports LLMP/VLAP information to decision makers (for example, local government officials) in your community?

Q 19 Has your lake association presented monitoring data and other LLMP/VLAP reports LLMP/VLAP information to decision makers in your community?

Q 20 If yes, to whom? (check all that apply) [2]

Q 21 If yes, how have they used that information? Please give specific examples if possible.

Q 22 Have you engaged with decision-makers in your local government or community about lake issues, such as water quality, invasive weeds or lake friendly living?

Q 23 If yes, with whom? (check all that apply) [2]

Q 24 If you have engaged with these decision makers, please explain how (e.g., informal discussions, letters or written comments, participation in public or town meetings).

Q 25 If you have engaged with any of the decision makers listed above, please explain what issues you have discussed with them. (check all that apply) [3]

Q 26 Do any of the local decision makers listed above actively request you or your lake association's input in the decisions that affect your lake?

Q 27 If yes, please provide some examples.

Q 28 Has the LLMP/VLAP made a difference in the decisions on water quality, planning and conservation in your lake community?

Q 29 If yes, how? Please provide one or more examples.

Q 30 How receptive are the decision makers in your community to learning and responding to information about the status of your lakes and watershed? (Extremely/Somewhat/Non-responsive/Rejects Information)

Q 31 Please provide any details or specific examples of when your town either has or has not been responsive or receptive to lake information and why you think that was.

Q 32 Are you satisfied with how your decision makers respond to water quality and lake conservation issues? (yes / no / no opinion)

Q 33 Please explain, citing specific instances.

Q 34 If you feel that your local decision-makers should be more proactive in protecting water quality, what actions or initiatives would you recommend that they take?

Q 35 What do you believe motivates your local government to protect water quality and stewardship in your lake community?

PART THREE - COMMUNITY

Q 36 Have you or your lake association presented monitoring data and other LLMP/VLAP reports to any of the following in your community? (check all that apply) [4]

Q 37 Have you ever presented information or mentored others in your community on how to practice lake friendly living?

Q 38 If yes, please explain.

Q 39 Are reports on the condition of the lake water quality placed on any of the following locations as a resource for other community members? (check all that apply) [5]

Q 40 Please indicate which if any of the following community members or bodies that you know have reviewed or made use of the LLMP/VLAP information. (check all that apply) [4]

Q 41 If you indicated any of the above, please explain "how" they made use of the information.

Q 42 Have lake monitoring results been used for education presentations or student projects in schools?

Q 43 If yes, please explain.

Q 44 Has the LLMP and VLAP distribution of lake data and reports influenced community support or active participation in protecting the water quality and conservation of your lake and watershed?

Q 45 If yes, please provide one or two examples.

Q 46 What do you believe motivates public attitudes and behaviors towards water quality and stewardship in your lake community?

Q 47 Have you collaborated with other lake, road or watershed associations?

Q 48 If yes, please provide an example.

PART 4 – INTERACTIONS BETWEEN COMMUNITIES

Q 49 Has your lake association worked together with other lakes or watershed associations?

Q 50 If yes, please provide one or two examples.

Q 51 Are your lake and its community part of the New Hampshire coastal watershed?

Q 52 Has your local government engaged with other towns on lake or watershed protection issues?

Q 53 If yes, please provide one or two examples.

Q 54 Have actions in neighboring communities impacted your lake?

Q 55 If yes, how?

Q 56 Have actions on your lake affected the lakes and watersheds of other communities?

PART 5 – PROGRAM FEEDBACK

Q 57 Please rate how well your program (LLMP/VLAP) communicates lake information to you.

Q 58 Please provide suggestions on how you think program communication could improve.

Q 59 Please comment how lake report contents might be improved.

Q 60 Please comment how you prefer to receive information.

Q 61 What, if any, additional monitoring needs do you perceive for your lake?

Q 62 Would you be interested in training on how to address water quality and stewardship issues with your local government?

Q 63 What type of training would help you become more involved and/or have a greater impact when addressing water quality and stewardship issues with your local government?

_____

[1] LLMP or VLAP monitor/ Former monitor/ LLMP or VLAP coordinator / Serve on a community volunteer committee / Serve on a community appointed committee / Lake or watershed association officer / Currently an educator / Retired educator / Local business owner / Retired / Elected official / Concerned citizen / Other (please explain)

[2] Selectmen / Planning Board / Zoning Board / Conservation Commission / Parks Department / Open Space Committee / Health Officer / Watershed Associations / State and Regional Governmental Agencies / Regional Planning Commission / Land Trust / Other (please explain)

[3] Water quality / Development/land use impacts / Invasive weeds / Blue green bacteria/algae / Other (please explain)

[4] Neighborhood, Road or Lake Associations / Friends, Neighbors or Co-workers / Schools (students and teachers) / Personal Networks or Social Media / Local Businesses / Scouts and Youth Groups / Recreational Clubs / Churches / Other (please explain)

[5] Lake, Neighborhood or Road Associations / Town Offices / Friends, Neighbors or Co-workers / Libraries / Personal Networks or Social Media / Schools / Local Businesses / Recreational Clubs / Churches / Scouts and Youth Groups / Other (please explain)

Appendix C - Individual Question Results

Q1. To participate in the study, please indicate your consent. (123 respondents)

Q2. With which program do you volunteer? (104 respondents)

Fifty-five respondents participated with VLAP (53%) and 46 with LLMP (44%). Three respondents volunteered with both programs.

Q3. For how long have you been a monitor or lake association member? (107 respondents)

Over a quarter of the respondents had been a monitor or lake association member for 15 years or more (31 or 29%). The smallest group of respondents were those who had been a monitor or lake association member for two years or less (6 or 6%). The middle ranges were more evenly split among those with 2-5 years (21%), 5-10 years (21%), and 10-15 years (22%) participation.

Q4. How would you describe yourself? (108 respondents)

Aggregations below integrate 13 open-ended responses under "Other".

Most respondents considered themselves concerned citizens (61% of respondents). Half of the respondents served on community committees (51%), either on voluntary community committees (38 or 35%) or appointed community committees (17 or 16%). One member also served as a member of a land conservation trust.

Almost half of the respondents were retired (48 or 44%). About one-fifth (23 respondents or 22%) had background as educators, with 16 retired and 8 currently active in the school system. There were 8 local business owners (7%). Other respondents further described themselves as lake property owners (3), including a president of a home owners association; residents (2) and one non-resident Respondents volunteered information on their professional experience as health safety officers in the chemical industry (1), engineering (1) and biological research (1).

Half of the respondents volunteered as lake monitors (54 or 50%) along with 3 former monitors (3%). One-third of the respondents were officers with their lake or watershed associations, either as officers (32 or 30%), members (3), or employees (1). 15 respondents coordinated monitoring activities on their lakes (14%).

Q5. Do you participate in other monitoring programs? (105 respondents)

Approximately half (57 or 54%) of 105 respondents participated in other monitoring programs.

Q6. If so, which ones? (60 respondents)

Roughly three-quarters of the 60 respondents participated in invasive aquatic species monitoring and eradication programs, with 44 as Weed Watchers and 18 as Lake Hosts. Almost one-quarter (14) of these respondents participated in both the Lake Host and Weed Watcher programs (14).

60 respondents volunteered in at least one additional monitoring program to the LLMP/VLAP programs, altogether reporting a total of 88 monitoring activities in addition to their participation with

LLMP/VLAP. 42 respondents participated in the Weed Watching program and 18 participated as Lake Hosts (some with both programs). 24 respondents (40%) participated in 2 or more additional monitoring programs. In addition to lakes, respondents monitored rivers and tributaries (8 or 13%) with the Volunteer River Assessment Program (VRAP), River Runners, the NH Rivers Council, and with individual river and watershed associations and programs. One monitored coastal waters with Great Bay Watch. Three respondents monitored conservation easements and one monitored with the NH Lotic Volunteer Temperature Electrical, Conductivity and Stage Sensing network (NH LoVoTECS). Respondents also monitored wildlife, the loon census (8 or 13%) and backyard birds (1). One respondent monitored boat use on the lake.

