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# Lake Champlain Water Quality: A Study of Public Awareness, Perceptions, and Behavior

Kelley Collier

Tridu Huynh

Michael Ialeggio

Colby Kearl

Autumn Reilly

*See next page for additional authors*

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**Authors**

Kelley Collier, Tridu Huynh, Michael Ialeggio, Colby Kearn, Autumn Reilly, Dana Ribaldo, Elaine Wang, Razelle Hoffman-Contois, Andrew Chevrefils, and Jan Carney

# Lake Champlain Water Quality: A Study of Public Awareness, Perceptions, and Behavior

Collier, K.<sup>1</sup>, Huynh, T.<sup>1</sup>, Ialeggio, M.<sup>1</sup>, Kearl, C.<sup>1</sup>, Reilly, A.<sup>1</sup>, Ribaud, D.<sup>1</sup>, Wang, E.<sup>1</sup>, Hoffman-Contois, R.<sup>2</sup>, Chevrefils, A.<sup>2</sup>, and Carney, J.<sup>1</sup>  
UVM College of Medicine<sup>1</sup>, Vermont Department of Health<sup>2</sup>

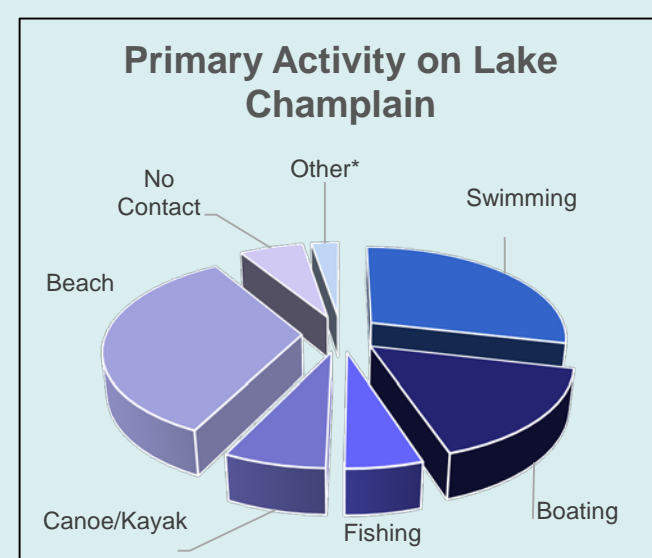
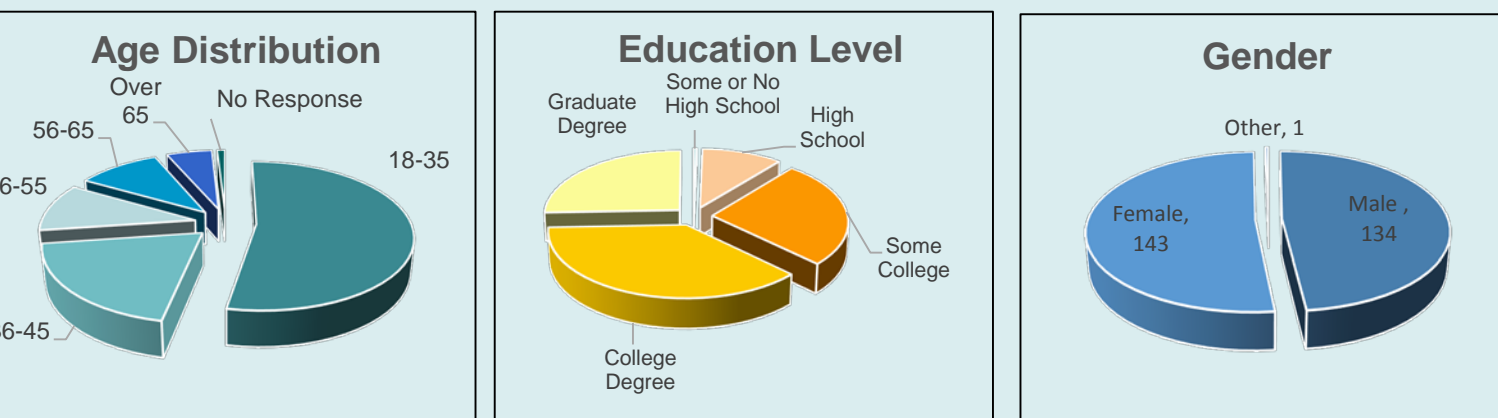
## Introduction

