

EXAMINING PERCEPTIONS, BEHAVIORS, & OPINIONS  
OF LANDOWNERS ALONG SARATOGA LAKE

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## **ABSTRACT**

EXAMINING PERCEPTIONS, BEHAVIORS, & OPINIONS OF LANDOWNERS ALONG SARATOGA LAKE

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Surveying 158 residents along Saratoga Lake revealed that most respondents recreate frequently on the lake, and perceive water quality as acceptable and important for property values, but threatened primarily by invasive species and development. While opinions varied on who should maintain the lake, most opposed restrictive land use regulations. Future studies and public outreach should focus on these subjects and addressing resident behaviors that may be contributing to non-point source pollution (NPS).

## **INTRODUCTION**

Our aim in this study is to answer the following questions regarding landowners along Fish Creek and Saratoga Lake. First, how do they perceive water quality and what do they believe are the foremost threats to it? Which of their behaviors potentially affect water quality, and in what other ways do they interact with Saratoga Lake? What are their opinions of policies related to maintaining water quality and regulating land use? We have developed a survey to answer these questions. Ultimately, we expect our findings to provide useful information and guidelines for future water quality-related outreach and education programs that target residents of the Saratoga Lake watershed.

### **THE SARATOGA LAKE WATERSHED:**

Before delving into our study, it will be helpful to sketch a brief profile of Saratoga Lake and its watershed. The 240 square miles of the Saratoga Lake Watershed is developmentally and socio-economically diverse (SLPID 2001). It is composed of thirteen towns, including the higher-density development of Saratoga Springs and lower-density development areas, such as Corinth. The watershed has a website entitled “Land to Lake Perspectives-The Saratoga Lake Watershed Plan,” which attempts to coordinate efforts by SLPID (Saratoga Lake Protection and Improvement District), the Saratoga County Environmental Management Council, and the Saratoga County Soil and Water Conservation District to protect Saratoga Lake and its tributaries. Though the site has not been updated since 2002, it acts as an agent to raise awareness of issues within the watershed, including population growth, pollution (non-point and

point source), recreation, eutrophication, invasive species, such as Eurasian milfoil and zebra mussels, wastewater and storm water. In previous years, people debated over whether to use Saratoga Lake or the Hudson River as new drinking water sources for Saratoga Springs. A survey conducted of residents in the Saratoga Lake Watershed found that about one-third of households supported using Saratoga Lake as a drinking source, while 41% were opposed and 23% undecided (Bergelin 2006). It was also noted that “recreational activities, household economic levels, [and] varying distances from Saratoga Lake influence how the community values Saratoga Lake as a resource” (Bergelin 2006).

Finally, population growth, development, and their impacts on water sources are among the foremost concerns regarding the watershed. A recent Saratoga Lake Watershed study examining zoning regulations and land use patterns shows that possible development land includes 56% of the total watershed area (Quentin 2007). Saratoga County has the fastest population growth in the state, partly due to I-87, which bisects the county. Due to the proximity of Saratoga County to large metropolitan centers such as New York City and Boston, with the completion of I-87 in 1967, the area became far more accessible and thus residential populations increased. In fact, the urban area in the county has doubled in acreage since 1976 (SLPID 2001).

The impacts of such population growth on water sources include increased runoff (due to increased impervious surfaces), increased pollutants, increased eutrophication (namely, algal growth, which decreases water’s dissolved oxygen levels), and possible temperature rises in riparian zones (the area of land along a body of water which, with sufficient vegetation, often serves as a natural buffer and filter for the water body) with the removal of vegetation (Quentin 2007).

## **NON-POINT SOURCE POLLUTION:**

It is important to monitor the impacts of development on water, especially those of non-point source pollution. The EPA recognizes non-point source pollution (NPS) as the United States' "largest remaining water quality problem" (EPA 2003). Nationally, concerns regarding the various forms of NPS fall roughly into the following domains: acid mine drainage, urban, agriculture, forestry, hydromodification and habitat alteration, marinas and boating, highways, roads and bridges, and wetland or riparian management (EPA 2009). Because NPS results from the aggregation of many activities diffused throughout a watershed, it proves particularly difficult to manage. Urban runoff, for instance, is commonly caused by the improper maintenance and malfunction of septic systems; pet excrements, lawn fertilizers, pesticides, and herbicides; improper disposal of such household chemicals as cleaners, automobile fluids, road de-icing substances, and vehicle emissions; as well as construction activities and the removal of vegetation within a watershed, especially along banks (EPA 2008).

In Saratoga Springs, much of Saratoga Lake's excess nutrient levels have been recognized as resulting from NPS, which includes leaking septic systems near tributaries and the lake's shoreline, as well as runoff from rural, urban, and woodland areas (SLPID 2001). A former Skidmore student has shown that, within the watershed, "septic systems are poorly maintained... homeowners generally do not have their septic tanks pumped out until their septic system has begun to cause pooling in yards, back-ups in basements or release foul odors" (Petri 2007). In aggregation, residents within the Saratoga Lake watershed can have significant impacts on water quality, especially by generating NPS, or by failing to follow laws and policies aimed at minimizing NPS.

## MANAGING NPS

Since watershed residents contribute to NPS through a variety of activities, strategies for managing and preventing NPS aim at changing these behaviors. To do so, governmental and nongovernmental groups may pursue regulatory initiatives, market incentives, public outreach and education programs, or some combination of these. Laws pertaining to water quality generally rely on regulations and standards to address *point* source pollution. NPS management, on the other hand, is achieved primarily through such programs as cost sharing, outreach, and education. Since most of these programs rely on voluntary efforts (of those initiating the programs, and especially of those who are the focus of outreach), residents' participation and cooperation is essential to the efficacy of such programs. Education plays an especially significant role in NPS management strategies, such as those proposed by the Administration's Clean Water Action Plan (Ribaudó et al. 1999). Education programs often target farmers, because agriculture is one of the foremost contributors to NPS:

Proponents of such programs believe expected water quality will be improved if the information provided encourages producers to (a) consider the environmental effects of their choices and/or (b) simultaneously improve expected water quality and profitability by using existing technologies more efficiently or by adopting alternative, more environmentally friendly technologies. (Ribaudó et al. 1999)

These programs often use demonstrations and workshops, technical assistance, newsletters, seminars, and field days to disseminate information. In making this point, however, Ribaudó et al. only address education programs involving residential *producers* (namely, farmers), not other residents (namely, regular homeowners) who, individually, might not generate NPS on the scale of producers, but who nevertheless contribute to aggregate NPS. Ribaudó et al. argue that, in many cases, education is an impractical means for reducing the amount of NPS that *producers* (namely, farmers) generate, because they usually lack financial incentives to adopt suggested

practices and reforms. For the purposes of our study, however, this potential obstacle to outreach and education does not necessarily apply to *non-agricultural* residents to the same extent.

Residents might not perceive applying lawn chemicals or clearing vegetation as closely tied to their financial livelihood to the same degree as, for instance, a farmer's use of agrochemicals. Hence, our study will focus on non-agricultural residents.

Non-agricultural sources of NPS are often even more diffuse and, therefore, more difficult to address. In order to identify and manage residential NPS effectively, it is first necessary to gain an understanding of residents' current relationship with the lake and their awareness of water issues. To date, this study has not occurred with landowners of Saratoga Lake. If such a study is successful, consequential education and outreach for the residents can serve, at the very least, as complements to regulations by building community support, understanding, and willingness to participate (Ribaud et al. 1999).

Because residents contribute to NPS, their cooperation in attempts to minimize and prevent it, by changing their behaviors, is critical. Nonpoint Education for Municipal Officials (NEMO) emphasizes the importance of residents' cooperation in its NPS management strategies.<sup>1</sup> Although NEMO is designed specifically to work with official land use decision makers, its members recognize the necessity of targeting other important resident groups and stakeholders as well. For example, in many of their watershed projects, they target forest and riparian landowners in *addition* to local land use officials (NEMO 1998). They also decide which stakeholders are most important to watershed management, in part, by assessing residents' concerns, values, motivations, reluctances, and awareness regarding local water issues. By

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<sup>1</sup> NEMO was created in the 1990s with an aim to "provide information, education and assistance to local land use boards and commissions on how they can accommodate growth while protecting their natural resources and community character" (NEMO 1998). Their national network includes an alliance of 32 educational programs in 31 states that attempt to protect natural resources—especially in minimizing NPS—through preventative land use strategies and planning.

studying residents in this manner, NEMO attempts to identify potential social impediments and complements to their plans which, in turn, indicate the most effective ways to proceed with their initiatives. For instance, they identify residents who are most likely to meet regulations and outreach with hostility, reluctance, or indifference, as well as those who may most readily cooperate.

NEMO often focuses on residents who seem most willing to cooperate in the beginning stages of watershed management programs, expecting these potential partners to disseminate information to other community members, as well as setting precedence and an example for other, more reluctant or passive residents to follow. They also look for an “existing motivation” that may complement their efforts, such as local, widely recognized and publicly discussed water quality issues; NEMO calls this process “selecting for success” (NEMO 1998). Identifying potential partners and existing motivations within watershed communities, therefore, can be used to design more effective outreach and education programs, informed by sensitivity to local concerns and awareness. Our survey attempts to identify such residential partners that are most accepting of regulations and outreach. This information could prove useful to watershed groups and those responsible for creating and enforcing regulations.

Rinaudo et al. also suggest the value of identifying existing motives and potential partnerships, namely, in outreach and education involving farmers. They argue that education and outreach initiatives that attempt to persuade farmers to change certain actions will only be successful under the following circumstances: “[When] (a) the actions that improve water quality also increase profitability, (b) producers have strong altruistic or stewardship motives, or (c) the on-farm costs of water quality impairments are shown to be sufficiently large” (Ribaudo et al. 1999). While Rinaudo et al. limit their analysis to farmers, the more general, noteworthy point is

that in order to formulate initial guidelines, *any* resident outreach program must first identify residents' values and financial concerns regarding their contribution to NPS. Hence, we designed our survey to address these topics.

