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**Como Neighborhood KAP Study – Final Report**  
**Community Clean-ups for Water Quality (CCWQ)**

**January 28 2012 Karlyn Eckman and Kenzie Consoer**  
**Water Resources Center, University of Minnesota**

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**Contact Information**

Karlyn Eckman, Ph.D., Senior Research Associate, Water Resources Center, University of Minnesota. 173 McNeal Hall, 1985 Buford Avenue, Saint Paul, MN, 55108. Phone: 612/624-7283. Email: [eckma001@umn.edu](mailto:eckma001@umn.edu)

## EXECUTIVE SUMMARY

1. A knowledge, attitudes and practices (KAP) study was conducted in subwatersheds 2 and 6 of the Como Lake neighborhood by the University of Minnesota Water Resources Center (WRC). The first-round baseline study was conducted in April 2011, and the second-round follow-up study in November 2011, following a Community Cleanup for Water Quality (CCWQ) effort sponsored by The Freshwater Society (FWS), Como Lake Neighbor Network (CLNN) and Capitol Region Watershed District (CRWD).

2. Como Lake has been designated as impaired for phosphorus as part of the Total Maximum Daily Load (TMDL) assessment process. While a portion of excessive phosphorus is caused by internal loading, the balance enters Como Lake from the underground storm sewer system as decomposed grass clippings and tree leaves from surrounding residential neighborhoods. Excess phosphorus contributes to an annual overgrowth of algae in the lake. The purpose of this KAP study was to determine changes in residents' knowledge, attitudes, practices and barriers related to cleaning leaves from yards, curbsides, gutters and storm drains. Results will be used to design education/outreach programs aimed at reducing phosphorus.

3. Study results found a very high level of concern for water quality in the lake regardless of respondent location. There was quite high knowledge of storm sewer connections from lawns to Como Lake, showing residential awareness of the connection of their lawns to the larger ecosystem (*e.g.* water bodies). Residents also self-reported very high levels of raking, bagging and composting of leaves and grass clippings. There was moderate knowledge about phosphorus and nitrogen. There were few (but highly visible) individuals reporting incorrect behaviors, highlighting an expressed social ethic to rake. There are numerous households that assist neighbors with yard chores, and high awareness and willingness to help elderly and disabled homeowners. The main barrier is lack of an organized bag pick-up, and strong preference for a community-wide leaf-bag pickup. Despite the short six-month period between the two surveys, there was a modest positive shift in respondent KAP values.

4. There were very many comments received about the timing of CCWQ clean-ups. Many trees still had leaves after the cleanups ended, requiring multiple episodes of raking for most respondents. The timing and participation of clean-ups should be reconsidered, with more frequent events spread throughout the autumn. Provision of tarpaulins might enhance participation by enabling neighbors to more easily and rapidly rake leaves to common locations.

5. Based on study findings, we recommend that outreach and education strategies build on the high levels of concern and stewardship expressed by residents. We recommend positive messages and reinforcement (rather than negative or admonishing messages), filling in gaps in knowledge, and rewarding positive behaviors. There are several areas where opportunities for education are highlighted, as well as ways that CRWD can support civic engagement and participation to improve water quality in the lake.

6. While in the field we observed significant issues with the condition of storm drains (broken or collapsed concrete structures and sediment build up) throughout the study area. We also observed significant and repeated over-application of winter de-icing chemicals in City streets and Como Park. CRWD might consider partnering with the City of Saint Paul and SPPR to address these potential sources of water quality issues in Como Lake.

## ACKNOWLEDGEMENTS

The authors thank the Capitol Region Watershed District for funding this study, and The Freshwater Society for the opportunity to work on this very interesting project. In particular, we thank Mark Doneux and Elizabeth Beckman at CRWD, and Joan Nephew and Peggy Knapp at The Freshwater Society. Sincere thanks to Janna Caywood (Como Lake Neighbor Network) for her contributions to the gap exercise and KAP study design, and for her welcome participation in the field survey work.