Q7. What lake or watershed issues do you engage in? (93 respondents)

More than half of the respondents (49) named their individual lake(s) as the lake or watershed issue they most engaged in. Additionally, one-quarter of the respondents said water quality (18) and just slightly less said invasive aquatic weeds and species (15). Many respondents were engaged with land use issues relating to development, erosion, shoreline protection or non-point source runoff (16). Activities included specific mentions of restoration projects (2), septic issues (2), a tree planting (1), and road salt reduction (2). Respondents were also engaged with phosphorous and eutrophication (4) and cyanobacteria (1) in their lakes. In addition, respondents were engaged in lake management issues relating to dam maintenance (1), lake levels (1) and safe boating (1). Respondents also engaged in fish and wildlife protection (10), including loon preservation (5), lead sinkers (4), fish stocking and management (2).

Respondents also gave examples of *how* they engaged on issues as advocates, monitors and stewards. Respondents acquired grants, managed projects, educated their communities on watershed best practices, engaged with their conservation commissions, coordinated volunteers, advocated for town funding and matching grants for their lakes and watersheds, shared information in discussions with their neighbors, town officials, attended meetings, wrote letters, tested water and delivered samples and supplies, cleaned their shores, removed trash, held yard sales, organized annual meetings and picnics, posted notices of events, forwarded newsletters from the state and other lake information sources, and advocated legislation and enforcement.

Q8. Do you belong to other community or environmental organizations? (103 respondents)

Two-thirds (68) out of a total of 103 respondents to this question belonged to other community or environmental organizations, while one-third (35) did not.

Q9. If yes, which ones? (71 respondents)

Providing additional information, 71 participants reported a total of 173 memberships with community and environmental organizations, of which 128 organizations were based in New Hampshire (with some Audubon memberships unspecified as national or state-based). The majority of the memberships were counted as having a community scope, including collaborations between communities (71), while others included those with a state (54), regional (31), or national scope (25).

Types of organizations with the greatest membership were those with a water focus, including lakes, watershed, river, loons (63), land and conservation trusts (39), and those with a bird (24) or general wildlife focus, including hunting and fishing (8).

Organizations with the most memberships reported were the NH Lakes Association (12), Audubon (14), the Society for Protection of New Hampshire's Forests (or "Forest Society") (10), the Loon Preservation Committee (8), Nature Conservancy (6), Appalachian Mountain Club (4), Moose Mountain Regional Greenways (4), and Lakes Region Conservation Trust (3).

Non-environmental community organizations included membership and participation with local church and regional ministries (1), local libraries (2), professional organizations (2), the Humane Society, the state and national chapter of the BMW Motorcycle Club, garden clubs, fishing and hunting groups, the Humane Society, the Scouts, a regional broadband project, and other unnamed programs to help communities and people in need.

Respondents also reported their participation in a total of 10 local government positions and advisory committees, and 4 state committees.

Q10. If yes, did you join before your LLMP/VLAP experience? (72 respondents)

Of the 72 respondents, 43 (60%) had already belonged to community and environmental organizations *before* their LLMP/VLAP experience. 29 (40%) had joined or begun participating with community and environmental organizations *after* they began their LLMP/VLAP experience

Q11. Have you become more involved in lake or other conservation issues by being a citizen lake monitor or lake association member? (100 respondents)

Of the 100 respondents answering this question, more than half said that they had become *more* involved in lake or conservation issues by being a citizen lake monitor or lake association member (56%). 44 respondents said they had *not* become more involved (44%).

Q12. If Yes, how has your involvement increased? Please explain how and why. If you answered No, please explain whether you would like to be more involved in the future and how. (61 respondents)

A number of respondents said that since beginning their LLMP/VLAP experience they had become more involved in other organizations and programs (9), in their local lake association (13) and a few with the NH Lakes Association (3). *"I have expanded my environmental role in my lake association."* Respondents also assumed roles as as mentors in their community by distributing information and providing presentations (11), engaging other residents in local association (1), and educating their community and local officials (11).

Respondents reported becoming more active addressing lake concerns including invasive aquatic species, land use impacts on the watershed, working on shoreline protection and setbacks (13). Respondents sought out learning opportunities (8). Many respondents said their awareness and commitment for lake and conservation issues had increased since becoming a citizen lake monitor or lake association member (17), raising watchfulness of lake activities (1).

"Just being more aware of issues and what are currently the hot topics for our lake and surrounding watershed."

"Testing the water quality has gotten me more involved in why it is bad. That has driven me … to learn more, gone to conferences and looked into new technology for measurement. I intend to get more involved in the future."

"More time due to recognition of need."

After becoming involved as a lake monitor, one respondent became a master gardener and had applied learnt landscaping principles in the lake community. Other respondents had initiated a watershed master plan, a town ordinance, satellite water quality sensing, use of beaver flow devices in their towns, and securement of conservation easements. Some began mentoring high school students in senior projects. Respondents also referred to the satisfaction gained in being able to contribute their professional or academic training to their participation with community lake issues. *"Yes. The shore land protection setback issue, involving high school students in monitoring as part of their senior projects, assisting with securing conservation easements."*

Of the 61 respondents, 9 became more active with local government, 3 taking official roles on their town's Board of Selectmen, Planning Board, and Conservation Commission. A number of respondents developed an interest in legislation (4), such as the Shoreland Protection Act. Some became actively involved in the NH Lake Association (3).

"I became involved as a VLAP monitor before joining the town conservation commission. For some time I was the only lake association board member that was a permanent resident of the town. I became the communication link between the town and the lake association."

"I have worked with our Selectmen, and Zoning and Conservation Commission when there have been questions of potential environmental impact to our rural community."

"I vote for conservation issues."

Several (6) said that they currently did not have time or want to increase their involvement. *"Always more to do, but, already spread too thin timewise."*

Q13. Before your involvement with the LLMP/VLAP, were you a member of any of the following [local government departments/officers]? (check all that apply) (53 respondents)

Aggregations below integrate the 24 open-ended responses to "Other".

Altogether, respondents had held 53 positions in governmental offices and committees before they began their involvement with the LLMP/VLAP. Respondents had served on their municipal Conservation Commissions (22), Planning Boards, including a planning board capital improvement committee (10), Boards of Selectmen (5), Zoning Boards (4), Budget Committees (3), School Boards (2), Parks Departments (2), Open Space Committees (1) and an Energy Committee (1). Respondents had served on the NH Department of Environment Services (1), other state and regional agencies (3) and the NH State legislature (1). None reported participation with regional planning commissions or as a health officer.

In addition to the positions in local government, respondents also reported that before their LLMP/VLAP involvement they had belonged to watershed associations (10), land trusts (7), lake associations (6), a shoreline advisory committee (1), beach committee (1), a property owners association

(2), professional chemical and engineer associations (2), regional watershed study member (1), NH lakes Association (1), and a science teachers association.

Q14. Are you currently a member of any of the following? (check all that apply) (47 respondents)

Aggregations below integrate the 17 open-ended responses to "Other".

18 respondents were current members of local government departments and committees, or a regional planning committee, with several holding more than one position. Positions held included Conservation Commission (10), Planning Board (4), Zoning Board (4), Budget Committee (1), regional planning commission (3), open space committee (1), shore line advisory committee (1) a town citizens advisory committee (1), a town milfoil committee, and work in state and regional governmental agencies (2). One respondent was currently considering joining a parks and recreation committee.

Many of the respondents additionally reported belonging to watershed associations (19), lake conservation or improvement associations (5), and land and conservation trusts (8) and a freshwater research center (1).

Q15. Did you start participating with local government before, after or during your LLMP/VLAP experience? (98 respondents)

Just over one-third (33 or 34%) of the participants began participating with local governments before their involvement with the LLMP/VLAP programs. Just over one-quarter (28 or 28%) of the respondents said they started participating with local governments after beginning their involvement with the LLMP/VLAP programs (17% during and 11% after). A little over one-third of the respondents replied that they had not participated with local government (37 or 37%).

Q16. What lake(s) are you involved with? (97 respondents)

Altogether respondents named 90 lakes. Many respondents were engaged with two or more lakes (14). Conversely, many of the respondents worked on the same lakes. In all, 15 lakes were named by two or more respondents. Three of the largest lakes were monitored by 13, 7 and 5 respondents each. Combined, the pool of respondents dedicated what can be considered as 123 "Lake Unit" efforts.