### **FOCUSING ON RESIDENTS ADJACENT TO SARATOGA LAKE**

If a group wished to implement public outreach and education in order to reduce residents' contribution to NPS of Saratoga Lake, and first had to survey landowners' concerns, values, motivations, reluctances, and awareness regarding local water issues, which residents should be studied first, as a priority? Riparian landowners (those who own property bordering water bodies) are especially relevant to NPS management, because riparian zones significantly influence NPS. For this reason (in part), we chose to survey residents living directly around the lake. Lakeside residents are likely to have the most frequent interactions with the lake, and be aware of water issues. They are most likely aware of such issues due to the publications distributed by watershed groups, such as the Saratoga Lake Association (SLA) and SLPID. Lakeside residents pay annual taxes that SLPID uses to combat the spread of Eurasian milfoil, and other lake nuisances. Thus, residents are stakeholders in the lake for recreational purposes and the improvement of water quality. Riparian zone residents also have the great potential to both negatively and positively impact water quality, depending on their behaviors.

Well-functioning riparian zones play critical roles in minimizing NPS in waterways. First, they serve as nutrient sinks and buffers, preventing excess nutrients (especially from fertilizers) from entering tributaries and larger water bodies (Lowrance et al. 1984). Riparian zones provide other environmental services as well: "The functions of...riparian areas include water quality improvement; stream shading; flood attenuation; shoreline stabilization; ground water exchange; and habitat for aquatic, semiaquatic, terrestrial, migratory, and rare species"

(EPA 2008). Hence, loss of riparian buffers can significantly exacerbate NPS, and increase the need and costs of storm-water and flood protection facilities (EPA 2008). However, property owners along riparian corridors sometimes diminish the ability of riparian zones to perform these services for a variety of reasons. Some riparian landowners either promote or discourage vegetation for aesthetic reasons. For example, one might minimize vegetation to ensure a better view of a stream or lake, which in turn can result in increased nutrient levels in the water body.

Thus, our study aims to identify lakeside residents' land use practices due to their closer proximity and relationship to the lake. Even if residents adjacent to Saratoga Lake are not riparian landowners, they still comprise a unique stakeholder group and are particularly worth studying. Many landowners around Saratoga Lake frequently use it for recreation; those who interact with the lake more frequently are more likely to observe potential problems, such as invasive species. Lakeside residents also pay annual SLPID taxes (as mentioned above), which fund various efforts to maintain the lake. Many residents are likely to view Saratoga Lake and the quality of its water as significant determinants of property value as well. For these reasons, we decided to survey property owners surrounding Saratoga Lake and Fish Creek.

## **RESEARCH QUESTIONS & GOALS**

Our study aims to assess lakeside residents' (1) perceptions of Saratoga Lake's water quality and the foremost threats to it; (2) their various behaviors and interactions with Saratoga Lake, namely, recreational and land use habits; (3) and their opinions of various policies related to maintaining water quality and regulating land use. To gather this information, we pursued answers to the following questions. First, how do residents perceive Saratoga Lake's water quality? Our survey asked landowners to rate water quality for various activities, such as fishing, swimming, and boating. Next, which of their behaviors potentially affect water quality in

Saratoga Lake? Survey questions relevant to this issue cover residents' recreational habits, land use practices (such as applying lawn and garden chemicals), the degree to which they remove or increase vegetation on their property, whether they maintain a grass lawn, and how they manage dog excrement (if present) on their property. Finally, what are residents' opinions of various policies that might be used to regulate land use and improve Saratoga Lake's water quality? How might these opinion influence residents' willingness to cooperate with education, outreach, and regulatory initiatives? Survey questions on this matter assess, for example, the extent to which residents shun or welcome restrictive land use regulations, how much they might be willing to pay each year to improve Saratoga Lake's water quality, and who they think should be primarily responsible for maintaining the lake—from different levels of government, to residents themselves. The next section explains our methods for developing this survey.

## **METHODS**

To gather our information, we administered a mail survey to residents adjacent to Saratoga Lake and Fish Creek in late March, 2009. In developing our survey, we examined surveys conducted in other watersheds throughout the U.S., identified questions that fit our study, and adapted them to the specifics of Saratoga Lake (see Appendix C). We also adopted question formats from other surveys; for example, we used the Leichart Scale to record residents' opinions of land use policies. Other questions were devised with the help of our advisor, Robert Turner. We asked questions about recreational and lawn maintenance behaviors, water quality for recreation, the severity of water quality issues from invasive species to NPS, land use policies, and demographics (see Appendix A). The majority of our survey questions are qualitative, as most watershed surveys gather qualitative information from residents through mail

or phone surveys. We had hoped to gather supplemental qualitative data through follow-up interviews with willing respondents, but were unable due to time constraints. Surveying residents by mail provides several advantages over phone or personal interviews. Since they can be distributed in mass, mail surveys allow one to gather data from a larger sample population; however, disadvantages include generally lower response rates and less detailed data.

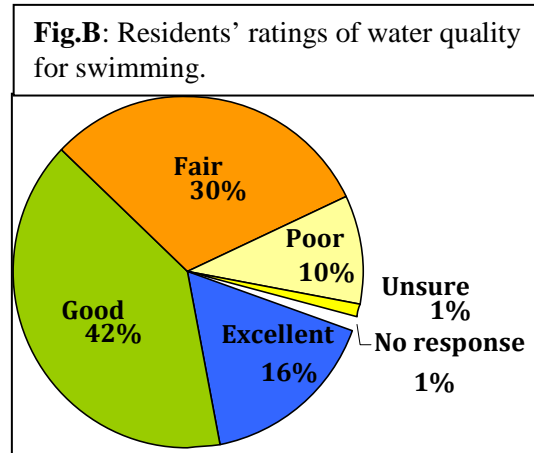
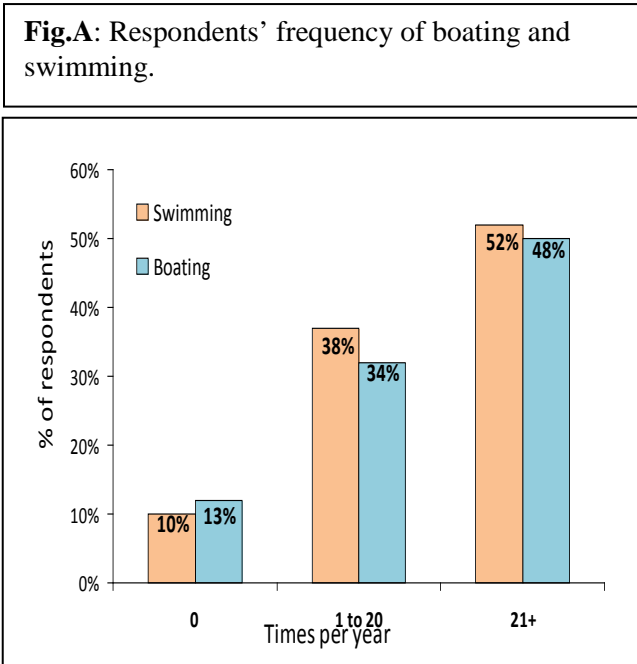
Our mailing list was formulated through ARCGIS 9.3. First, we selected all of the properties within 90m of Saratoga Lake and Fish Creek. There were 760 such properties. We then removed the properties that were listed as seasonal residencies, and multiple properties that share the same landowner. Seasonal landowners were not likely to reside on the water during the late winter months, when we mailed and collected the surveys. Our survey was administered to the remaining 533 landowners—this number does not include the multiple property owners or seasonal residencies (see Appendix B). Most of these properties are residential, while there are a small number of commercial properties, including restaurants and small businesses. We received 158 surveys out of 498 as thirty-four surveys were returned to us due to invalid addresses, most likely caused by errors in the ARCGIS property listings. Ultimately, we had a 32% response rate.

Data was compiled in Excel and analyzed through Statistical Package for the Social Sciences (SPSS) (see Appendix D). In our analysis, we used crosstabs to find correlations among data concerning demographics, values, opinions and behaviors.

## RESULTS & ANALYSIS

Our results are separated into three sections, according to the three general categories of questions: residents' behaviors, perceptions of lake issues, and policy opinions. These are based on the 158 respondent's answers to our survey. Based on the demographic information gathered, two-thirds are male, more than half hold at least a college degree, half are above sixty years old and a majority have lived on the lake for eleven years or more.

### Results & Analysis: Residents' Behaviors



The residents living around Saratoga Lake are important stakeholders, because they often use the lake for recreation. Most of our respondents recreate frequently on Saratoga Lake. Over half of the respondents swim more than twenty-one times per year, while only one-tenth never swim in the lake (Figure A). Almost half of the respondent's motor boat on the lake more than twenty-one times per year. By comparison, a survey done in the Portage Lake watershed found that nearly half of respondents swim and boat once a week. This suggests that—at least in the

cases of Saratoga Lake and Portage Lake—it is common for residents to use lakes frequently for recreation.<sup>2</sup>

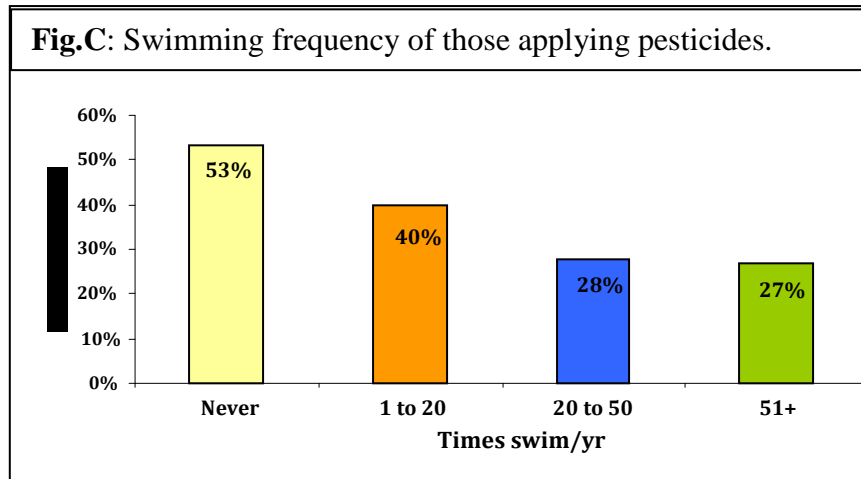
Residents were also asked to rate water quality for different recreational activities on Saratoga Lake.<sup>3</sup> They could rate it “excellent,” “good,” “fair,” or “poor” for each activity. It should be noted that we deliberately excluded any definition or criteria for judging water quality from the survey; thus, respondents were free to answer the question based on their own understanding of water quality. Overall, most respondents rated water quality as “fair,” “good,” or “excellent” for recreation. Residents’ ratings of water quality is particularly noteworthy: only one-tenth of respondents reported poor water quality for swimming, while a slight majority found it to be “good” or “excellent” (Figure B). Since swimmers fully immerse themselves in Saratoga Lake’s water, they are more likely to notice excessive algae, weeds, zebra mussels, and other potential nuisances. Swimming and motor-boating received the greatest percentage of “fair” and “poor” ratings, most likely because they are the most popular activities. Regarding fishing and other forms of boating, fewer people frequently fish, canoe, kayak, or sailboat, which likely explains the fact that less people rated water quality as poor for these activities. Water quality is viewed as especially good for fishing, most likely because of the abundance of weeds (namely, Eurasian milfoil) in the lake, which provide habitats for fish. The most important finding mentioned above is the fact that residents recreate heavily on Saratoga Lake, which characterizes them as stakeholders in its water quality, at least for purposes of recreation. Future