Melissa Baker, CRWD Water Resource Technician, worked on the sampling frame and prepared maps and Excel spreadsheets for the survey sample. Conservation Corps of Minnesota crew members Matt Case, James Shaffer, Caitlin Charron, Amanda Pretteplace, Jessica Schulz, Lindsay Schmitz and Mary Hammes worked during the first week of the door-knocking survey in the Como neighborhood, and did data entry. Second-round CCM crew members included Matt Case, Karen Katz, Abby Endert, Mollie Thiet, H. Zizkind, Mary Hammes and James Shaffer. CCM crew members braved snow, wind and cold temperatures to successfully reach many of the Como neighborhood residents, and their assistance was invaluable.

Alec Albright (WRC student worker) also participated in data entry and analysis.

We acknowledge the encouragement and support of colleagues Kimberly Nuckles and Lynne Kolze at the Minnesota Pollution Control Agency. Without their support, the KAP study method would probably not have been piloted in Minnesota.

Finally, thanks to the hundreds of Como neighborhood residents who were willing to talk with us about their opinions on stormwater and the condition of Como Lake.

## ACRONYMS

CATA	Check all that apply
CCM	Conservation Corps of Minnesota
CCWQ	Community Cleanup for Water Quality
CLNN	Como Lake Neighbor Network
COOR	Check only one response
CRWD	Capitol Region Watershed District
CS2E	Como Subwatershed 2 East
CS2W	Como Subwatershed 2 West
CS6S	Como Subwatershed 6 South
CS6N	Como Subwatershed 6 North
D10	District 10 Community Council
DNR	Minnesota Department of Natural Resources
FWS	The Freshwater Society
KAP	Knowledge, attitudes and practices study
MPCA	Minnesota Pollution Control Agency
N	Nitrogen
P	Phosphorus
SASE	Self-addressed stamped envelope
SPPR	Saint Paul Parks and Recreation Department
TMDL	Total maximum daily load
WRC	University of Minnesota Water Resources Center

## INTRODUCTION

This report summarizes the major findings of the Como Lake KAP (knowledge, attitudes and practices) study. The purpose of this study was to gain baseline and post-project data on respondent knowledge, attitudes, practices and constraints related to water quality in Como Lake. The study was in support of TMDL-related phosphorus-reduction activities undertaken by the Minnesota Pollution Control Agency (MPCA), the Capitol Region Watershed District (CRWD), the Como Lake Neighbor Network (CLNN), and The Freshwater Society (FWS). Results of this study are being used to plan education/outreach activities and civic engagement activities of the Community Cleanup for Water Quality (CCWQ) project sponsored by the Freshwater Society, funded by the Capitol Region Watershed District, and organized by the Como Lake Neighbor Network. The CCWQ model organizes neighbors in a collaborative effort to clean curbs, gutters and storm drains of leaves and other organic matter, which is bagged, weighed and composted. The quantity of leaf material is then correlated to a corresponding amount of phosphorus that is prevented from entering Como Lake (CLNN 2011).

This study had two distinct phases: a first-round baseline survey in late winter 2011 prior to commencing clean-up activities, and a second-round follow-up survey toward the end of the 2011 autumn leaf-raking season. This yielded two separate databases that could be compared. The field portions of the first-round survey were carried out from March 14-31 2011. Mailed questionnaires were received throughout the month of April 2011 and data entry and analysis was completed during the first week of May. A total of 357 questionnaires was received in the first-round survey. The adjusted sample for the first-round survey was 572 households within Como subwatersheds 2 and 6, for a response rate of 62% and margin of error of 3.18. This is considered acceptable for a statistically representative sample of the study subwatersheds.

The field portions of the second-round survey were carried out from November 14-20 2011. Data entry and analysis were completed by December 31, 2011, although mailed questionnaires continued to be received through mid-January 2012. 283 questionnaires were included in the second-round. The adjusted second-round sample included 563 households within the same geographic area as the first-round survey, yielding a response rate of 51% and margin of error of 4.11. Both first and second round samples are considered acceptable for a statistically representative sample of the study subwatersheds.