Q17. What do you think is the most important issue(s) for the protection of your lake? (97 respondents)

Most of the 97 respondents named more than one issue, for example: *"Watershed runoff; poor septics; use of fertilizers; heavy boat traffic during high water periods (causing shoreline erosion) The decision to maintain the lake at higher levels than 10 years ago means when there is heavy rain, the lake gets higher and boat traffic erodes sediment into the water."*

Top lake issues, according to number of mentions, were water quality issues relating to land use, lakeshore and watershed stewardship (62), and invasive species (38). These were followed by safe and environmental friendly boating (14), lake levels (6), fish stocking methods (1), protection of wildlife and habitat, and climate change.

Land use concerns related to water quality were interrelated and included shoreline protection and stewardship (25), watershed scale management (25), run off and erosion (16), development (13),

fertilizers and nutrients (15), and septic systems (12). Respondents also were concerned about health and use of the lake as a public water source (3), acid rain (1), and mercury in fish (1). Water quality and pollution were also named as concerns more generally (25).

Social issues were also said by respondents to be most important for the protection of their lake. The most frequently mentioned social issue was education (16), of the public in general and of lake shore property owners and residents in particular. *"Educating lake shore residents about maintaining septic systems and preventing erosion of the watershed. Preventing contamination by exotic aquatic weeds."* One respondent said respect for people as well as the environment was important for the lake.

Respondents mentioned policy issues, saying that greater enforcement and compliance with laws and regulations, and particularly the Shoreland Protection Act (6) were most important for the protection of their lake. Three respondents called for strengthening shoreline protection laws and regulations. Better enforcement, new limits for boat speeds and horsepower, and bans of jet skis and two-stroke engines on respondents' lakes were also mentioned.

Community or state funding to support Lake Hosts and other invasive weed programs was also mentioned (3).

Q18. Have you personally presented monitoring data and other LLMP/VLAP reports LLMP/VLAP information to decision makers (for example, local government officials) in your community? (102 respondents)

Half (52 or 51%) of the 102 respondents had personally presented monitoring data to decision makers, while 50 (49%) had not.

Q19. Has your lake association presented monitoring data and other LLMP/VLAP reports LLMP/VLAP information to decision makers in your community? (100 respondents)

60 respondents out of 100 said that their lake association had presented the LLMP/VLAP reports to community decision makers. 14 respondents (14%) said that their associations had not presented the lake information to their decision makers. One quarter of the respondents (26) did not know.

Q20. If yes, to whom? (check all that apply) (67 respondents)

Lake associations had given LLMP/VLAP information to their selectmen (48), conservation commission (45), planning board (32), watershed association (16), state and regional agencies (14), zoning board (12), open space committee (6), parks department (6), regional planning commission (5) and land trusts (4).

Additional responses under the category of "Other" included posting on the town website (1), state legislature (2), town master plan committee (1), water precinct (1), school administrators (1), NHDOT (1), town public works department (1), and a lake associations (1). Data was also provided to lake residents (1), LLMP/VLAP volunteers (1), at a watershed conference (1), and to the Society for the Protection of NH Forests.

Q21. If yes, how have they used that information? Please give specific examples if possible. (58 respondents)

There were 50 responses saying decision makers taking LLMP/VLAP information into account when making lake and watershed management decisions. Respondents commented that the towns look to their lake associations for guidance and interpretation and to clarify the status and water quality trends of the lake (5), as well as for their education on the issues.

Officials had used the LLMP/VLAP information when making decisions on land use/development/runoff/erosion (11), watershed protection and best management plans (6), supporting water monitoring (6), prevention/eradication of invasive species (6), restoration projects (4), reduced amount of salt used on roads (3), removal of a dam (1), water levels (2), beach issues, a state delisting of impaired waters (1), and cyanobacteria prevention (1).

"As evidence of the health of the watershed. Encourage planning board to set proper boundaries on land development."

"Reduced road salt areas established along lake and results reflected in lower conductivity results."

"Data presented has been critical over more that two decades in stopping proposed large residential developments on three separate occasions."

Local government officials had taken LLMP/VLAP into account when allocating community funding (16), most notably in relation to the eradication and control of invasive aquatic species and water monitoring. Towns had also consulted lake monitoring information when deciding whether to support a pond reclamation project and create a conservation easement (1). State and federal decision makers had also considered the lake monitoring information when approving funding for a one year phosphorous source tracking study.

In addition, towns had referred to LLMP/VLAP information when adopting local ordinances and regulations (14), including watershed (4), wetlands (1), water protection (3), shoreline (2), and town zoning ordinances and regulations (3). *"The town has a watershed management plan based at least to some extent on our data."*

Voters are also decision makers in local government, and one respondent provided an example when lake monitoring information had influenced town voters to support a lake-friendly measure then opposed by their local Planning Board.

8 respondents doubted that their local governments had used the information, including a few who said that decision makers had ignored the LLMP/VLAP.

"Not sure if the data was used but the town in now gearing up to revisit our … Watershed ordinance."

Q22. Have you engaged with decision-makers in your local government or community about lake issues, such as water quality, invasive weeds or lake friendly living? (97 respondents)

Two-thirds (63 or 65%) of the 97 respondents said they had engaged with decision-makers in their local government or community on lake issues. The remaining one-third (34 or 35%) had not engaged with their local decision-makers.

Q23. If yes, with whom? (58 respondents)

Respondents reported that they had engaged with their Town Selectmen (45 or 70%), Conservation Commission (37 or 58%), Planning Board (22 or 34%), Zoning Board (12 or 19%), State and regional agencies (13 or 20%), Parks Department (5 or 8%), Open Space Committee (4), Health Officer (5), Town Budget Committee (1), Town Administrator (1), Town Public Works department (2), Road Agent (1), water precinct (1) and school administration (1). One respondent also had engaged with the state legislature on lake related issues. Respondents had also posted information in their Town Halls and on the Town websites.

In addition, respondents said they engaged with watershed associations (13 or 20%), land trusts (4 or 7%), lake associations (2) and a garden clubs (1).

Q24. If you have engaged with these decision makers, please explain how (e.g., informal discussions, letters or written comments, participation in public or town meetings). (62 respondents)

Out of 62 respondents, about one-half (32) had engaged with their decision makers. Respondents had participated in public or town meetings written letters or commented on proposals (21), engaged decision makers in informal discussions (23), shared data (3) and presented information (7). Participants also requested funds (7) and prepared Town warrant articles (3), and worked with decision makers to form a watershed planning committee (1). Respondents also served in positions on local (3) and state (1) government.

Other respondents also said that they would report problems observed in their area to their town officials. One respondent managed a Town boat launch. Others worked with decision makers to fix problems that were degrading or threatening water quality, in one case on solving issues relating to the lake winter draw down.

In addition, respondents wrote articles for newspapers and newsletters (2), posted information in public areas (1), sent out mailings (1), circulated petitions (1) and made phone calls to members (1).

Q25. If you have engaged with any of the decision makers listed above, please explain what issues you have discussed with them (check all that apply). (66 respondents)

66 respondents had engaged with decision makers, many on more than one issue. Respondents had primarily engaged on water quality issues (43), development and land use impacts (37), invasive aquatic weeds (34), cyanobacteria (17), and other issues (6).

Q26. Do any of the local decision makers listed above actively request you or your lake association's input in the decisions that affect your lake? (90 respondents)

Of the 90 respondents, half said their local decision makers actively request input from them or their lake association when making decisions that affect their lake (45 or 50%). One-fifth said their local government did not seek input (18 or 20%). One-third of the respondents did not know (27 or 30%).

Q27. If yes, please provide some examples. (36 respondents)

Land use and infrastructure (12), invasive weed prevention and control (8), and lake and beach management (3) decisions were those that most frequently motivated local decision makers to request input. Specific examples related to shoreline setbacks, development of a watershed master plan, dam maintenance (2), lake levels (1), and use of lake water (1). Local decision makers requested input from lake monitors and associations for writing Town ordinances (3), preparing their annual budget (2), for a public forum (1) and educational events (1).