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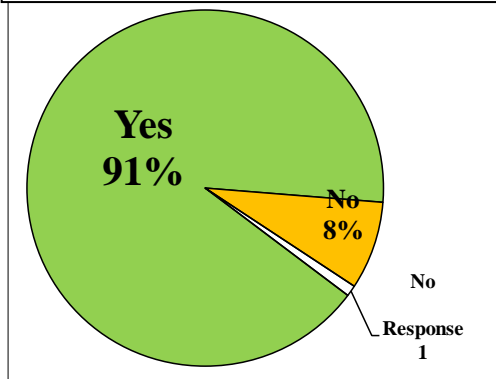
<sup>2</sup> By contrast, in the Kirker Creek 2006 study, 75% of respondents report that they never use the creek for recreational purposes; this is to be expected, however, because lakes lend themselves to a greater variety of recreation than creeks (Kirker Creek Watershed Planning Group, 2006).

<sup>3</sup> Many of the other watershed surveys that we reviewed asked residents to rate water quality. Similar to our survey, the Seneca Lake Watershed Resident Survey found that water quality for swimming received a greater percentage of ratings as “poor” than other activities. Also, almost half (48%) of their respondents rated water quality for swimming as good or excellent, while a majority (58%) of our respondents rated water quality as “good” or “excellent” for swimming (Genesee/Finger Lakes Regional Planning Council).

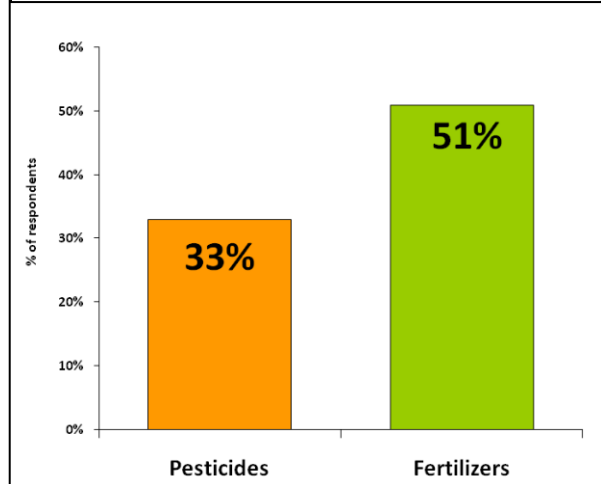
outreach initiatives should thus consider building support based on cooperation among recreationists.



**Fig.D: Residents’ responses to “Do you maintain a grass lawn?”**



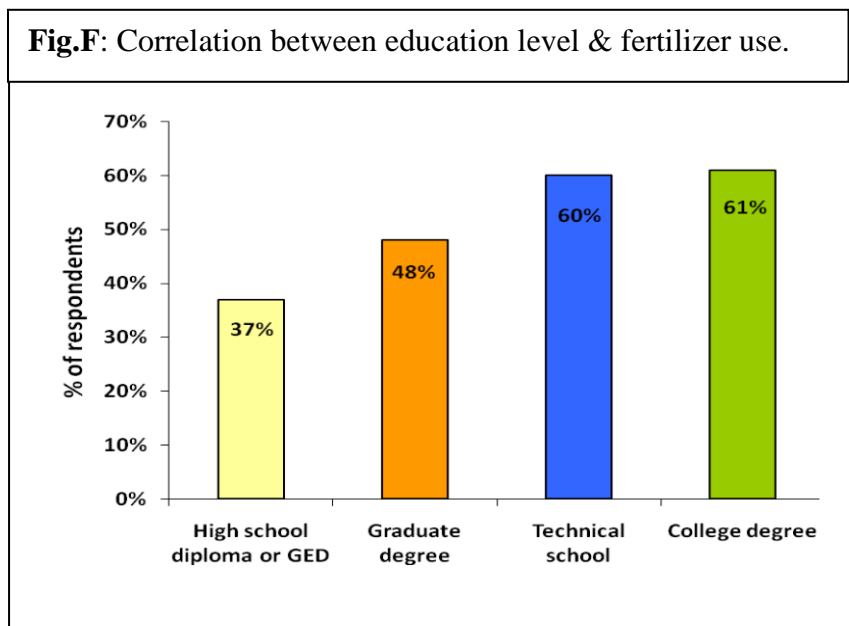
**Fig.E: Percent of residents who apply fertilizers and/or pesticides 1-5 times/yr.**



Landowners who report applying pesticides are less likely to swim than other respondents (Figure C). More than half of the residents who apply pesticides do not swim in the lake. This may indicate that those residents who swim in Saratoga Lake avoid using pesticides because they do not wish to pollute the water they use to swim. A significant majority of residents maintain a grass lawn (Figure D).<sup>4</sup> We also found that one-third of our respondents apply pesticides, and

<sup>4</sup> Interestingly, the Center for Watershed Protection found that the same percentage of their respondents, 91%, maintain grass lawns (Blankenship, 1999).

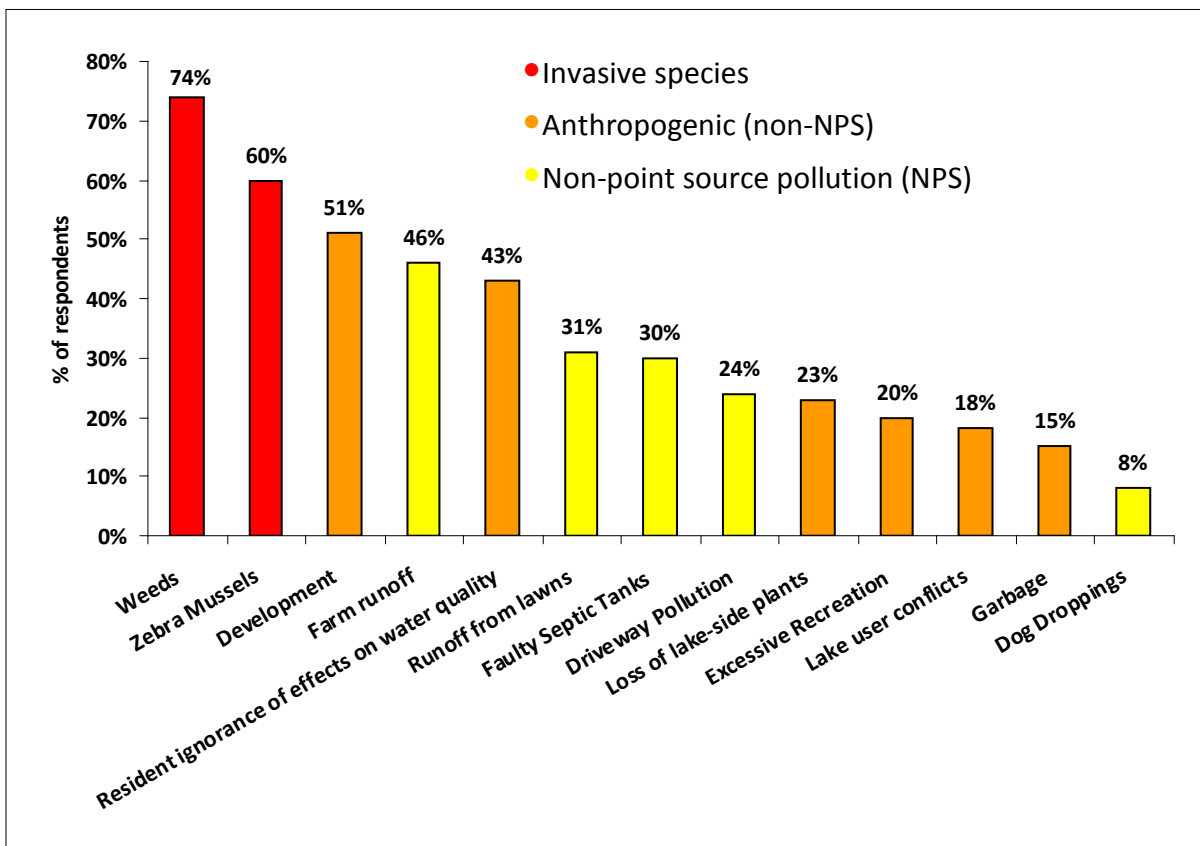
slightly more than half apply fertilizers, which is most likely explained by the fact that so many of them maintain grass lawns (Figure E). This finding is potentially a cause for concern, because our respondents are lakeside residents, and any fertilizers or pesticides they use could easily enter Saratoga Lake. Future studies should investigate the actual extent to which lakeside residents apply fertilizers and pesticides. Likewise, future outreach initiatives should aim at reducing fertilizer and pesticide use on properties around the lake, and residents should be educated about the effects of such lawn maintenance practices on water quality.



Finally, it is worth noting that the Center of Watershed Protection’s survey of Chesapeake Bay watershed residents found that respondents with higher levels of education and more income were more likely to use fertilizer (Blankenship, 1999). While our survey did not ask for residents’ incomes, we also found that residents with higher levels of education use more fertilizers (Figure F).

## Results & Analysis: Residents' Perceptions of Issues facing Saratoga Lake

Fig.G: Issues rated as “serious” by respondents.