## METHODS

### The Knowledge, Attitudes and Practices (KAP) Study Methodology

The University of Minnesota Water Resources Center (WRC) was contracted by The Freshwater Society to design and conduct a KAP study of the project area. The KAP method is a customized, highly focused social research and evaluation method that has been extensively used in international water, health, education and other disciplines since the 1930s (Eckman 2011). However, it is relatively unknown in North America, and is a new approach to measuring social outcomes in water quality projects in the United States. It has been piloted by the WRC on more than a dozen water quality and other projects over the past four years. Benefits of the KAP method are that it is comparatively quick and cost-effective to develop and administer. It is

described in Eckman (2011) and Eckman (forthcoming), and has been successfully applied in other projects in Minnesota (see for example Eckman and Walker 2008; Eckman 2011; and Eckman, Fortin, Nuckles and Were 2011).

The Como KAP study began with a “gap exercise,” a brainstorming session that focused on identifying gaps in the CCWQ team’s knowledge about residents and their lawn care practices in the study area. The gap exercise resulted in a long list of issues that various team members felt should be investigated in the study. This list was prioritized, refined and converted into a draft questionnaire in Microsoft Word for discussion and further refinement among team members. The draft questionnaire was then entered into a draft Survey Monkey format. The Survey Monkey questionnaire was pre-tested by all team members, finalized and then printed. An introductory letter (see Appendix 1) from the CRWD administrator was then mailed to all respondents in the survey area, informing them that enumerators would be contacting them during mid-March in a door-knocking survey.

The first and second-round questionnaires are attached as annexes to this report. The second round questionnaire differed slightly from the first-round questionnaire. A few questions utilized for CCWQ planning were dropped as they were no longer needed (e.g. questions 19 and 22). A few other questions were excluded because they were felt to be accusatory or leading in the first-round survey (e.g. #18, 19). A few efficacy questions were added to the second-round survey (e.g. #25, 28). The second-round introductory letter mailed to residents is included in the appendix.

### The Study Area

The project team (CRWD, CLNN, FWS and WRC) determined that a paired watershed approach would be desirable, comparing data from control (no education/outreach) with treatment (with education and outreach) areas. Como Lake subwatershed 2 was designated as the treatment sample, because CLNN had previously organized a CCWQ, and some education and outreach had already been done. Subwatershed 6 was designated as the control sample, because it was of similar size, had no previous education and outreach, and was separated from subwatershed 2 by a buffer area (subwatershed 4).



Map 1: Como Lake subwatersheds



It was determined that the two subwatersheds should be further divided into halves, according to their proximity to Como Lake, yielding four quadrants. This would enable the researchers to do more detailed data analysis and stratified sampling, based on relative proximity to the lake. Accordingly, four quadrants were designated:

**Como subwatershed 2 = TREATMENT (where CLNN has been active):**

- Como subwatershed 2 west (CS2W) – immediately adjacent to Como Lake. This stratum included the households west of Victoria Avenue.
- Como subwatershed 2 east (CS2E) – most households not adjacent to Como Lake. This stratum included households east of Victoria Avenue.