Planning Boards (5) were the most frequently mentioned local government department requesting input from LLMP/VLAP volunteers and lake associations followed by Conservation Commissions (4), Selectmen (2) and single mentions each of Health Officer, Public Works Officer (2), Open Space Committee, Sewer Planning Committee, Zoning Board and Parks & Recreation Department.

Q28. Has the LLMP/VLAP made a difference in the decisions on water quality, planning and conservation in your lake community? (94 respondents)

Over half of the 94 respondents said that the lake programs had made a difference in the decisions their lake community made on water quality, planning, and conservation (55 or 59 %). A little over one-third of the respondents didn't know (34 or 36%). A smaller number of respondents said that the lake programs had *not* made a difference in the decisions affecting the water quality, planning and conservation in their lake community (5 or 5%).

Q29. If yes, how? Please provide one or more examples. (52 respondents)

Of the 52 respondents, 37 provided examples indicating the LLMP/VLAP data had made a difference in their lake community, either by providing tools and information that informed decision processes, by increasing credibility for protecting the lake environment, or by increasing greater awareness and capacity in the community. Respondents said the lake monitoring programs increased the awareness of town decision-makers, property owners and lake users, leading to better educated decisions and more people in the community keeping an eye for activities impacting the quality of their lakes. Respondents noted instances when the programs provided the community with the knowledge and awareness that allowed them to intervene and prevent or remedy problems or initiatives that would adversely affect the lake or watershed environment (10).

Lake monitoring data influenced funding (20) to support projects and programs to improve water quality, such as septic control, road improvement and salt reduction, runoff control, or invasive weed prevention and removal, or land use. Respondents gave 19 examples of decision makers using the lake monitoring data for municipal policies and adoption of ordinances. Two respondents said the lake information had informed town voter decisions. 6 respondents said that the citizen monitoring lake information influenced greater compliance with shoreline regulations.

"The numbers are used to discuss future projects for water quality improvement. They are the trigger."

"The data is used in discussions on funding and ordinance discussions."

"Honestly, they know someone is "watching" and various groups are much more cognizant."

"Conservation Commission has allocated money for the Lake Host Program and the planning board, & selectmen have become aware of weed and water quality issues."

"better awareness, understanding, heightened stewardship, local laws"

The programs also helped with community events such as the Old Home days and beach replenishment activities (1).

"Town officials supported salt reduction on roads before NH DOT"

"The numbers are used to discuss future projects for water quality improvement. They are the trigger."

"We are more in tune with ways to prevent invasive species as a result of education from this program. Our successful program (to date) informs us that we're learning a good deal, executing the right monitoring processes and staying vigilant of potential invasive threats."

"without [the monitoring program] we wouldn't be where we are today… / / we wouldn't have received 3 section 319 grants to begin our restoration process"

"Gives credibility to the arguments"

Q30. How receptive are the decision makers in your community to learning and responding to information about the status of your lakes and watershed? (85 respondents)

Close to two-thirds of the respondents said their community decision makers were "Somewhat responsive" (53 or 62%) to information about the status of their lakes and watershed. One third or the respondents said their community decision makers were "extremely responsive" (27 or 32%) to lake information. Several said their local decision makers were "non-responsive" (3 or 5%), or "rejects information and refuses to respond" (1).

Q31. Please provide any details or specific examples of when your town either has or has not been responsive or receptive to lake information and why you think that was. (49 respondents)

Respondents said their Towns responded to lake information when the lake was considered central to the community and economy (3), or when the officials saw a connection between water quality and property and economic values (3). When respondents perceived that decision makers did not see the value of the pond to the Town, they saw them as less or non-responsive to lake information. Town reception of lake information was also affected by budget and human resource restraints or when lake related information had to be balanced with other concerns such as road safety. One respondent said their town responded to lake information after seeing positive results of a project and evidence that success a project was working. One Town also "*used lake quality data to justify funding satellite sensor experiment"*, indicating that at least some towns may be responsive to try innovative technologies and solutions when proposed.

Town reception of lake information improved when a lake association had built close or good working relationships with the Town (2). Training also improved a Town's reception of lake information after their road officer attended a NH Lakes Association erosion workshop. Citizen pressure also influenced how a town received lake information. In one Town, voters forced their town officials to respond to lake information by voting down a Planning Board proposal to override setback requirements. One commenter said their Town responded to lake information only after their lake association persisted on an issue (1).

"The lake is the town's life blood, and we all know it." "The lakes/ponds in town are considered a valuable resource…There is always interest in lake information when decisions are made that might impact the lake."

"I believe the Selectmen are responsive since tax revenues are greatly dependent on lake-related home values. The Town pays water testing costs, I believe."

Generally towns were responsive when facing real or potential costs of invasive weeds (13), providing funds to prevent or remove weeds established in their lake (5).

"Our Pond is small (100 ac)… Town not much interested on what goes on. Except taxes."

"Even though the Town is the largest waterfront property owner on the pond, and has a Town beach and recreation area on the pond, they don't seem to care about maintaining it - they do not see the value of the pond if they (… selectmen, … budget committee members) themselves have no interest in it."

"Mostly a budgetary problem. We have a part time Code Enforcement Officer."

"They are receptive, fortunately for us. But they also have to maintain safe roads, allow reasonable development and recreational access. There is always a balance that zealots on either side of the issues should accept."

"Restoration of [waterbody] was very controversial … Opinions in Town have begun to change in the last couple of years with the success of milfoil management efforts…The opinion of many people was that the project was expensive and would only benefit the residents on the pond, although there are … points of public access for visitors and the pond is heavily used recreationally. Many people also thought it was a dying cause, that eutrophication was inevitable and occurring too rapidly."

Echoing the previous question, survey respondents also said that their Towns responded to lake information when writing Town ordinances, master plans and zoning regulations, when attempting to comply with federal, state or local requirements (5), or when receiving reports of violations.

"rewriting local shoreland ordinance"

"The Town accepts our opinions re legislation and beach regulation."); "Our planning board has relied heavily on … data to ensure that developers adhere tightly to federal, state and local environmental laws and regulation."

"When they realized their error and violation they quickly determined immediate remediation was needed. I left with a gentlemen's handshake assuring the issue would be resolved the end of the week. Happily it was."

However, other comments said their Towns were slow or did not respond when violations were reported. Comments did not always explain why, although explanations may lie in the values mentioned in the above paragraphs. One commenter did observe that small town relationships impeded the willingness of residents to notify the Town of violations: *"Shoreline violations mostly have to be reported via the "snitch system", which is difficult in a small town."*

Towns were generally considered receptive to lake information when the officer dealing with the matter at hand was the Conservation Commissioner. It was less certain how a Town would respond to lake information when the Planning Boards (2), Boards of Selectmen (10) and Budget Committees were involved. When these officers were in charge, responsiveness to lake information depended on the individual holding office. Having a state representative and senator champion lake information also increased a Town's receptiveness.

"It depends completely on who is on the Board of Selectman at the time. Some Boards are bullied by people who only look at the lake as a cash cow for property taxes while other Boards are made up of people more willing to see a bigger picture."

"Ongoing issue….may finally have been resolved until the next board of selectmen and road agent arrive." "Planning board and board of selectpeople are closed off to any environmental discussions, regardless of how presented."

"Depends on who is a selectman at the time as to whether they are especially lake friendly/knowledgeable or not."

Q32. Are you satisfied with how your decision makers respond to water quality and lake conservation issues? (93 respondents)

Of the 93 responses, 47 (51%) were satisfied with how their decision makers responded to water quality and lake conservation issues. 20 respondents were dissatisfied (22%), while 26 had no opinion (28%).

Q33. Please explain, citing specific instances. (44 respondents)

Reasons for satisfaction were generally put in terms of the town's willingness to listen and take recommendations into account and provide funding.

"We are supported throughout our watershed by the local town select and planning boards."

"The Selectmen supporting the project … was terrific."