Respondents perceive weeds (viz. Eurasian milfoil), zebra mussels, and development as the foremost threats to Saratoga Lake’s water quality, most likely because these are highly visual and thus easy to recognize (Fig.G).<sup>5</sup> The NPS issues highlighted in yellow (farm runoff, lawn runoff, faulty septic tanks, driveway pollution, and dog droppings) have potentially greater impacts on water quality than invasive species. Zebra mussels and weeds are more nuisances (especially for recreation) than significant threats to water quality. Nevertheless, SLPID cites zebra mussels and milfoil as pertinent issues facing Saratoga Lake. Residents do not seem to make the connection between the less visible and less publicized—but more cumulative—effects

<sup>5</sup> Similar to our findings, in the Portage Lake Watershed House Survey (2007), residents cited invasive, exotic species and development as the foremost threats to Portage Lake. (Portage Lake Watershed Forever Committee, 2007)

of their own actions. Anthropogenic, non-NPS issues include development, residents' lack of understanding of their impacts on water quality, loss of lake-side plants, excessive recreation, lake user conflicts, and garbage (all highlighted in orange). Residents generally rated these issues as less serious than NPS issues, with the exceptions of development and resident ignorance.

Almost half of respondents (49%) reported a decrease in vegetation since the acquisition of their property. This number may be large enough for concern, particularly if those residents own property within Saratoga Lake's riparian zones. Further studies might investigate the degree to which vegetation has increased or decreased in areas adjacent to Saratoga Lake, and the extent to which resident's private land use decisions contribute to such trends. Here, it should be noted that almost a quarter (24%) of respondents said that they were "unsure" of how serious a problem the loss of lakeside vegetation is around Saratoga Lake. This might suggest that future initiatives in public education should inform residents of the potential effects of vegetation loss on water quality, especially within riparian zones. Overall, the above findings indicate that respondents are most aware of well-publicized and easily visible issues, while NPS and anthropogenic, non-NPS issues are perceived as less serious, even though they potentially have more significant impacts on water quality. Public outreach and education should aim to inform residents' of these issues.

## **Table 1: Respondent Issues**

### *Waste:*

Dead fish left behind by fishermen  
Raw sewage dumped into the lake  
Boaters' gas and debris

### *Recreation:*

Lack of public access/too much public access  
Need to follow boating rules, boater safety  
Non-resident abuse of the lake

### *Regulation:*

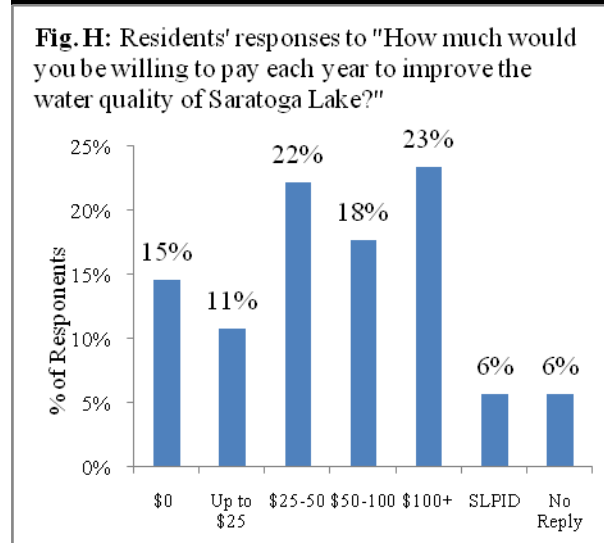
Local ordinance inadequacies/excessive regulation  
Future problems caused by unaddressed problems of today

### *Development:*

Flooding/varying lake levels caused by housing developments

Many respondents wrote in additional issues (that were not included in our survey question), which they believe to be pertinent to Saratoga Lake. We categorized them as concerns regarding waste, recreation, regulation, and development (Table 1). Within the category of “waste,” residents mentioned dead fish left by fishermen, raw sewage being dumped into the lake, and boaters’ gas and debris. Concerning recreation, respondents described lack of public access to the lake, too much public access to the lake, the need for people to follow boating rules and boating safety, and non-residents’ “abusing” the lake. Respondents also listed inadequacies of local ordinance, excessive regulation, and the need to prevent current problems from worsening (if unaddressed) as issues pertinent to regulation. Finally, some landowners cited flooding and fluctuations in the lake’s water level caused by housing developments as problematic. These issues should be the subject of further interviews and surveys, to determine the extent to which other residents find them significant.

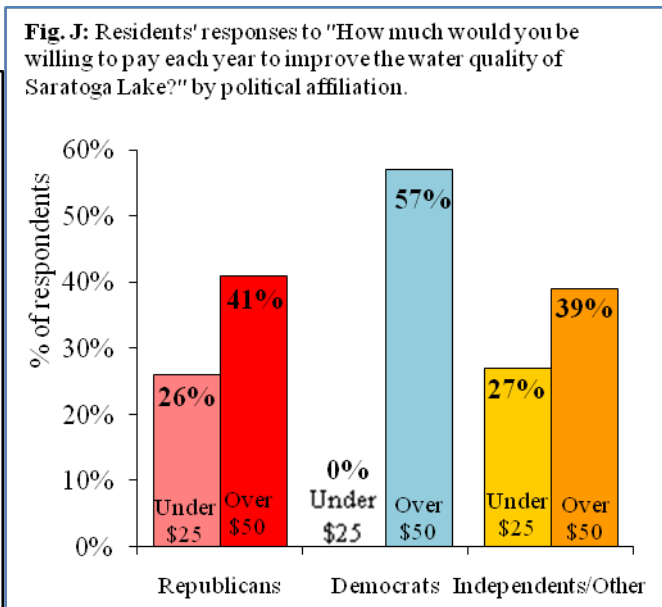
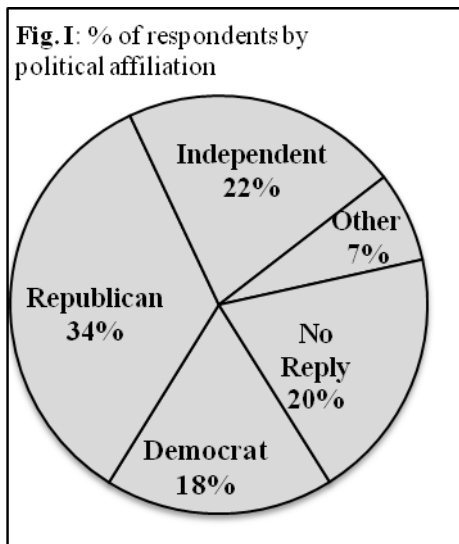
## Results & Discussion: Resident's Policy Opinions



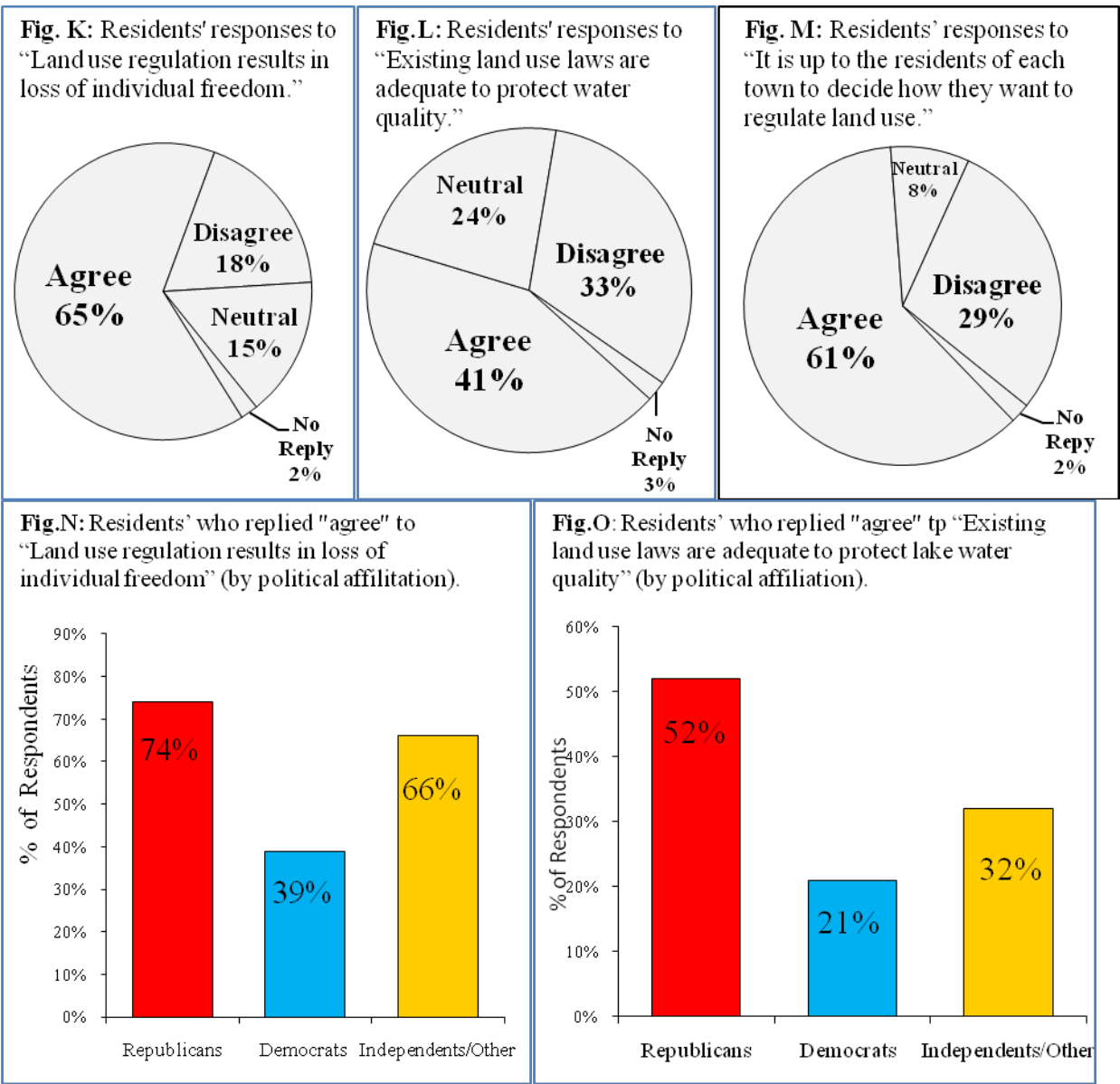
When asked how much they would be willing to pay annually to improve Saratoga Lake's water quality, the amount respondents were willing to pay annually varied greatly among residents (Fig.H). It should be noted that "SLPID" was added as a category, because many residents responded to the question by writing that they already pay an annual tax to the Saratoga Lake Protection and Improvement District (SLPID).<sup>6</sup> In light of this fact, residents might have interpreted the survey question as asking how much they would willingly pay in *addition* to the SLPID tax, which may have influenced responses.<sup>7</sup>

<sup>6</sup> Residents within the SLPID tax base are taxed \$1 for every \$1,000 dollars they have in assets.