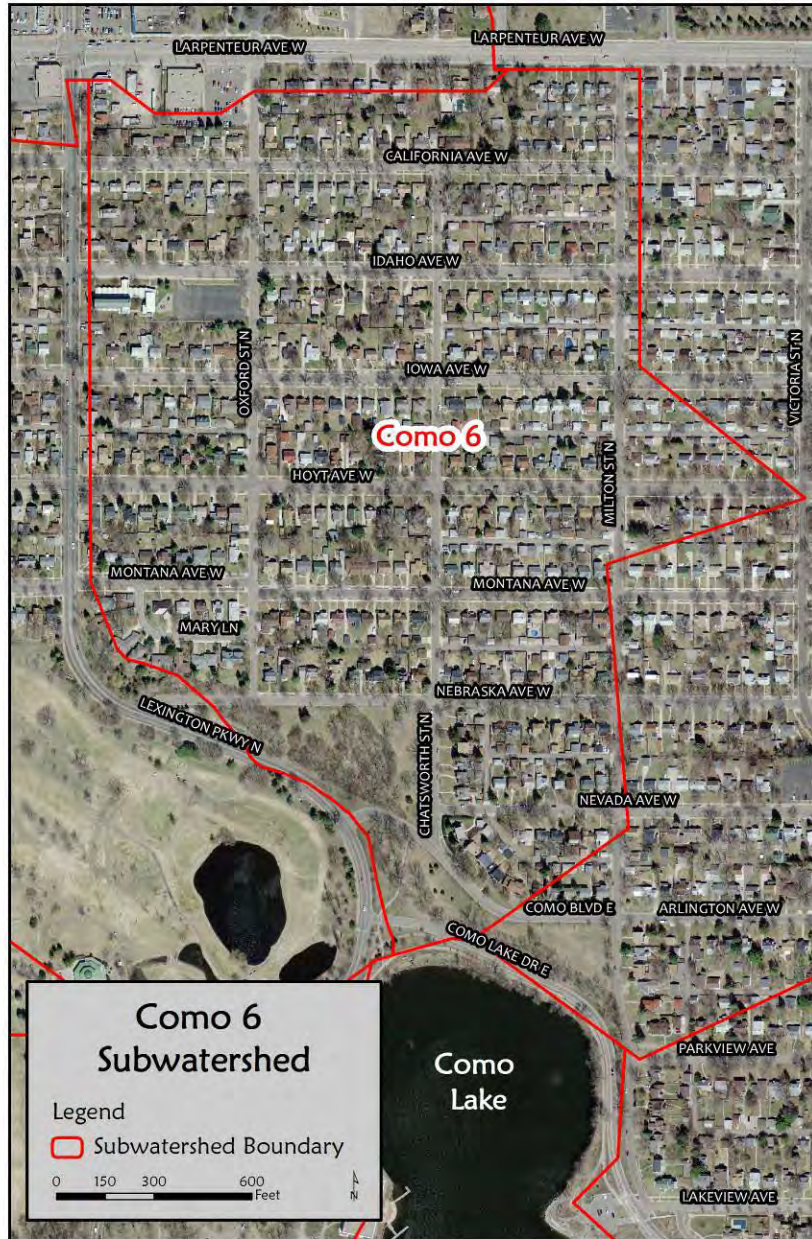
Map 2: Como subwatershed 2



**Como subwatershed 6 = CONTROL (where CLNN has not been active):**

- Como subwatershed 6 south (CS6S) – adjacent to Como Lake. This stratum includes households south of Hoyt Avenue.
- Como subwatershed 6 north (CS6N) – not adjacent to Como Lake. This stratum includes households north of Hoyt Avenue.

Map 3: Como subwatershed 6



In addition, twenty-three homes on Avon Avenue in CS2E were designated as the “Avon cluster,” as CLNN’s lead organizer also leads a Block Club on this street. Many of the Avon cluster residents had participated in previous CCWQs. It was hoped that Avon cluster data could be compared with the other four groupings. However, only ten cluster residents could be contacted in this survey, rendering the cluster sample too small to draw statistical inferences or comparisons. Therefore the Avon Cluster is not included in the analysis below.

### The Survey Sample

The sampling frame was obtained by CRWD from City records and refined by CRWD GIS staff, which compiled quadrant-specific maps overlaid with street addresses. CRWD staff also prepared an Excel spreadsheet with 613 names and addresses derived from the City database. The entire area was walked by team members (Caywood and Eckman) in March 2011 to identify non-resident buildings (businesses, churches, etc.). WRC staff (Eckman and Were) then reconciled the spreadsheet and maps, yielding a master list containing 654 property addresses. This number was adjusted downward during the field survey as the field team discovered that some addresses or properties did not exist; that some addresses were duplexes with two street numbers; and that a large number of homes were vacant.<sup>1</sup> 82 homes were eventually determined by the enumerators to be unoccupied in April 2011, eventually reducing the first-round sample size to 572. In November 2011, field crews determined that nine additional houses were unoccupied (or a total of 91), further reducing the sample size to 563.

### Administering the First-Round Survey

The Conservation Corps of Minnesota (CCM) was subcontracted by FWS to conduct door-to-door interviews of survey respondents. The field survey team was comprised of staff from WRC, CCM, and CLNN’s lead organizer. WRC staff facilitated, organized and supervised the field survey. As noted, CRWD GIS staff provided invaluable help with the sampling frame and maps.