Respondents described dissatisfaction when a Town did not provide support or funding, did not listen and respond, provide adequate enforcement or was not proactive. One commenter mentioned a lack of respect for volunteers or appreciation of their work, while another mentioned *"fear of retribution if we speak up too loudly".*

The power of Selectmen was noted in 6 comments. Several respondents indicated that even when satisfied, the situation could change with the next election: *"Enforcement is always at the hands of the Selectmen: so far so good"* and *"the response of decision makers can vary over time."*

"Planning board and board of select people are closed off to any environmental discussions, regardless of how presented."

"Selectmen and Budget Committee challenge every request, yet fail to attend Information Sessions or see the big picture."

One respondent said their town officials were only *"…only recently [beginning to] show any interest, in my view, because they are now beginning to understand the financial impact of maintaining the quality of the lake environment."*

Respondents also commented on the continual effort that was required to get their lake community to follow-up on initiatives, projects and commitments. Highlighting the disparity that can exist between towns, even when sharing the same waterbody, one respondent was satisfied that one town provided continuous funds, but disappointed by another's refusal of lake association requests.

Respondents also expressed their satisfaction and dissatisfaction in relation towards community residents and property owners. One respondent indicated satisfaction for an engaged and vocal community that *"vocalized a shared concern"*. Another wrote that in their community property owners *"didn't want town officials coming around."*

Frustration towards builders who *"do not mind paying the penalty or 'voluntary work stoppage'; who do not acknowledge a master plan"* was also expressed, and that *"Developers generally have much greater resources for hiring lawyers to fight these battles, and if the town and/or state with their dwindling resources don't see this sort of thing as a high priority, then little attention gets paid to it."*

Approximately one-quarter of the responses noted that their answers could be found in the previous question (9).

Q34. If you feel that your local decision-makers should be more proactive in protecting water quality, what actions or initiatives would you recommend that they take? (43 respondents)

Eight respondents said they did not know how their decision-makers should be more proactive, or had no recommendation, while 3 said they thought their town was doing a good job.

Other respondents recommended that their decision makers could be more proactive by becoming more open-minded and knowledgeable (4), saying, for example: *"It's a learning experience"*, and *"Become more knowledgeable regarding environmental issues. They at least have been very open to listening to the data and taking it seriously."* One respondent recommended directly involving decision makers in lake monitoring programs to *"offer them hands-on experience and knowledge of what we actually accomplish for our local watershed"*.

Others thought that their decision makers could be more proactive in providing funds ("Show us the money") (8), particularly for sponsoring Lake Hosts and other invasive weed prevention and removal programs (6). One respondent was unhappy that water quality took a back seat to invasive weeds in their community and that decision makers should be more proactive about supporting monitoring for water quality. Funding was also recommended for a watershed master plan, for a gravel paving plan to reduce salt use, and water quality and lake protection in general.

Respondents thought their officials should be more proactive on runoff, erosion and related development issues (13), while a couple specifically recommended land conservation. Respondents wanted action on invasive species (6), particularly for funding for Lake Host programs. Septic system standards were recommended by 5 respondents, with one commenter saying *"Septic system performance is an un-addressed issue."* Others were concerned for management at a watershed level,

with respondents asking for funding to implement a watershed plan, and another for watershed zoning overlays. Shoreline setbacks (5), controls for road runoff and salt controls, controls of boat speeds and better land management were among issues where more action from decision makers was needed.

Many respondents also recommended better regulations and standards (10) on related issues to zoning, runoff, septic and boating. One responded that their community needed a *"town wide watershed ordinance – all bodies of water should be treated equally and protected"*

Respondents also wanted their towns to take stronger steps for enforcement (6), primarily of the Shoreland Protection Act and other shoreline regulations. One respondent recommended, *"An anonymous reporting system - and less 'hammer' related work with owners. Construction and landscapers should be held responsible for violations."*

The State of New Hampshire should be more proactive, according to some respondents. One wrote, *"The state should be doing much much more, NOT the local decision makers. The state advertises the lakes and wants to benefit from the room and meals taxes but does very little to address the problems the people they are attracting cause. The state owns the lakes. The state should be providing sufficient funding to cover Lake Host costs 100% for a full season. They should stop trying to push these costs to the local government and the land owners."* One respondent wanted local decision makers to collaborate more closely with the state and the NH Lakes Association.

Q35. What do you believe motivates your local government to protect water quality and stewardship in your lake community? (67 responses)

About half of the 67 respondents commented that taxes and property values (33), as well as the economy and its dependence on tourism (9), were the guiding factors in motivating their local governments to protect water quality and lake stewardship. One commenter wrote, *"They [town decision makers] recognize the lake to be the crown jewel of the town's natural resources…Lake front properties pay 60% of the town's Real Estate taxes."*

"Selectmen and townspeople know that clean water in [the] Lake means stable property assessments there. Since lakeshore landowners pay the highest portion of local taxes, water quality is important. Recreation is strictly secondary."

Respondents also referred to the desire to avoid costs, or a *"crisis that affects them"* as motivating factors, such as the recognition of the potential future costs of removing invasive weeds once introduced into a lake. Another respondent said that the size of the budget motivated the extent to which their local Board of Selectmen protected lake water quality and stewardship.

Public pressure, community participation, and reelection (11) were also pointed to as factors that motivate decision-makers.

"Quality of life issues important in election of officials."

"Public support. Convincing the voters that these things are important, causes local government officials to rethink their positions. They will eventually come around to the majority voters view."

One respondent simply wrote, *"the people in the community"* were the motivating factor for their decision makers.

One respondent said that EPA regulations motivated their local decision makers. Other respondents pointed to health concerns (3), its safety as a drinking water source (2), as well as in relation to the public town beach (1). Some responses indicated that water quality represented a motivating factor in itself (4).

Respondents also commented that their decision makers were motivated by the function of lakes as a community and natural resource (16) that enhanced the quality of life (8) that were important for their community.

"… enjoyable recreational use; minimize public discontent"

"recognized enjoyment value."

"I think that they realize the importance of the lake to the community."

Others considered that many local decision makers were motivated by their own personal feelings and values related to lake issues, as property owners, people who enjoy the lake, or as members of the community. *"A significant number of those active in town government and their friends and use the lakes for recreational activities."* One respondent commented that decision makers were also motivated by idealism. Another wrote, *"Hopefully a complex answer.....Beauty, water quality, wild life, etc."*

Q36. Have you or your lake association presented monitoring data and other LLMP/VLAP reports to any of the following in your community? (check all that apply) (60 respondents)

Respondents had provided LLMP/VLAP reports to neighborhood/road/lake associations (42 or 70%), friends/neighbors/co-workers (29 or 48%), schools (19 or 32%), personal networks/social media (9 or 15%), and local businesses (7 or 12%) as well as recreational groups (3), youth groups (3) and churches (2).

Respondents added that they had posted information in the Town annual report and Town web site, lake association websites and their library. They had also presented the information to garden clubs and at outreach events like Old Home Days and the Southern NH Outdoor Recreation Exposition.

One respondent wrote, *"We have no association. Pond owners cold to idea."*

Q37. Have you ever presented information or mentored others in your community on how to practice lake friendly living? (86 respondents)

Out of 86 respondents, 50 (58%) had presented information or mentored others in their community on how to practice lake friendly living, while 36 (42%) had not done so.

Q38. If yes, please explain. (52 respondents)

Respondents primarily said they informed and educated members on lake stewardship at annual meetings of their lake, road and neighborhood associations (20), and mentored neighbors in one-on-ones informal discussions (9).

A number of respondents indicated that they directed their education efforts towards mentoring lakeside residents and property owners on how to better manage their shoreline property

(5). One respondent conducted a door-to-door campaign (1) and another respondent worked with the community to establish a neighborhood covenant for lake-friendly property practices. Respondents mentored their community on aquatic invasive species (1), phosphorous and fertilizer use (2), brush cleaning, stormwater, culverts and runoff, and septic systems (2), including providing property owners with technical information on septic design.

Respondents also gave presentations at Town meetings (2), participated in educational forums (4), set up displays and information tables at public events (1), and spoke at meetings of garden clubs and other local organizations. Others worked with students and schools on school programs and projects (5), took young people out on monitoring trips, and led public educational boat tours (2), and recruited volunteers (2). One acted as a point person for answering lake stewardship questions in the community, while another was managed a bog nature reserve and led public education events there. Respondents also wrote/distributed articles for newspapers and newsletters (8), educational leaflets and brochures (6), posted website articles (6) and sent out emails and mailings (6). One respondent posted video clips on their lake association website.