<sup>7</sup> In comparison to the Seneca Lake Watershed Resident Survey, Saratoga Lake homeowners were generally willing to pay more than Seneca Lake resident: Thirty-percent of Seneca Lake residents said they would pay nothing, while only 8% were willing to pay over \$100. We do not have sufficient data to explain why this is the case. (Genesee/Finger Lakes Regional Planning Council)



None of the democratic respondents were willing to pay less than \$25 per year to improve Saratoga Lake's water quality (Fig.J). A greater percentage of democratic respondents than those of other political affiliations were willing to pay over \$50 annually. Overall, democratic respondents are willing to pay more than residents of other political affiliations, which suggests that any local initiatives requiring funding should turn primarily to democrats for financial support. As mentioned in the literature review, identifying which stakeholders are most likely to support initiatives aimed at improving or protecting water quality can be useful in the beginning stages of outreach, for it allows groups like NEMO to recognize those who are most likely to support their efforts. It should be noted, however, that while democratic residents may be willing to pay most to improve the lake's water quality, Fig. I indicates that they comprise a minority among those surveyed.



A majority of respondents believe that land use regulation reduces individual freedom

(Fig.K). This finding, when compared to the fact that a majority of respondents also believe that the residents of each town should decide how they want to regulate land use (Fig.M), suggests that most respondents value autonomy and independence in the way they manage their property, and oppose restrictive land use regulations. To avoid resident antagonism and opposition, outreach initiatives attempting to mitigate NPS by changing land use practices should involve

landowners in decision making as much as possible, especially since most respondents believe that residents should be free to decide their own land use (Fig.M).

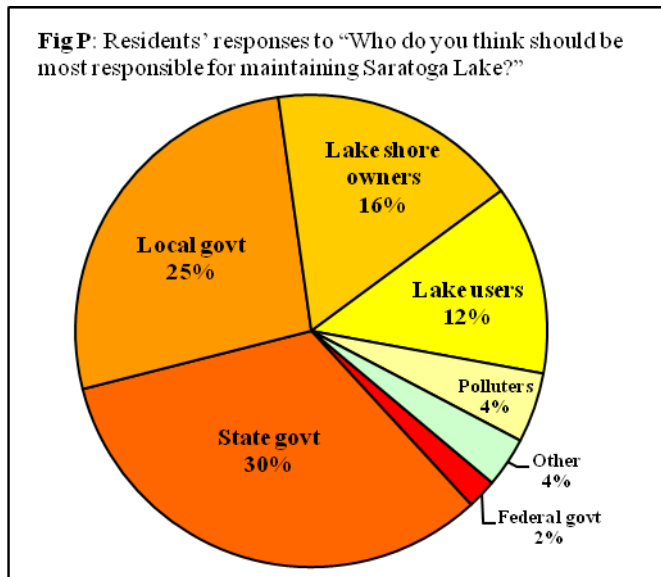
A greater percentage of respondents believe that existing land use laws are adequate to protect Saratoga Lake's water quality, although they do not comprise an overall majority (Fig.L). The fact that nearly one quarter of all residents responded "neutral" suggests that, at the very least, those who replied "neutral" may be unaware of existing land use laws.<sup>8</sup> Public outreach and education should inform residents of existing land use laws. Also, residents might change their opinions of the adequacy of such laws after learning more about the existing and potential effects of land use on Saratoga Lake's water quality.

A greater percentage of republican respondents believe that existing land use laws are adequate for protecting Saratoga Lake's water quality than independents/other and democrats, respectively (Fig.O). Also, a greater percentage of republicans believe that land use regulations encroach on personal freedom than independents/others and democrats, respectively (Fig.G). Among those who provided their political affiliations, republicans are most opposed to restrictive land use regulations and most satisfied with existing land use laws, while democrats are least opposed to restrictive land use regulations and least satisfied with existing land use laws. Since a majority of republican and independent/other respondents perceive land use regulation as undermining individual freedom, they can be expected to vote against such regulations when given the opportunity. Public outreach should thus focus on these two groups, educating them on the importance of (voluntarily and legislatively) preventing NPS resulting from poor land management practices, such as excessively clearing vegetation and increasing impervious

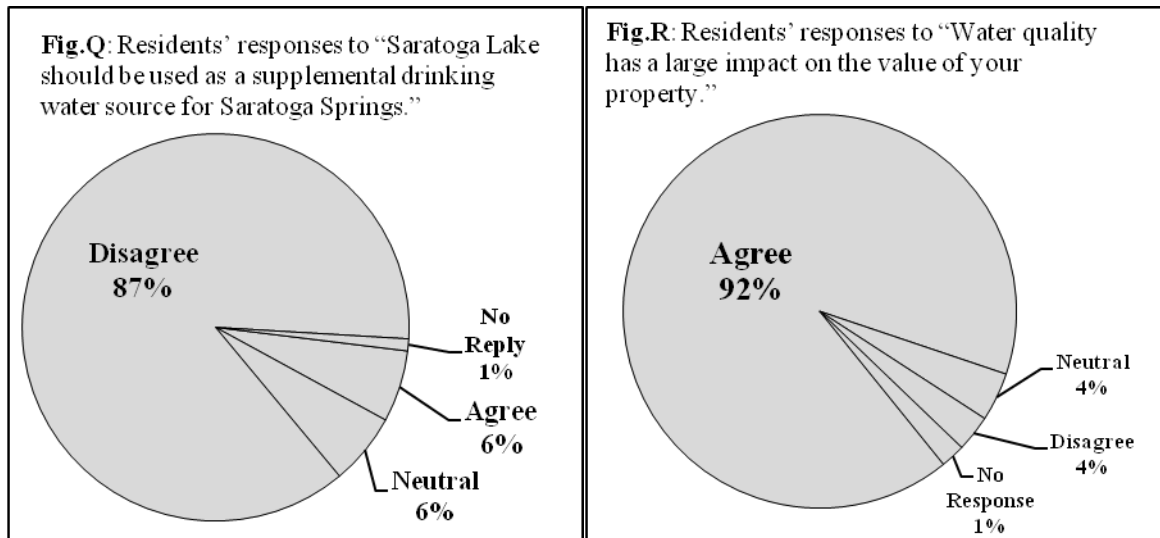
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<sup>8</sup> The fact that 41% of respondents in the Seneca Lake watershed survey indicated that they did not know when asked the same question, suggests that it is common for watershed residents to be unaware of existing land use laws. (Genesee/Finger Lakes Regional Planning Council)

surfaces on one's property, or failing to use silt fences during landscaping and home construction.



While, respondents' opinions about who should be responsible for maintaining Saratoga Lake vary greatly overall, a slight majority (57%) believe that this responsibility should lie within a level of government, namely, state and local (Fig.O). When compared with the fact that most respondents think residents should be free to decide land practices for themselves (Fig.M), it becomes apparent that most respondents want Saratoga Lake to be government managed, but not their land use. They therefore would not recognize imposing land use regulations as *included* among government responsibilities for maintaining the lake. Perhaps residents have this attitude because they do not realize that land use can influence water quality. Future studies should assess the extent to which residents recognize these potential effects. Educational outreach may subsequently focus on teaching landowners about the actual and potential effects of land use on water quality.



A significant majority of respondents (87%) are opposed using Saratoga Lake as a drinking water source for Saratoga Springs (Fig.Q).<sup>9</sup> It should be noted, however, that the question asks residents to state whether they want the lake to be used as drinking water *for Saratoga Springs* specifically, not generally or for other municipalities. Thus, it is unclear whether respondents based their answers on the understanding that Saratoga Springs would be the sole recipient of this supplemental drinking water. There may be other reasons for objecting as well; if residents frequently use the lake for recreation, for instance, they may be opposed to using the lake as a drinking water source for fear that it would restrict the forms and extent of recreation on the lake. Future studies should further investigate residents' opinions on this matter.

The fact that a large majority of our respondents (92%) believe water quality strongly influences property value is perhaps one of our most significant findings (Fig.R). Lakeside residents may be unique within the Saratoga Lake watershed, because they have such a marked

<sup>9</sup> Another survey conducted of residents in the Saratoga Lake Watershed found that about one-third of households supported using Saratoga Lake as a drinking source, while 41% were opposed and 23% undecided (Bergelin 2006). It was also noted that "recreational activities, household economic levels, [and] varying distances from Saratoga Lake influence how the community values Saratoga Lake as a resource" (Bergelin 2006).

stake in Saratoga Lake's water quality, at least as it pertains to property values. As mentioned in the literature review, financial incentives significantly influence landowners' willingness to change or adopt certain behaviors (Ribaudo et al 1998). Our findings suggest that lakeside residents are most likely to show concern for potential threats to Saratoga Lake's water quality when they fully recognize the connections between such threats, water quality, and property value. In other words, property value gives lakeside residents financial incentive to protect, maintain, and improve the lake's water quality. However, since "water quality" is a completely ambiguous term in our survey, future studies should examine criteria residents consider when judging water quality. Finally, it is unclear why so many respondents believe water quality influences property values and, yet, oppose using Saratoga Lake as a drinking water source, despite the fact that the lake's water quality would likely *have* to be improved if turned into a drinking water source. Since we lack sufficient data to adequately explain this finding, future studies should explore this topic further.

## **CONCLUSION**

The 158 residents who responded to our survey represent a broad array of perceptions, opinions, and behaviors. First, many landowners reported frequent recreation, which suggests that recreationists comprise a significant stakeholder group. Next, residents perceive weeds, zebra mussels, and development as the foremost threats to water quality, even though the former two are more nuisances than significant detriments to water quality. One would expect homeowners to have a positive impact on water quality since residents value water quality for recreational and financial reasons. However, slightly more than half of respondents use fertilizers and approximately one-third use pesticides. This corresponds to NPS and non-NPS anthropogenic sources of pollution being perceived as lesser threats than invasive species and development. Therefore, the effects of these pollutants on water quality should be emphasized in public education.

Finally, our findings regarding residents' policy opinions reveal a general preference for "home rule," or autonomy in land use, particularly among republicans. Recall that democratic respondents are willing to pay more to improve the lake's water quality than residents of other political affiliations. Future attempts to encourage property owners to change or restrict their land use practices should keep this in mind, as many property owners will greet such initiatives with mixed levels of support. Continuations of our study should investigate the topics and issues mentioned above in further detail, either through surveys or interviews.