WRC organized a one-day training workshop for the six CCM crew members in survey enumeration (including human subjects’ research regulations, data privacy, research ethics and mock interviewing). The CCM crew was divided into three two-person interviewing teams<sup>2</sup> and each was assigned to one of the four quadrants. Each team was provided with a clipboard and packet of materials, including an aerial map of their quadrant with addresses superimposed on each building, reference photos, and a property list with addresses, names, and worksheets on which to record each visit and revisit to the property. The lists were returned to WRC each evening for reconciliation with a master list. CCM crews interviewed respondents each afternoon and evening, and entered data the following morning before resuming field

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<sup>1</sup> Vacancies were verified by presence of lockboxes or sealed mailboxes; absence of footprints over many weeks of successive snowfalls; gas meter disconnects; information provided by neighbors; or other evidence.

<sup>2</sup> Enumerator teams were either male-female or female-female. No male-male teams were fielded. All teams wore identifying CCM or U of M clothing and name badges.

interviewing. This process was continued by WRC staff once the CCM crew completed their contract on March 18.

CLNN's lead organizer teamed up with WRC staff during the first week to form a fourth two-person interview team. These four teams conducted door-to-door interviews in each quadrant during the week of March 14-18 2011. Respondents in CS2E and CS2W were provided with a postcard inviting them to a CCWQ workshop. Teams entered questionnaire data the following morning, and generally conducted interviews in the afternoons and early evenings. By the end of the first week 143 interviews had been conducted by the CCM crews, or 24% of the potential sample. WRC staff continued interviewing the following two weeks, focusing on evenings and weekends when more residents were likely to be home.

CCM crews encountered a fairly high number of refusals during the first week of field visits (see column 3 in Table 1 below), with higher numbers in subwatershed 6. The overall refusal rate for the first-round survey was 9%.

**Table 1: First-Round Sampling and Response Data**

<b>Quadrant</b>	<b>Initial sample</b>	<b>Refused</b>	<b>Vacant</b>	<b>Adjusted Sample<sup>3</sup></b>	<b>Interviewed in person</b>	<b>Mailed</b>	<b>Cum Total (all)</b>	<b>RR (%)</b>
<b>Como Subwtsd 6 North</b>	216	16 (8%)	25	195	70	38	108	<b>55%</b>
<b>Como Subwtsd 6 South</b>	156	18 (13%)	20	135	57	19	76	<b>56%</b>
<b>Como Subwtsd 2 West</b>	135	7 (6%)	15	123	66	25	91	<b>74%</b>
<b>Como Subwtsd 2 East</b>	143	9 (7%)	18	130	53	17	70	<b>54%</b>
<b>Unspec</b>						12	12	
<b>Total</b>	654	50 (9%)	82	573	246	110	357	
<b>Overall RR (%)</b>				573			357	<b>62%</b>

<sup>3</sup> Initial sample less properties determined to be unoccupied.

After three weeks of door-knocking, many potential respondents had still not been contacted. At least 200 homes showed clear signs of occupancy (in part because of almost daily snow events), but no one was home during repeated visits by the crews in the afternoon and evening hours. By the end of the third week of the survey, 246 respondents had been interviewed, but 326 had not yet been encountered after a minimum of six visits per household.

WRC staff decided to deliver a packet containing a “Sorry we missed you” note, questionnaire, and SASE envelope at each potential respondent’s home. Packets were hand-delivered on March 26 and 27 2011. This strategy resulted in another 110 questionnaires completed and returned to WRC during the months of April, May and June 2011.

#### Administering the second-round survey

The same process was followed in the second round survey. CCM assigned a new crew to assist in the door-to-door interviewing (three team members had participated in the April survey). The second-round crew received the same one-day training as the first, and spent the remaining four days of their contract in the field. We discovered that Clean Water Action was canvassing the area during same period and asking for money. This caused confusion among some residents, and accounted for many refusals (“we already talked to someone about water quality a few days ago”).

A major difference in the second-round survey was that WRC staff did not continue door-knocking during the ensuing weeks. Rather, CCM and WRC delivered questionnaires with SASEs to every household in the survey area that had not yet participated in an interview. Questionnaires were returned in the mail by respondents through the end of December, when the Survey Monkey collector was closed and data analysis commenced. 289 questionnaires were received by December 31, yielding a 51% response rate. Five more questionnaires were received in January, two months after they were delivered to respondents. Those questionnaires were not included in the data set, although the respondents’ written comments were included in the analysis.