Q39. Are reports on the condition of the lake water quality placed on any of the following locations as a resource for other community members? (check all that apply) (67 respondents)

Most of the 67 respondents said that the lake water quality reports were placed with lake/neighborhood/road associations (35) and shared with friends/neighbors/co-workers (26). Lake reports were also placed in around the community, in town offices (26) libraries (14), schools (7), town conservation commission (1), at local businesses (3) and recreational clubs (1). Four respondents said they did not know if they information had been placed in the community locations.

Respondents also said that lake reports were published on lake association websites (15) and newsletters (1), town websites (2), a Town Annual Report (1), and a NH Fish & Game kiosk (1)). Respondents also communicated report results in newspaper articles (1), press releases (1), and personal networks and social media (10).

Q40. Please indicate which if any of the following community members or bodies that you know have reviewed or made use of the LLMP/VLAP information. (check all that apply) (58 respondents)

Respondents said that neighborhood/road/lake associations (37), friends/neighbors/co-workers (15), schools (11), a college, personal networks/social media (6), recreational clubs (2), personal networks/social media (6), churches (1), and local businesses (2) had all reviewed or made use of the lake monitoring data. Under “Other”, one respondent added that they had tried to engage a local Scouts camp without success, while others gave examples from local and state government.

Q41. If you indicated any of the above, please explain “how” they made use of the information. (43 respondents)

Of the 43 respondents, 28 said that they or lake associations had presented the information to others in the community presentations at annual meetings, conversations, events and newsletters to educate and increase awareness, or keep the community aware of conditions on the lake, but did not say if the information had been acted upon. A couple of respondents said that community members valued the lake reports as baseline information for the lakes.

Three respondents said that lake information had influenced landscape practices, on their own property (1), on the town beach (1), and in a community best management plan. 9 respondents said that their community schools had used the lake reports as teaching tools or for projects. One respondent said that realtors used the lake data for promotional purposes, while another said property owners used the lake data to promote real estate sales. Another said that fishermen on their lake referred to lake monitoring information to assess temperature gradients and oxygen level, and that the community also kept an eye on mid-summer results out of concerns for cyanobacteria and algal blooms. One respondent said that 20% of the residents on the lake used its water for household use and that they referred to monitoring results to determine whether it was still safe to use.

Five respondents also referred to use of the lake monitoring information to inform or influence local and state policies and decisions, including a beach management action, an ordinance, setting permits, and in identifying violations for enforcement. Four respondents gave examples of the lake information being used to acquire project funding. One outcome was reduced salt application on roads.

Q42. Have lake monitoring results been used for education presentations or student projects in schools? (89 respondents)

Slightly over one quarter (23 or 26%) of the respondents said that local schools had had used lake monitoring results for presentations and projects. Slightly fewer (18 or 20%) said that their schools had not used the monitoring results. A little over half of the respondents did not know (48 or 54%).

Q43. If yes, please explain. (24 respondents)

Twenty-four respondents said that schools had used the lake reports, providing examples that extended from 5th grade and Sunday school through to high school senior projects and undergraduate studies. Schools used the lake monitoring results for school curriculum projects (6), class presentations (3), special field trips and eco tours (5), and demonstrations of sampling techniques (6). In one class, students integrated a lake report into a creative graphic project to make a brochure for the lake association (1). Respondents also said that, at lake association and other educational presentations, they encouraged students to volunteer in lake programs. One volunteer youth projects not only educated but also engaged young people, bringing “man power” to their lake protection program.

Q44. Has the LLMP and VLAP distribution of lake data and reports influenced community support or active participation in protecting the water quality and conservation of your lake and watershed? (88 respondents)

Thirty-eight (43%) out of 88 respondents said that the LLMP/VLAP distribution of lake data and reports had influenced community support for lake protection and watershed conservation. Forty-eight (55%) respondents said they did not know if the lake data and reports had an influence. Three respondents (2%) said the lake monitoring information had not influenced community support for lake water and watershed quality and conservation.

Q45. If yes, please provide one or two examples. (35 respondents)

Respondents said that the lake monitoring information had helped maintain community interest and concern (10) for lake and watershed conservation.

“These reports help to continue the support of the [Lake/Watershed] …program”.

"We believe that people are more likely to maintain a pristine, invasive free environment than one that has already failed."

Respondents indicated that lake monitoring reports built community capacity by providing a tool to educate and engage others, increasing participation and volunteers in lake protection activities (6). One respondent said described the influence of the lake monitoring information had a ripple effect that extended from lake association members throughout the rest of the community. Another said the lake monitoring programs helped strengthen and encourage citizen engagement in local government

"People have acted or spoken up where they would have remained silent had we not informed them. Town meetings are attended because we discuss and publicize them when they involve the pond or the neighborhood."

"Once people become aware of the [monitoring] program on the lake, they have offered to participate."

Respondents also provided examples where the lake reports influenced community decisions to reduce salt use on roads, fund water monitoring and prevention and removal of invasive aquatic weeds. Another wrote, *"Real estate sales people often give general data about the water quality to prospective homeowners. After the people move in they often become some of the strongest advocates for water quality in the town."*

Comments included examples of the data influencing Town voters (4) support for watershed (2) and water quality (1) ordinances and for the defeat of a warrant article (1). Respondents credited lake monitoring information for influencing decision makers to provide funding of lake related projects (7) and making better decisions. *"Mostly they are cognizant of "it" and have considered our waterway before making final decisions".*

However, one respondent voiced frustration that lack of follow-up negated the influence of the reports, saying *"pond association is only active 1X year - annual meeting; plans are discussed to promote pond conservation, but these seem to 'evaporate' after the one meeting; only pond activities are placing and removing boards in the dam - by the dam owner, and same two people do the following: 3X summer water testing, weed watching, placement and removal of loon nest, and monitoring loons."*

Another respondent pointed out a potential link between public access and public concern, writing: *"Since there is no public access to our lake, this is not a big concern or issue."*

Q46. What do you believe motivates public attitudes and behaviors towards water quality and stewardship in your lake community? (75 respondents)

Respondents most frequently named property values, tax revenues and local economies (24) as the factors motivating public attitudes and behaviors towards water quality and stewardship in their communities.

"For residents on the water - high awareness. For second home owners - get away with what they can. Many tourists don't seem to care. non-water-front residents care - because keeping property taxes high on waterfront properties keeps their taxes lower "

"People make an investment in water-front property, and that investment is often impacted by the quality of the water body. We believe attitudes have shifted greatly over the decades to one of

paying attention to what is important for the quality of water to remain high. Otherwise, investments can decline rapidly."

Seven respondents commented that it takes bad news or a crisis (7) to motivate behavior, citing the loss of property values brought by an exotic milfoil invasion and cyanobacteria bloom. One suggested that the visual trigger of dirty water motivated a response

One respondent wrote the most important factor to motivate lake stewardship was *"Sharing the importance with shoreline property owners."* Respondents saw shoreline property owners with varying perspectives. Some complained that shoreline residents were motivated by personal biases that caused direct negative impacts. *"Preferred lake level based on where residents live on the lake." "Self-interest of those using the lake and living on its shore." "People would rather have green grass by putting fertilizer on it that can run into the lake."* Other respondents saw property ownership more positively and said pride of ownership and wanting to protect water quality and the lake environment for future generations motivated their actions. *"Many properties have remained in families for generations, so there is strong attachment has developed. People want to preserve the places for their children and future generations." "History of respect for the water body and knowledge that property values ultimately hinge on it."*

Recognition of the lake as a community resource (7) was also said to motivate stewardship. One respondent called their lake the *"keystone"* of their community. Some respondents suggested that a fundamental value of water quality in its own right motivated stewardship in the community (6), *"Common interest in maintaining the current high water quality." "I think people want to have a good lake environment to live in."* Communities were also seen as being motivated by recognition of the unique value of their lake(3), as well as a sense of community pride for its clean water, and were motivated to protect their lake as a community resource for current and future generations.