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Our Families & Friends  
Each Other  
The Trees That Died

## Appendix A

### SKIDMORE WATER RESOURCES INITIATIVE: SARATOGA LAKE LANDOWNER SURVEY

1. How many times do you use Saratoga Lake for recreational purposes per year? (Please X the appropriate box):

	0	1 - 5	6 - 20	21 - 50	51 +
<i>Swimming</i>					
<i>Fishing</i>					
<i>Hiking/ Wildlife Viewing</i>					
<i>BBQ /Picnic</i>					
<i>Motor Boating</i>					
<i>Sailing/Rowing/Kayaking/Canoeing</i>					

2. How many times do you apply the following to your property per year? (Please X the appropriate box):

	0	1 - 5	6 - 10	11 - 15	15 +
<i>Pesticides</i>					
<i>Fertilizer</i>					

3. Are there more or less bushes and trees on your property than when you moved in? (Please circle one): *More / Less*

4. Do you maintain a grass lawn at your residence? (Please circle one): *Yes / No*

5. In some places, residents pay money to a local association that works to improve water quality. How much would you be willing to pay each year to improve the water quality of Saratoga Lake? (Please circle one):

*\$0 up to \$25 \$25 - \$50 \$50 - \$100 \$100+*

6. If you have a dog, what is done with the dog droppings most of the time? (Please circle one):

*No Dog Leave It Bury It Flush It Put in Trash*

7. How would you rate Saratoga Lake's water quality for the following? (Please X the appropriate box):

	Excellent	Good	Fair	Poor	Not Sure
<i>Swimming</i>					
<i>Fishing</i>					
<i>Motor Boating</i>					
<i>Sailing/Rowing/Kayaking/Canoeing</i>					

8. How serious of a problem do you believe the following issues are? (Please X the appropriate box):

	Serious Problem	Minor Problem	Not a Problem	Unsure
<i>Fertilizer/pesticide runoff from farms</i>				
<i>Runoff from lawns</i>				
<i>Street/driveway pollution</i>				
<i>Dog droppings</i>				
<i>Garbage</i>				
<i>Excessive recreation (ex. boating)</i>				
<i>Development</i>				
<i>Weeds</i>				
<i>Faulty septic tanks</i>				
<i>Zebra mussels</i>				
<i>Loss of lake-side plants</i>				
<i>Conflicts among lake users</i>				
<i>Residents not understanding the effects of their actions on water quality</i>				
<i>Other (please specify)</i>				

9. Do you agree or disagree with the following statements? (Please X the appropriate box):

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
<i>“Land use regulation results in loss of individual freedom.”</i>					
<i>“It is up to the residents of each town to decide how they want to regulate land use.”</i>					
<i>“I desire policy that reduces or eliminates use of a product because of concerns that it is polluting the environment.”</i>					
<i>“Existing land use laws are adequate to protect lake water quality.”</i>					
<i>“Saratoga Lake should be used as a supplemental drinking water source for Saratoga Springs.”</i>					
<i>“Water quality has a large impact on the value of your property.”</i>					

10. Who do you think should be most responsible for maintaining Saratoga Lake? (Please circle one):

*Federal government      State government      Local government      Lake shore property owners*  
*Those who cause the pollution      Lake users*

11. Are you very active in a group that protects Saratoga Lake? (Please circle one): *Yes / No*

12. In which township or municipality do you live? (Please circle one): *Saratoga Springs / Malta / Stillwater*

13. Are you a full-time or part-time resident at this address? (Please circle one): *Full- time / Part-time*

14. For how long have you lived at this residence? (Please circle one):

*Under 1 year      1-5 years      6-10 years      11-20 years      20years +      Lifetime*

15. What is the size of your property? (Please circle one):

*.5 acres or less      0.5 - 1 acre      1.1 - 5 acres      5 -10 acres      10 acres +*

16. What is the highest level of education you have completed? (Please circle one):

*Less than a high school diploma      High school diploma or GED      Technical School*  
*College Degree      Graduate School*

17. What is your political affiliation? (Please circle one): *Republican / Democrat / Independent / Other*

18. Age: \_\_\_\_\_ 19. Gender: \_\_\_\_\_

We would also like to talk to local residents in greater detail about some of the issues raised in this survey.  
 If willing, please provide your name and contact information in the space below:

**THANK YOU FOR PARTICIPATING IN THIS SURVEY! YOUR TIME IS APPRECIATED!**  
**YOU CAN USE THIS SPACE FOR COMMENTS IF ANY:**

*When completed please put this survey in the pre-addressed envelope.*

**Appendix B**

Map of Saratoga Lake and Fish Creek Riparian Properties



## Appendix C

### Other Watershed Surveys' Findings

#### Survey Name: Gunpowder Watershed Survey

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Quality	Biggest Concerns?	1 – development, 2 - zoning, 3- land use 4 – drinking water, 5 – stream water

<http://clark.the-rileys.net/Gunpowder/SurveyResults.html>

#### Survey Name: Black Creek Watershed Survey

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Behavior	How do you use the watershed?	Most common – hiking
Behavior	Landscaping?	Most common was fertilizer application
Behavior	Handle Dog Waste?	Out of those that had dog, 3/5 picked up waste, 2 /5 left on ground - none buried
Quality	Is the water safe to...?	None would drink from, only one would eat fish from
Quality	Biggest concerns?	1 - pollution/quality, 2 – wildlife conservation, 3 – open space 4 – recreational use

[http://www.ces.ncsu.edu/depts/agecon/WECO/blackcreek/BC\\_Survey.pdf](http://www.ces.ncsu.edu/depts/agecon/WECO/blackcreek/BC_Survey.pdf)

#### Survey Name: Middle Flint Survey, Kearsley Creek

Response Rate: 12.4%

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Quality	Rank Goals?	1- remove human waste, 2 – protect drinking water, 3 – remove trash, 4 – minimize flow that cause flooding, bank erosion and habitat loss

[http://www.gcdcwws.com/SWM/Phase%20II/Survey%20Results/MiddleFlint%20Survey\\_04sep.pdf](http://www.gcdcwws.com/SWM/Phase%20II/Survey%20Results/MiddleFlint%20Survey_04sep.pdf)

#### Survey Name: Cedar Creek Watershed 2005

Response Rate: 36.6

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Demographics	Length of Residence?	Average – between 20 – 25 years
Demographics	Part-time/Full time resident?	49% - part time, 34% full-time of non-riparian Of riparian, 10% full time, 5% part time
Recreation	Uses?	Fishing – 85%, wildlife observation – 79%, swimming/wading – 78%, aesthetics – 77%
Quality	Top 15 issues?	1- multiple unit developments are not Desirable, 2 – lawn runoff, 3 – buffer zones important, 4 – regulations enforced important 5 – water fluctuations problematic

<http://www.cedarlake.info/assets/pdf/ExecSummary2006.pdf>

#### Survey Name: Mill Creek 2007

Response Rate: 51% (after second mailing) - (Looked at Non-Agricultural Landowners)

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Quality	Greatest Concerns?	1 – stream pollution, 2 – trash in stream, 3 – erosion
Awareness	Aware of protection group?	Yes – 16.7%

[http://www.opequoncreek.org/Watershed%20Based%20Plan/Appendix\\_D\\_Mill\\_Cr\\_Survey\\_Results.pdf](http://www.opequoncreek.org/Watershed%20Based%20Plan/Appendix_D_Mill_Cr_Survey_Results.pdf)

#### Survey Name: Seneca Lake Watershed Resident Survey

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Policy	How much pay per year?	\$0 – 30%, up to \$25 – 25%, \$25 to \$50 – 12%, \$50 to \$100 – 11%, 100+ - 8%, no response – 14%
Quality	Quality for Recreation?	48% for swimming excellent/good, swim highest number of poor responses 7%, 68% for

		boating excellent/good, 58% for fishing excellent/good
Quality	Biggest Issues	51% view weeds as problem, Out of those that perceive it as serious, the majority 81% think it is somewhat to very serious
Policy	Land use regulation results in loss of individual freedom.	42% agree, 29% disagree
Policy	It is up to the residents of each town to decide how they want to regulate land use.	36% agree, 36% disagree, 16% don't know
Policy	How adequately do you feel the present land use regulations protect water quality in the lake?	Very adequate – 2%, Adequate – 22%, Not Adequate – 23%, unsure – 45%
Policy	Existing land use laws are adequate to protect lake water quality.	2%, very adequate – 22% adequate – 23% inadequate, 45% didn't know
Policy	Water quality has a large impact on the value of your property	Major – 49%, limited – 20%, none – 10%, unsure – 15%, no answer – 14%
Policy	Who most responsible for maintaining water body?	Most suitable is watershed-wide/multi-county district
Action	Member of Protective Group	87% - no
Demographics	Length of Residence	52% - 20 + years
Demographics	Size of Land	47% - 1 acre or less

<http://www.gflrpc.org/Publications/SenecaLakeWMP/chap9app.pdf>

Survey Name: **Sherman Lake 2007**

Category	Question	Findings
Policy	I am willing to spend \$75 - \$150 more to control weeds	67% agree, 25% disagree, 8% Neutral
Quality	Biggest issue?	Weeds – 75% Strongly Agree Big Issue, overall 92% agree problem
Demographics	Length of Residence?	35 families -20+ years, 23 families 30 + years, 9 families – 50+ years out of 66 responses

[www.shermanlakemi.com/files/ShermanAnnualMeetingReport07.pdf](http://www.shermanlakemi.com/files/ShermanAnnualMeetingReport07.pdf)

Survey Name: **Richmond 2002 Survey**

Response Rate: 23 %

Category	Question	Findings
Demographics	Length of Residence?	(a) – Less than 1 year, 5%, (b) – 1 to 5 years, 15%, (c) 5 to 10 years, 12%, (d) 10 years +, 68%

<http://www.ottawasewergatefiasco.com/RichmondSurvey0702.htm>

Survey Name: **Dry Run Creek 2005 & 2008**

Response Rate: 38.5% (in 2005)