Lake Champlain serves as a major source of drinking water and a prime recreational area in Vermont. The Vermont Department of Health actively monitors Lake Champlain water quality, generates informational resources, and issues restrictions and advisories as necessary. Key water quality issues include: blue-green algae blooms (BGAB), combined sewer overflow (CSO), mercury-based fish consumption advisories, and suitability for recreational use. Determining public awareness of Lake Champlain water quality, and how perceptions of Lake Champlain water quality influence behavior, are essential to improving communication with at-risk and underinformed populations.

## Methods

- Conducted a literature review
- Developed and administered a survey to 288 adults at 8 locations in Chittenden County
- Analyzed data in Excel and SPSS with a p value cut-off of  $p = 0.05$
- Conducted quality control on a random 10% of surveys
- Number of resources seen or used was used as a proxy for awareness

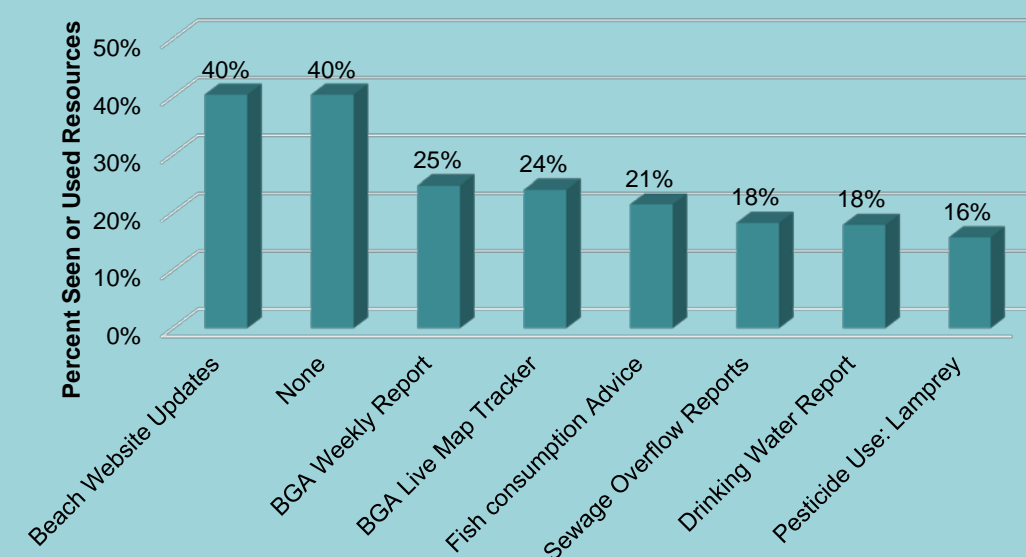
## Descriptive Statistics



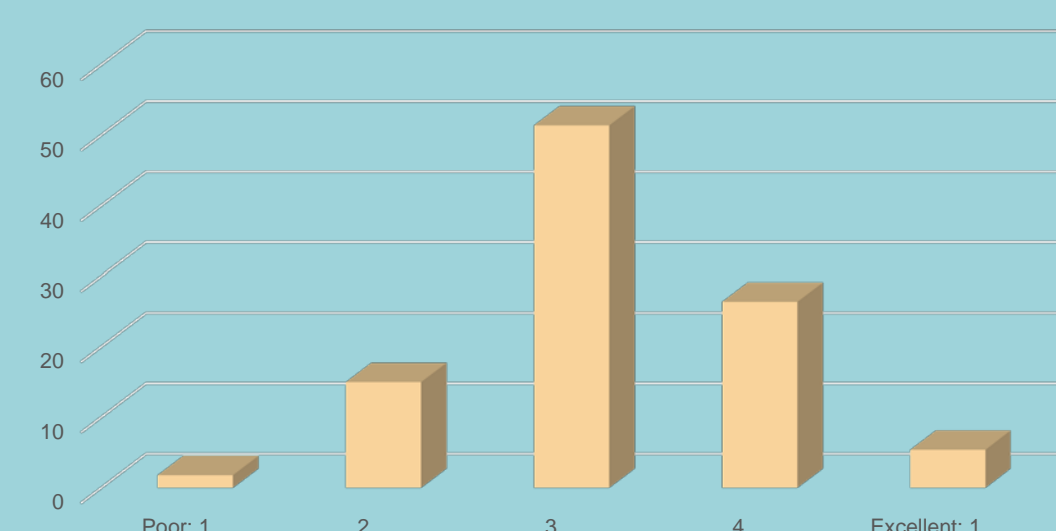
- 94.4% of respondents had contact with Lake Champlain in the last five years
- 41.1% had chosen to stay away from Lake due to concerns about water safety
- 40% of respondents had not seen any informational resources regarding Lake water quality