Recreational values, wanting to swim, fish or otherwise recreate in clean water (12), and values for quality of life (6) and aesthetics (3) were also seen as motivating attitudes and behaviors towards protecting water quality and lake stewardship. Strong personal attachments for a lake and respect for conservation were also seen as a powerful motivator, with some respondent's commenting on their strong attachment that has been reinforced through family generations (3).

Education was named as a powerful motivator of behavior and attitudes in lake environments by 14 respondents. Some said that taking stewardship action (3) in itself motivated people's attitudes and behaviors, empowering them and showing the positive results of their actions (2). *"Seeing a positive impact or the potential consequences"*. Lake Host programs and lake associations were credited by a few as motivating stewardship in their community.

Q47. Have you collaborated with other lake, road or watershed associations? (87 respondents)

Out of a total of 87 respondents, 35 (40%) said they had collaborated with other lake, road or watershed associations. The remaining 52 (60%) respondents had not collaborated with other lake, road or watershed associations.

Q48. If yes, please provide an example. (34 respondents)

Thirty-four respondents either named groups that they or their lake assocations had collaborated with or describing how they had collaborated. 17 respondent replied with names of organizations they had collaborated. *"[W]e promote each others Annual Meetings and guest speakers." "We have visited other lakes/ponds and looked at their inspection facilities and processes. We also are very interested in knowing what best practices can be deployed to mitigate invasive species."* Respondents had also collaborated with the NH Lakes Association (4) and the Maine Congress of Lake Associations (1).

Peer-to-peer training consultations and mentoring were the most mentioned form of collaboration (9). Respondents had also collaborated with other lake associations to share resources (6), such as milfoil sampling equipment (2), monitoring data (3), and educational materials (1). One lake association collaborated with a land trust by donating land. Respondents had held joint Lake Host training sessions (2), meetings and events with other associations. One respondent had participated in the national Secchi Dip-in.

"[O]ther lake associations have contacted us about milfoil treatments, grant acquisition, developing watershed ordinance, and water shed restoration projects"

"Discussed salt conditions and the Class A status with other lake Association."

Watershed protection issues (6) were an area for collaboration that included examples of cooperation on a watershed survey, sharing data for development of a watershed protection plan, and participation in a state river nomination program.

Interconnected water bodies motivated at least one collaboration. One respondent simply wrote in reply, *"We send clean water downstream."*

Q49. Has your lake association worked together with other lakes or watershed associations? (87 respondents)

Slightly over one-third of the 83 respondents said their lake associations had collaborated with other lake or watershed associations (33 or 38%). Just under one-third of the respondents said their lake and watershed associations had not collaborated, (26 or 30%) and roughly the same number didn't know (28 or 32%).

Q50. If yes, please provide one or two examples. (33 respondents)

Respondents gave examples of peer consultation between associations (6), including trainings, demonstrations and field trips for shared learning opportunities. *"Attended field trips, help in preparing proposals and editing reports".* Other respondents gave examples in which associations shared resources (equipment, money, or people) for joint water sampling and Lake Hosting activities (5). In one example, associations collaborated on a joint grant and acquired a DASH (diver-assisted suction harvester) boat for invasive weed removal. Two associations conducted a joint tour of stormwater projects and others collaborated with other associations a watershed survey. One respondent said that their lake association was joined by another *"at our local fair in order to gain public awareness"*. One respondent said their lake association worked with other organizations *"mostly on legislative concerns"*.

Overall, lake associations appeared most motivated to collaborate on invasive weeds (10), on watershed planning and issues related to runoff (9). A collaborations on use of road salt and several on water sampling were also mentioned (3).

"We have provided volunteers for surveys of the watershed surrounding several local lakes"

"Our assoc communicated … on the weed problem in the pond that exists between our two lakes…"

"Demonstrated milfoil removal technique."

"Our Youth Conservation Corps which works on watershed issues was started to emulate the good work done by a group on [another lake association]."

A few respondents gave examples of larger lakes, or lake associations, helping smaller ones that had less resources. *"Occasionally loaned our sampling equipment to another association in town." "Other assocs have contacted us for guidance in establishing a monitoring, weed watching, or boat washing/inspection program."* One respondent said their association *"work[s] with upstream lakes"*.

Six respondents said their associations collaborated with the NH Lakes Association or the Maine Lake Congress, and 7 with watershed or regional organizations. However, one respondent brought up a potential issue with collaboration: *"… Assoc was a member of NH Lakes Assoc, and gives yearly donation but resisted joining past few years as they think the membership fees are unfairly high (small lakes paying the same as large lakes)…"*

Respondents also named collaborations with other types of groups and institutions, including a college, a conservation commission and other community organizations.

Q51. Are your lake and its community part of the New Hampshire coastal watershed? (87 respondents)

53 of the 87 respondents said their community was not part of the New Hampshire coastal watershed (53 or 61%). 14 respondents said their lake was within the coastal watershed (16%). 20 respondents did not know (23%).

Q52. Has your local government engaged with other towns on lake or watershed protection issues? (88 respondents)

Of the 88 respondents, over half (52 or 64%) of the respondents did not know if their local governments had worked with other towns on lake or watershed protection issues. Almost one-quarter of the respondents (20 or 23%) said their town had worked together with other towns. The remainder (12 or 14%) said their towns had not worked with other towns on lake or watershed issues.

Q53. If yes, please provide one or two examples. (23 respondents)

Towns collaborated with other communities on watershed, regional or river planning and management (8). One community had written a model watershed protection ordinance that had served as a model for other towns. A couple of collaborations involved towns sharing the same lake: *"[… Lake] spreads across three towns, and they are aware of each other's ordinances."* Towns also joined forces to extract and prevent invasive weeds, including purchase of a milfoil suction machine. Other municipal collaborations involved remediation of pollution caused by one town's septic treatment facility. In

another examples, towns jointly underwrote the cost of their monitoring programs and worked together on a joint pond restoration project.

Q54. Have actions in neighboring communities impacted your lake? (89 respondents)

Most of the respondents did not did not know (40 or 45%) whether actions in neighboring communities affected their lake. Just under one-third (31%) of the respondents said neighboring communities had not impacted their lakes, while a quarter of the respondents said they had made impacts (21 or 24%).

Q55. If yes, how? (22 respondents)

Neighboring weed watching activities provided positive impacts on the respondent's lake in several cases. On the flip side, the real or possible lack of neighboring investment to prevent or control invasive species worried a number of respondents.

"Positively- Lake Hosting has protected our lake Negatively- land use management has been poor in neighboring communities and construction companies have been fined due to poor land use management."

"It is possible that some community that does not have as an aggressive program as ours could in fact be a source of concern if their watercraft are not vigilantly inspected and cleaned. We cannot become complacent or assume we are 'in the clear' with respect to species mitigation."

"Our selectmen and population, generally, are aware of the vast sums neighboring town spend fighting milfoil."

Adoption of watershed standards by neighboring towns provided positive impact, according to one comment. However, different standards between towns was a cause for concern for others. One respondent said that their neighboring town had refused to cooperate with the respondent's community on a drinking water protection process. Another respondent reported that two towns on the same lake had different town setback standards. One respondent commented, *"Lake quality is a watershed issue so all towns have impact."*

One respondent described a complex exchange between two towns within a common watershed. The pollutants went from one town into another and then returned, after having deposited its nutrients in the wetlands of the second town. *"Thus the stormwater from [the first town's] development flows into [the] wetlands [of the second town] and then to [its] Lake. When it leaves the lake it flows back into [the first town], but only after it has deposited its nutrients in the water body."*

Development in neighboring towns and related congestion were mentioned in five comments as sources of negative impacts, causing problems from construction silt runoff, increases in stormwater and fertilizers, septic systems, congestions and flooding. *"Disregard for the impact of steep slope development on the water quality of the lake."*

One respondent said mercury contamination as a result of incineration from the east impacted the lake, providing a reminder of the potential impacts between distant communities.

Q56. Have actions on your lake affected the lakes and watersheds of other communities? (86 respondents)

One-quarter of 86 respondents said that actions on their lake had affected the lakes and watersheds of other communities (20 or 23%). Over half of the respondents said they did not know (49 or 57%). The remaining 17 respondents said actions on their lake had not affected the lakes and watersheds of other communities (20%).