Category	Question	Findings
Policy	“Regulations protecting Dry Run Creek watershed limit my choices and personal freedom”	Strongly Agree 5.9%, Somewhat Agree 18.8%, Not sure 29.4%, Somewhat Disagree 32.9%, Strongly Disagree 12.9%
Action	Fertilize?	39% fertilize lawn. 58% once per year, 36% 2-3x/year; 5% fertilize monthly – North Carolina 2006 study
Action	Fertilize?	60% fertilize regularly, 25% four times/year. Tennessee 2003 Study
Action	Fertilize?	49% fertilize regularly – Utah 2003
Action	Fertilize?	71% fertilization rate, Minnesota 2002

Action	Dog Droppings?	1/3 residents never or rarely pick up dog waste South Carolina 2002
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[http://www.uni.edu/step/reports/dry\\_run\\_creek.pdf](http://www.uni.edu/step/reports/dry_run_creek.pdf)

Survey Name: **Portage Lake Watershed Household Survey 2007**

Category	Question	Findings
Action	Recreation	Boating: 45 % once a week + Swimming, snorkeling, or scuba diving: 42 % once a week + Fishing: 37 % p once a week +
Action	Maintain Grass Lawn?	81% do
Quality	Major Issues?	1 - spread of invasive, exotic species (42 percent) 2 – Development along the shoreline (27 percent) 3 – Lack of understanding by lake users and residents of How their actions can affect water quality (23 percent)
Quality	Rate overall water quality?	82 % overall as excellent (25 %) or good (57 %).
Quality	Unsure as to Issues	27 % don't know if the decreased quality of the fishery is a problem, 24 % don't know if lack of effective regulations are a problem, and 18 % don't know if pollution from failing or poorly maintained septic systems are a problem.
Demographics	Part-time/Full-time	(74 percent) are full time residents

[http://www.pscinc.com/Documents/PLWF/PL\\_HouseholdSurveyFinalReport.pdf](http://www.pscinc.com/Documents/PLWF/PL_HouseholdSurveyFinalReport.pdf)

Survey Name: **Stephenfield Lake Watershed - Landowner Survey**

Category	Question	Findings
Quality	Overall Condition	1% excellent, 24% good, 44% fair, 17% poor, 14% no response
Quality	Major Issues	1 – agricultural runoff (52%), 2 – Bactria (42%), 3 – Excessive Algae Growth (41%), 4 - Chemicals/Pesticides (39%), 5 – Excessive Nutrients (36 %)

<http://www.lasalledboine.com/images/Stephenfield/StLWMP-Survey.pdf>

Survey Name: **Otsego Lake Watershed Survey Analysis**

Category	Question	Findings
Behavior	Recreation?	1. Boating (86%) 2. Wading/Swimming (84%) 3. Wildlife watching (62%) 4. Fishing/ice fishing (54%) 5. Sailing (35%), canoe/kayak (32%)
Quality	Pollutants of greatest concern?	1. Nutrients 2. <i>E. Coli</i> bacteria 3. Sediment 4. Exotic species
Quality	Top Issues	1. Faulty septic systems 2. Decreasing water quality 3. Lake levels third 4. Residential fertilizers 5. Overuse of recreational vehicles 6.shoreline development 7. Storm water runoff
Policy	Major Obstacles	1. 81% lack of funding 2. Apathy (76%) 3. lack of education (65%)
Action	What would you do to improve water quality?	1. 89 implement conservation practices 2. 84% reduce the amount of fertilizer used 3. 73% support zoning ordinances, which protect water quality 4. 49% responded would contribute financially to conservation projects 5. 27% assist with water quality monitoring and attend watershed meetings

<http://www.huronpines.org/upload/File/Otsego%20Lake%20Survey%20Analysis%202-08.pdf>

Survey Name: **Creekside Resident Survey, Kirker Creek, 2002**

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Action	Recreation	75% never use the creek for recreational purposes (biking, running, walking or nature watching)
Quality	Water Quality Opinion	All answered, 75% never use the creek, even for walking, and 25% don't know where it flows past their backyards, only 11% stated that they had no opinion of the condition of the creek. 1. Need improvement (31%). 1. "Has potential, but needs some help." (31%) 3. "Health hazard/public nuisance" (14%) 4. good condition (8%) 5. wonderful natural resource (6%). 61% feel that some type of improvement to Kirker Creek is needed.

<http://www.ccrd.org/survey.html>

Survey Name: **Dickinson Bayou Watershed Survey**

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Demographics	Education	Less than a high school diploma (2%), High school diploma or GED (14%), Some college/technical school (28%), College degree (34%), Graduate school (20%)
Demographics	Age	20-30yrs old (10%), 31-40yrs old (24%), 41-50 yrs old (16%), 51-60yrs old (24%), 61-70yrs old (12%) 71+ yrs old (6%)
Action	Recreation	1. Fishing (40%), 2. None (32%), 3. Boating (28%)
Quality	Concerned about children swimming?	60% yes
Policy	Willing to pay for study?	\$0-20 (44%), \$20 – 40 (10%), \$40-60 (6%), \$60-80 (8%), \$80-100 (16%), 100-150 (4%), \$150-200 (0%), 200 + (10%)

[http://dickinsonbayou.org/documents/Survey\\_results.pdf](http://dickinsonbayou.org/documents/Survey_results.pdf)

Survey Name: **Tinkers Creek Watershed Survey 2008**

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Action/ Demographics	Fertilizer /Education	Those who fertilize, 75% high school grad, 55% grad school or higher
Action/Demographics	Pet waste can be a source of nutrients & bacteria for near by streams and water bodies	62% with an advanced degree strongly agreed while 32% of high school graduates agreed

[http://www.tinkerscreekwatershed.org/conference\\_pdfs/T5A.pdf](http://www.tinkerscreekwatershed.org/conference_pdfs/T5A.pdf)

Survey Name: **Center for Watershed Protection**

<i>Category</i>	<i>Question</i>	<i>Findings</i>
Action	Maintain grass lawn	91%
Action	Fertilize per year	48%, once a year or less, 83% twice a year or less 73% applied in the spring (center typically advises to fertilize once in the fall)
Action	Pesticide Application	21%, referenced study in Minnesota were only 24% of those using pesticides understood what they were applying
Action	Dog Droppings	41% of the 750 surveyed had a dog and 1/3 rarely or never picked up after dogs or refused to answer the question- 37% thought pet waste didn't contribute to water pollution – source of fecal coliform and contamination in urban waterways
Action/ Demographics	Education/ Fertilizer use	Those with higher levels of education and more income were more likely to use fertilizer

<http://www.bayjournal.com/article.cfm?article=1643>

# Appendix D

## Raw data

Skidmore Water Resources Initiative: Saratoga Lake Landowner Survey

1. How many times do you use Saratoga Lake for recreational purposes per year? (Please X the appropriate box):

1a. Swimming			
		Frequency	Percent
Valid	0	16	10.1
	1-5	20	12.7
	6-20	38	24.1
	20-50	40	25.3
	51+	42	26.6
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

1b. Fishing			
		Frequency	Percent
Valid	0	30	19.0
	1-5	36	22.8
	6-20	38	24.1
	21-50	19	12.0
	51+	23	14.6
	Total	146	92.4
Missing	System	12	7.6
Total		158	100.0

1c. Hiking/ Wildlife Viewing			
		Frequency	Percent
Valid	0	34	21.5
	1-5	28	17.7
	6-20	21	13.3
	21-50	12	7.6
	51+	46	29.1
	Total	141	89.2
Missing	System	17	10.8
Total		158	100.0

1d. BBQ /Picnic			
		Frequency	Percent
Valid	0	21	13.3
	1-5	20	12.7
	6-20	34	21.5
	21-50	20	12.7
	51+	42	26.6
	Total	137	86.7
Missing	System	21	13.3
Total		158	100.0

1e. Motor Boating			
		Frequency	Percent
Valid	0	21	13.3
	1-5	21	13.3
	6-20	33	20.9
	20-50	35	22.2
	51+	40	25.3
	Total	150	94.9
Missing	System	8	5.1
Total		158	100.0

1f. Sailing/Rowing/Kayaking/Canoeing			
		Frequency	Percent
Valid	0	38	24.1
	1-5	26	16.5
	6-20	32	20.3
	20-50	26	16.5
	51+	20	12.7
	Total	142	89.9
Missing	System	16	10.1
Total		158	100.0

2. How many times do you apply the following to your property per year? (Please X the appropriate box):

2a. Pesticides			
		Frequency	Percent
Valid	0	96	60.8
	1-5	52	32.9
	Total	148	93.7
Missing	System	10	6.3
Total		158	100.0

2b. Fertilizers			
		Frequency	Percent
Valid	0	76	48.1
	1-5	81	51.3
	Total	157	99.4
Missing	System	1	.6
Total		158	100.0

3. Are there more or less bushes and trees on your property than when you moved in? (Please circle one):

		Frequency	Percent
Valid	more	62	39.2
	less	76	48.1
	same	13	8.2
	Total	151	95.6
Missing	System	7	4.4
Total		158	100.0

4. Do you maintain a grass lawn at your residence? (Please circle one):

		Frequency	Percent
Valid	yes	143	90.5
	no	13	8.2
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

5. In some places, residents pay money to a local association that works to improve water quality. How much would you be willing to pay each year to improve the water quality of Saratoga Lake? (Please circle one):

		Frequency	Percent
Valid	0	23	14.6

up to 25	17	10.8
25-50	35	22.2
50-100	28	17.7
100+	37	23.4
SLPID	9	5.7
Total	149	94.3
Missing System	9	5.7
Total	158	100.0

6. If you have a dog, what is done with the dog droppings most of the time? (Please circle one):

		Frequency	Percent
Valid	no dog	86	54.4
	leave it	12	7.6
	bury it	10	6.3
	flush it	3	1.9
	trash it	36	22.8
	Total	147	93.0
Missing	System	11	7.0
Total		158	100.0

7. How would you rate Saratoga Lake's water quality for the following? (Please X the appropriate box):

7a. Swimming			
		Frequency	Percent
Valid	excellent	53	33.5
	good	65	41.1
	fair	15	9.5
	poor	5	3.2
	unsure	12	7.6
	Total	150	94.9
Missing	System	8	5.1
Total		158	100.0

7b. Fishing			
		Frequency	Percent
Valid	excellent	25	15.8
	good	67	42.4
	fair	47	29.7
	poor	15	9.5
	unsure	2	1.3
	Total	156	98.7
Missing	System	2	1.3