## Results

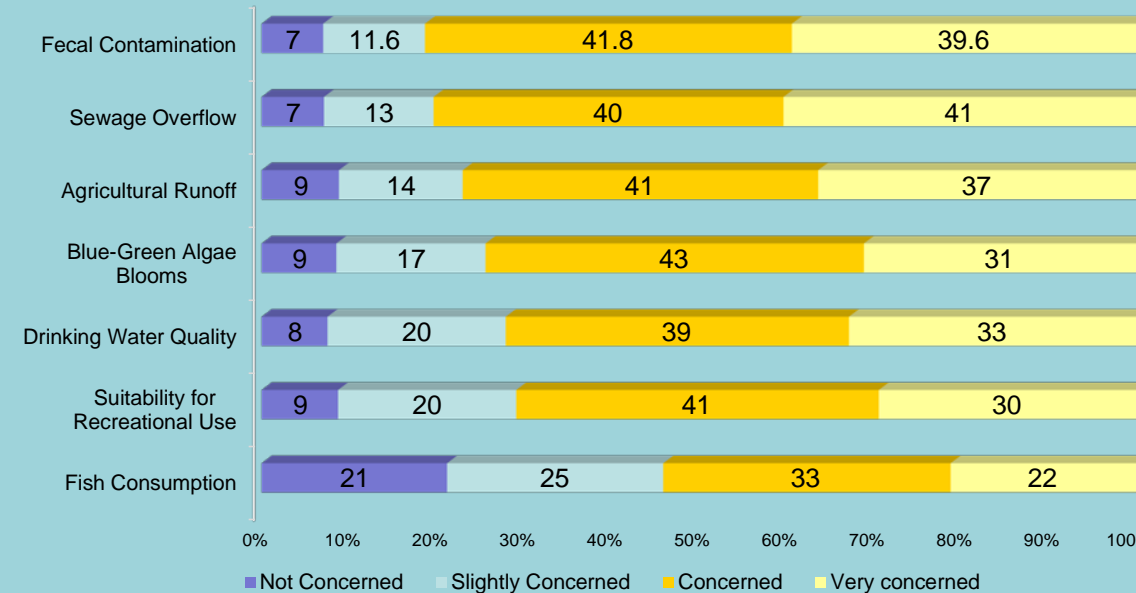
Lake Champlain Water Quality Educational Resources Seen or Used