Q57. Please rate how well your program (LLMP/VLAP) communicates lake information to you. (87 respondents)

87 respondents rated the LLMP/VLAP Program communications to them as "Very good" (58 or 67%); "Good" (18 or 21%); "So-So" (7 or 8%); "Fair" (1 or 1%); and "Poor" (3 or 3%).

Q58. Please provide suggestions on how you think program communication could improve. (46 respondents)

When asked for suggestions on how the monitoring programs could improve their communications to them, five respondents provided no feedback. 10 respondents provided positive feedback on the communications and coordination of the programs and indicated no improvements were necessary. *"I have never been disappointed." "It already seems excellent." "I think it is handled very professionally and very well"*.

31 respondents provided a number of suggestions to improve program communications. Many requested that the programs provide lake monitors with the data and reports (5) and to distribute the reports more widely (4). *"I think that all the […] monitors should receive a copy of the [lake report]. As it is now, a few copies are left at the [association] office*". *"Reports could be mailed to homeowners on the lake and within the communities." "Send annual report to all conservation commissions". "I am not sure how wide spread the distribution of water quality reports is to local government governing bodies."*

Respondents also asked for greater and timelier access to monitoring data and reports. Many respondents wanted data and reports to be posted online (9). *"Have all of the reports and their archives available on line and easily downloaded."* Several respondents asked for data to be posted as it became available. *"Provide our monitoring data back to us (rather than a published "book" each year, just emailing trend data to each monitor would allow us to make use of it more." "I would like to see the data that has been developed from […] our sampling available to us on-line on a real time basis. We only get results a year later."* A number of respondents asked to see data and comparisons with other lakes (1). *"It would be useful to see results from upstream ponds and streams, even though that is part of a different testing program."*

Other suggestions that the programs hold more forums and presentations in the community (2).

A number of the monitors called on New Hampshire to reinstate budget for more staff and funding (9). *"It's absurd that their budget was cut and now a biologists only accompanies volunteers and does special testing once every two years; environmental issues increase and the NH response is to cut back." "great job considering the budget cutbacks…" "Recent budget problems have limited report contents."*

A notification protocol as also suggested. *"If alarming conditions are arising in an area, timely notification of Code Officers and Selectmen is important."*

One respondent asked the monitoring programs for guidance on distributing lake information. *"The program has been very responsive to requests that I have made. If the program wishes for me to do such things as make the report available to libraries, etc., the program needs to communicate that wish."*

Q59. Please comment how lake report contents might be improved. (45 respondents)

Many commenters commented favorably on the current lake reports (12). Five had no suggestions, including one who had not seen any reports. Two respondents referred to comments in previous questions, which are incorporated below.

One respondent's comment briefly conveyed the importance of the lake reports: *"The lake report is the main source of information".*

Many respondents addressed on the level of technical detail or language used in the reports. These commenters were split between those who preferred more comprehensive, or technical data and analysis (6) and those wanted more streamlined information in layman terms (7). Among those wanting more comprehensive analysis, was one respondent said the technical analysis had been instrumental in demonstrating to the town how their expenditures had made a difference. Other respondents however were frustrated by too much technical detail that they found dense and hard to understand, with comments such as *"I don't understand the reports"* and *"Our volunteers and members generally want to see a simple report so they can easily understand how the lake is doing. Typically, the reports are dense and filled with difficult to understand charts."*

As a possible solution to this divergence in preferences, 5 respondents said it would be useful to have a non-technical summary that would be backed by a fuller data and analysis. This was in line with requests to have a short version of the monitoring data that could be given to property owners, used in newsletters, or posted on websites.

Other commenters requested more frequent analyses (5), trend analyses comparing the lake water quality to previous years (4) and one a comparison to other lakes (1). Suggestions included putting historical data for parameters in table form (1). A number of respondents also asked for a quicker turnaround (3) or more frequent reporting (1), putting full monitoring data online and giving access to the database (1).

Others asked for reports in more electronic formats (6) that could be posted online or used in PowerPoint, or to make the reports more visible in the community (4). One suggested to reduce printing costs by referencing and avoiding a bulk of repeated background information.

LLMP and VLAP reports are produced separately. There were a number of comments specific to a revised and simpler VLAP format. Of these 8 respondents preferred the new format (8), while 5 preferred the older format. One respondent requested the state restore full VLAP funding.

Q60. Please comment how you prefer to receive information. (72 respondents)

71 out of 72 respondents preferred to receive routine LLMP/VLAP communications by email, including those who said either postal mail or email were acceptable (10). Only one respondent preferred to receive information by postal mail (1).

Many respondents also expressed preference for reports in electronic format (20), while others said they also would prefer to have paper copies of larger documents (11). Two respondents also said

that they liked to be presented information in workshops and meetings.Two respondents suggested establishing a notification system, or protocol, to be ready in case something detected on the lake required a quick response (2). A few respondents said they preferred annual to bi-annual reports (3).

Q61. What, if any, additional monitoring needs do you perceive for your lake? (44 respondents)

The question "What, if any, additional monitoring needs do you perceive for your lake?" received 44 responses. Nine respondents said no additional monitoring was needed, and 2 said they did not know.

20 respondents suggested monitoring for additional types and sources of pollutants that put their lakes at risk, including sources of nitrogen and other nutrient inputs (2), leaking septic systems (1), sources of erosion and sediment (2), leading indicators of cyanobacteria (1), invasive species besides milfoil (1), metals and MBTE (1), mercury in trophic levels (1), toxic chemicals such as pharmaceuticals, stormwater management (1) by sampling spring tributaries for chlorides (3). Other monitoring suggestions included remote sensing for phosphorous, chlorophyll and transparency in hard to access areas and *"about once each ten years […] do a thorough baseline study, phytoplankton, zooplankton, pH, conductivity, sample the streams, and more."*

There were numerous comments addressing resource needs. Respondents said they needed more monitoring equipment (3), volunteers (4) and funds. Volunteer needs were largely to support people-intensive Lake Host and related invasive weed programs. *"[The Association] does a great job with volunteers but it is nearly impossible to provide the coverage…On any given weekend as soon as the ice is out, the parking lot at the boat ramp is full with NH, MA and sometimes ME plates. Out Lake Host coverage does not start until Memorial Day – hundreds of boat launches occur without the trailers being checked."* One commenter also suggested *"It may be helpful if there was some sort of program for children to get involved. Lake associations could sign up kids to 'help' with monitoring, or Weed Watching, or 'Junior Lake Hosts' -- something along those lines to get them interested early (and presumably drag their parents along!)*". Others voiced concern that the *"interest in the Lake Host program is dwindling"*.

Five respondents requested that the state reinstate annual instead of biennial biologist lake visits (5). One respondent said there was a need to lobby the NH legislature to get these funds (1).

Finally, one respondent suggested monitoring for *"more info on how to find out what we can do to improve - and what are the factors that make the values change."*

Q62. Would you be interested in training on how to address water quality and stewardship issues with your local government? (79 respondents)

Out of 79 respondents, 28 (35%) said they would like more training to address water quality and stewardship issues with local government. 51 respondents said they did not want this training (65%).

Q63. What type of training would help you become more involved and/or have a greater impact when addressing water quality and stewardship issues with your local government? (33 respondents)

Out of a total of 33 respondents, 19 respondents described trainings that would help their involvement and impact when addressing lake issues with local decision-makers. Several respondents

indicated an interest in advocacy training to help them to approach local and state decision makers (4). One respondent would like training in advocacy for the Shoreland Protection Act and to have a discussion on non-point source runoff. Respondents also were grant writing (1) and PowerPoint (1) trainings.

Other monitors said they were interested in trainings on lake issues and stewardship (3) to stay ahead of potential threats, reduce runoff and learn concrete ways to increase pond life. Some respondents expressed interest in technical training for better monitoring methods. One commenter valued the current refresher trainings and those at the annual NH Lakes Congress.

One respondent did not know exactly, but was interested in future training opportunities. Seven respondents said they did not know. Seven others said they did not want more training, either because they were satisfied with existing trainings or because of personal time constraints. One respondent thought trainings should be left to the Conservation Commission.