Total		158	100.0
7c. Motor Boating			
		Frequency	Percent
Valid	excellent	38	24.1
	good	64	40.5
	fair	38	24.1
	poor	8	5.1
	unsure	5	3.2
	Total	153	96.8
Missing	System	5	3.2
Total		158	100.0

7d. Sailing/Rowing/Kayaking/Canoeing			
		Frequency	Percent
Valid	excellent	42	26.6
	good	62	39.2
	fair	18	11.4
	poor	4	2.5
	unsure	15	9.5
	Total	141	89.2
Missing	System	17	10.8
Total		158	100.0

8.. How serious of a problem do you believe the following issues are? (Please X the appropriate box):

8a. Fertilizer/pesticide runoff from farms			
		Frequency	Percent
Valid	serious	72	45.6
	minor	51	32.3
	not a problem	11	7.0
	unsure	22	13.9
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0
8b. Runoff from lawns			
		Frequency	Percent
Valid	serious	49	31.0
	minor	68	43.0

	not a problem	20	12.7
	unsure	19	12.0
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

8c. Street/driveway pollution

		Frequency	Percent
Valid	serious	38	24.1
	minor	71	44.9
	not a problem	22	13.9
	unsure	21	13.3
	Total	152	96.2
Missing	System	6	3.8
Total		158	100.0

8d. Dog droppings

		Frequency	Percent
Valid	serious	12	7.6
	minor	70	44.3
	not a problem	47	29.7
	unsure	27	17.1
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

8e. Garbage

		Frequency	Percent
Valid	serious	24	15.2
	minor	74	46.8
	not a problem	36	22.8
	unsure	21	13.3
	Total	155	98.1
Missing	System	3	1.9
Total		158	100.0

8f. Excessive recreation (ex. boating)

		Frequency	Percent
Valid	serious	32	20.3
	minor	72	45.6
	not a problem	45	28.5
	unsure	7	4.4
	Total	156	98.7
Missing	System	2	1.3

Total		158	100.0
8g. Development			
		Frequency	Percent
Valid	serious	81	51.3
	minor	45	28.5
	not a problem	22	13.9
	unsure	7	4.4
	Total	155	98.1
Missing	System	3	1.9
Total		158	100.0
8h. Weeds			
		Frequency	Percent
Valid	serious	117	74.1
	minor	33	20.9
	not a problem	1	.6
	unsure	3	1.9
	Total	154	97.5
Missing	System	4	2.5
Total		158	100.0
8i. Faulty septic tanks			
		Frequency	Percent
Valid	serious	47	29.7
	minor	44	27.8
	not a problem	24	15.2
	unsure	38	24.1
	Total	153	96.8
Missing	System	5	3.2
Total		158	100.0
8j. Zebra mussels			
		Frequency	Percent
Valid	serious	95	60.1
	minor	41	25.9
	not a problem	3	1.9
	unsure	16	10.1
	Total	155	98.1
Missing	System	3	1.9
Total		158	100.0
8k. Loss of lake-side plants			
		Frequency	Percent

Valid	serious	37	23.4
	minor	58	36.7
	not a problem	21	13.3
	unsure	38	24.1
	Total	154	97.5
Missing	System	4	2.5
Total		158	100.0

8l. Conflicts among lake users

		Frequency	Percent
Valid	serious	29	18.4
	minor	68	43.0
	not a problem	28	17.7
	unsure	27	17.1
	Total	152	96.2
Missing	System	6	3.8
Total		158	100.0

8m. Residents not understanding the effects of their actions on water quality

		Frequency	Percent
Valid	serious	68	43.0
	minor	59	37.3
	not a problem	11	7.0
	unsure	17	10.8
	Total	155	98.1
Missing	System	3	1.9
Total		158	100.0

8n. Other (please specify)

bird droppings  
boating safety  
Bow and Arrow, dead fish  
carelessness: boater's gas and debris, owner's runoff. No recreation access  
development  
drawing water out for selling  
drinking water source issue  
fishermen's' dead fish  
flooding  
flooding caused by housing developments in Malta along route 9  
litter along road and water  
local ordinance inadequacies  
milfoil  
need to follow boating rules, too many hunters, bow and arrow fisherman  
non resident boaters

nonresidents get priority over tax payers  
 not sure how to answer, if excess development/pesticide use and recreation continue, it could negatively effect quality in the future, need to monitor  
 raw sewage dumping into lake  
 resident pollution  
 safety of watercraft users speeding close to shore  
 salt on road  
 Sandy bay users no toilets, cig butts  
 serious flooding  
 tires  
 too many boats, small right of way  
 too much public access  
 too much regulation  
 users garbage, leave dead carp, hunting within 500ft, urinate, no safety regulations  
 users of lake are careless and disrespectful  
 varying lake levels  
 water level fluctuations  
 water treatment affects fishing

9. Do you agree or disagree with the following statements? (Please X the appropriate box):

9a. "Land use regulation results in loss of individual freedom."

		Frequency	Percent
Valid	strongly agree	41	25.9
	somewhat agree	61	38.6
	neutral	24	15.2
	somewhat disagree	15	9.5
	strongly disagree	14	8.9
	Total	155	98.1
Missing	System	3	1.9
Total		158	100.0

9b. "It is up to the residents of each town to decide how they want to regulate land use."

		Frequency	Percent
Valid	strongly agree	38	24.1
	somewhat agree	58	36.7
	neutral	13	8.2
	somewhat disagree	27	17.1
	strongly disagree	19	12.0
	Total	155	98.1
Missing	System	3	1.9

Total	158	100.0
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9c. "I desire policy that reduces or eliminates use of a product because of concerns that it is polluting the environment."

		Frequency	Percent
Valid	strongly agree	46	29.1
	somewhat agree	70	44.3
	neutral	15	9.5
	somewhat disagree	11	7.0
	strongly disagree	11	7.0
	Total	153	96.8
Missing	System	5	3.2
Total		158	100.0

9d. "Existing land use laws are adequate to protect lake water quality."

		Frequency	Percent
Valid	strongly agree	14	8.9
	somewhat agree	50	31.6
	neutral	38	24.1
	somewhat disagree	36	22.8
	strongly disagree	16	10.1
	Total	154	97.5
Missing	System	4	2.5
Total		158	100.0

9e. "Saratoga Lake should be used as a supplemental drinking water source for Saratoga Springs."

		Frequency	Percent
Valid	strongly agree	4	2.5
	somewhat agree	4	2.5
	neutral	10	6.3
	somewhat disagree	9	5.7
	strongly disagree	130	82.3
	Total	157	99.4
Missing	System	1	.6
Total		158	100.0

9f. "Water quality has a large impact on the value of your property."

		Frequency	Percent
Valid	strongly agree	120	75.9
	somewhat agree	25	15.8
	neutral	6	3.8
	somewhat disagree	4	2.5
	strongly disagree	2	1.3
	Total	157	99.4
Missing	System	1	.6

Total	158	100.0
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10. Who do you think should be most responsible for maintaining Saratoga Lake? (Please circle one):

		Frequency	Percent
Valid	federal govt	3	1.9
	state govt	48	30.4
	local govt	39	24.7
	lake shore owners	25	15.8
	polluters	7	4.4
	lake users	19	12.0
	other	7	4.4
	Total	148	93.7
Missing	System	10	6.3
Total		158	100.0

11. Are you very active in a group that protects Saratoga Lake? (Please circle one):

		Frequency	Percent
Valid	yes	60	38.0
	no	94	59.5
	Total	154	97.5
Missing	System	4	2.5
Total		158	100.0

12. In which township or municipality do you live? (Please circle one):

		Frequency	Percent
Valid	saratoga springs	52	32.9
	Malta	45	28.5
	stillwater	44	27.8
	town of saratoga	15	9.5
	schulerville	1	.6
	Total	157	99.4
Missing	System	1	.6
Total		158	100.0

13. Are you a full-time or part-time resident at this address? (Please circle one):

		Frequency	Percent
Valid	full-time	96	60.8
	part-time	60	38.0
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

14. For how long have you lived at this residence? (Please circle one):

		Frequency	Percent
Valid	less than 1 year	1	.6
	1-5 years	32	20.3
	6-10 years	2	1.3
	11-20 years	38	24.1
	20+ years	44	27.8
	lifetime resident	40	25.3
	Total	157	99.4
Missing	System	1	.6
Total		158	100.0

15. What is the size of your property? (Please circle one):

		Frequency	Percent
Valid	0.5 acres or less	69	43.7
	0.5-1 acre	53	33.5
	1.1-5 acres	21	13.3
	5-10 acres	3	1.9
	10+ acres	10	6.3
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

16. What is the highest level of education you have completed? (Please circle one):

		Frequency	Percent
Valid	high school diploma or GED	27	17.1
	technical school	10	6.3
	college degree	59	37.3
	graduate degree	60	38.0
	Total	156	98.7
Missing	System	2	1.3
Total		158	100.0

17. What is your political affiliation? (Please circle one):

		Frequency	Percent
Valid	republican	54	34.2
	democrat	28	17.7
	independent	34	21.5
	other	11	7.0
	Total	127	80.4
Missing	System	31	19.6
Total		158	100.0

19. Gender:

		Frequency	Percent
Valid	m	99	62.7
	f	54	34.2
	Total	153	96.8
Missing	System	5	3.2
Total		158	100.0

18. Age:

		Frequency	Percent
Valid	50	6	3.8
	60	9	5.7
	70	2	1.3
	80	2	1.3
	90	1	.6
	28	1	.6
	29	1	.6
	35	1	.6
	36	1	.6
	37	1	.6
	39	1	.6
	41	2	1.3
	42	4	2.5
	44	3	1.9
	45	1	.6
	46	3	1.9
	47	3	1.9
	48	4	2.5
	49	5	3.2
	51	2	1.3
	52	5	3.2
	53	3	1.9
	54	3	1.9
	55	7	4.4
	56	2	1.3
	57	5	3.2
58	5	3.2	
59	3	1.9	
61	5	3.2	
62	8	5.1	

63	3	1.9
64	2	1.3
65	9	5.7
66	5	3.2
67	1	.6
68	4	2.5
69	4	2.5
71	2	1.3
72	1	.6
73	1	.6
74	5	3.2
75	4	2.5
76	2	1.3
79	1	.6
82	1	.6
84	1	.6
85	1	.6
86	1	.6
88	1	.6
91	1	.6
96	1	.6
Total	150	94.9
Missing System	8	5.1
Total	158	100.0

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