**Table 2: Second Round Sampling and Response Data**

Quadrant	Initial Sample	Refused	Trust, Vacant, Dup, etc.	Adjusted Sample	In-person Subtotal	Mail Subtotal	SUM	RR %
C6N	216	16	26	190	26	63	89	30.8%
C6S	156	24	15	141	26	37	63	21.8%
C2W	135	7	15	123	34	39	73	25.3%
C2E	143	1	34	109	18	45	63	21.8%
Unspecified					0	1	1	.03%
Total	654	50	82	563	104	185		
Cum total				563	104	289	289	
RR (%)					.18%	32.8%	51.3%	

All data was entered via Internet into Survey Monkey, and questionnaires were kept secure in a locked location at the University of Minnesota.

## RESULTS

### Demographic observations

As noted, there were a very high number of vacancies (homes for sale, in foreclosure or trusteeship, or unoccupied without explanation). This was highest in CS6N (25), followed by CS6S (20), CS2E (18) and CS2W (15). Unoccupied homes accounted for 13% of the initial sample of 654, reducing the available sample of occupied homes to 572. Vacancies may be due to an aging demographic (we were told by neighbors that many elderly residents had shifted to some form of assisted living) and/or prevailing economic conditions (many homes were in trusteeship, in foreclosure or for sale). Field crews attempted to ground-truth homes that appeared to be vacant using a variety of observational methods for signs of occupancy.

Field crews also noted that the sample had rather limited diversity. There appears to be a predominantly older (aging) white demographic. Teams reported that many elderly women observed them from windows, but refused to come to the door (perhaps numbering in the dozens). Crews observed that the neighborhoods seem to be transitioning from elderly residents leaving single-family homes (as reported by neighbors), and are being replaced by younger, somewhat more ethnically diverse residents. Only one household was unable to speak English. The field crews encountered nine households with deaf residents. Questionnaires and stamped return envelopes were left with those respondents; all nine questionnaires were successfully completed and returned to WRC.

### Field observations

Most respondents self-reported that they are doing the “correct” behaviors (such as not raking leaves into the street). However, respondents often complained about a particular neighbor sweeping leaves and grass clippings into the street. Multiple respondents would often point to a specific house as the offending neighbor. Such complaints were expressed on nearly every block in the study area, and each block seemed to have at least one resident that swept or blew leaves into the street. Interestingly, Q12 data showed that only nine individuals (2.6%) self-reported that they do indeed rake leaves into the street. While these numbers are very low for the sample overall, these individuals seem to have high visibility in their neighborhoods and may be a source of potential conflict (several stories were heard about arguments with an offending neighbor).

Many respondents commonly expressed concern for elderly residents who are unable to do yard work. On some blocks, one respondent (or family) would help four or five elderly neighbors up and down the block with yard maintenance throughout the year, and this situation was encountered on many blocks. There are clearly many “good Samaritans” throughout the study area who take on added responsibility for clearing storm drains, curbs and yards of leaves, as well as other lawn and housekeeping chores for their neighbors.

The questionnaire referred to a photo of a “typical” street, yard, boulevard, curbside and storm drain. However, as we learned during the field survey, many streets in the sample have neither curbs nor boulevards, and this was very often pointed out by respondents. Also, many streets do not have regularly spaced storm drains, and in some blocks these occur only at intersections or at the bottom of hills. Most residents seemed to be aware of the location of the nearest storm drain, even if it was located at the opposite end of the block. During the first two weeks of the survey, all storm drains were covered by snow and ice, and were not visible until the week of April 1. At that point the survey teams noted that storm drain types vary greatly, from very large concrete openings (often broken) to more recent cast iron grates with debris traps. Consequently, the photos used in the survey to demonstrate a “typical” boulevard, curb and storm drain did not accurately reflect reality for a large number of the survey respondents. Therefore, responses for questions asking whether respondents clear their boulevards, curbs and storm drains may be somewhat skewed. Lack of maintenance of the storm drain system was of concern to many residents. Residents frequently complained about the condition of storm drains, noting that many drains were clogged below arm’s reach with debris, sand and silt.