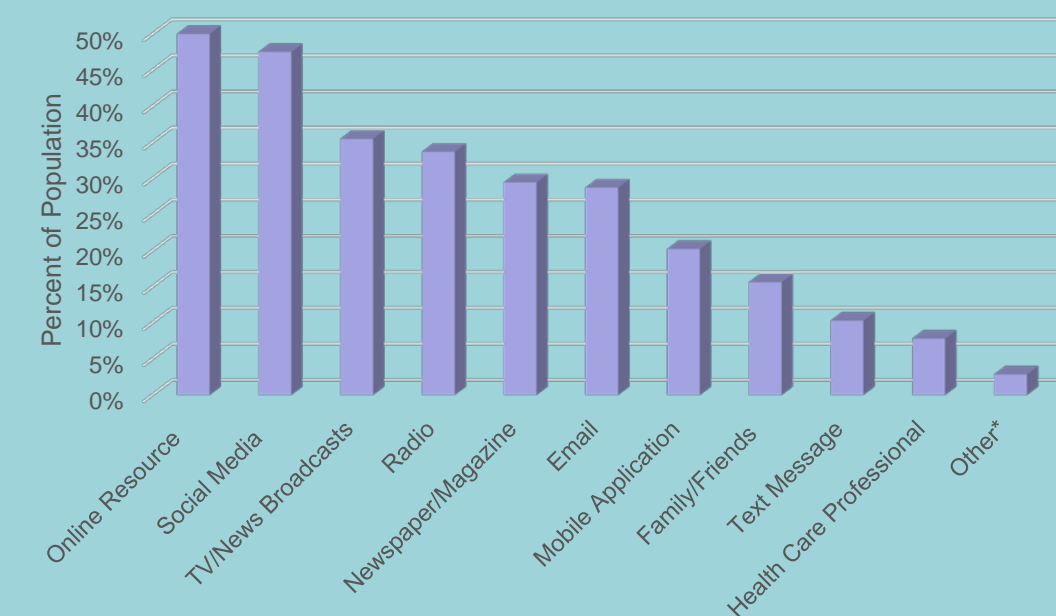
Perception of Lake Champlain Water Quality



Level of Concern About Specific Lake Champlain Water Quality Issues



Preferred Modes of Communication about Lake Champlain Water Quality



### Underinformed Populations

Compared to respondents age 36 and older, 18-35 year olds were:

- Less likely to be concerned about BGAB, CSO, fecal contamination, agricultural runoff, and fish consumption
- Less likely to have seen the CSO reports or information about pesticide application for lamprey control ( $p=0.001$ ,  $p=0.012$ )
- More likely to favor receiving information via family/friends, social media, or a mobile application ( $p=0.048$ ,  $p=0.001$ , and  $p=0.036$ )

### At Risk Populations

- Women of reproductive age were less likely to be aware of fish consumption advisories than other demographics ( $p=0.007$ )
- Respondents with young children in the household showed no difference in levels of concern about lake water quality issues, informational resources seen or used, and perception of water quality ( $p>0.050$ )

### Staying Away from Lake Champlain

Those who reported staying away from the Lake due to concerns about water quality:

- Were more likely to report awareness of the BGAB weekly report, beach website updates, and, in general, more resources than those who did not report staying away ( $p<0.001$ ,  $p<0.001$ , and  $p<0.001$ )

### Underutilized Information

- Respondents residing in towns with blue green algae blooms were no more likely to have seen either the BGAB weekly report or BGAB live map ( $p=0.770$  and  $p=0.380$ )
- Respondents residing in towns with permitted CSO outlets were less likely to be aware of CSO reports than those who did not reside such areas ( $p=0.001$ )

## Discussion

Overall, respondents reported concerns across a wide range of water quality issues, yet had a low level of awareness of existing educational resources.

- 18-35 year olds reported less concern and awareness regarding Lake Champlain water quality than older respondents. Increased awareness within this age range could increase protection of vulnerable subpopulations such as young children and women of childbearing age.
- Residents in towns permitted for CSO outlets and towns where blue green algae blooms occur were no more aware of the reports relevant to them than others.
- Despite over two decades of intensive interagency outreach efforts, women of childbearing age were less likely to be aware of mercury-based fish consumption advice than others.
- Respondents in general reported a high level of concern regarding suitability for recreational use but low awareness of Beach Closure information.



## Recommendations

- Use of a Mobile App and outreach via social media targeting the underinformed subpopulations should be introduced as these modes were found to be the preferred method of communication. This is consistent with a 2014 report by the EPA highlighting the need for digital resources due to increasingly technology-savvy populations, citing a texting service developed by the New York City Department of Health and a "BeachCast" mobile application used by the Great Lake States as examples.
- At present, Beach Closure information is scattered across various State and Local Agency webpages. A central repository as well as improved on-site Beach Closure postings could improve public awareness.

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