### Fall leaf observations

It was noted that leaf fall during September, October, November and December 2011 was quite prolonged. Different species of trees dropped their leaves at different times over the four-month period commencing with basswoods and ash, elms, then maples and finally oaks. We received a large number of comments that residents had raked multiple times during the autumn, and

that the CCWQ clean-up dates did not correspond with peak leaf fall. We heard repeatedly that residents have raked four or five times by the time of the second-round survey.

### **First-Round KAP Values**

Knowledge, attitude and practice values in the first and second round studies were high for the majority of residents in all four quadrants of the study area. Initial high scores established a low expected improvement during the second round. However, many of the knowledge, attitude, and practice values did increase during in the second round survey.

### **Knowledge**

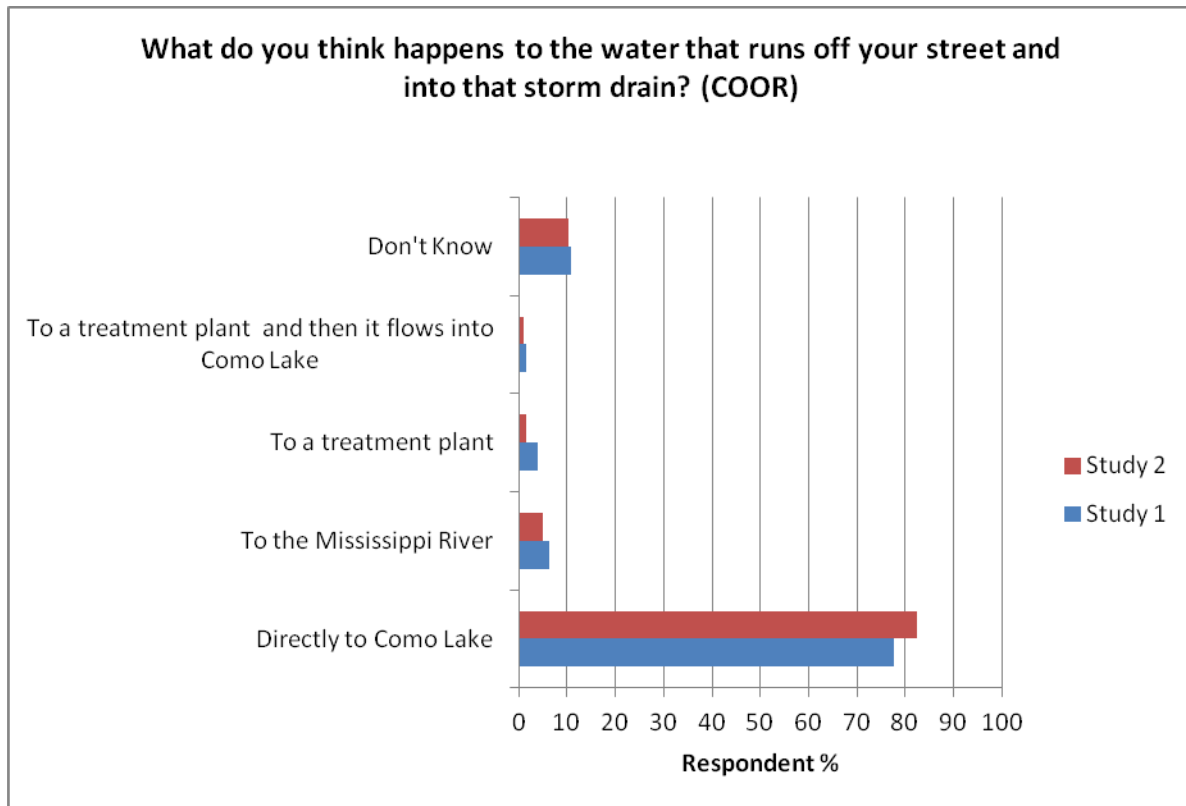
The first knowledge question (Q6 in April 2011; Q 10 in November 2011) was intended to investigate whether residents understand the connection between the water entering their storm drain and the condition of Como Lake via the underground “sewershed.” This was in a check-only-one-response (mutually exclusive) format. The percentage of correct responses was high in both surveys, but increased slightly in the second round KAP survey (see Table 3 below).

In the first round KAP survey conducted in April 2011, 78% of all respondents knew that stormwater from their street drains directly into Como Lake (the “correct” answer). Only 6% stated that stormwater goes to the Mississippi River, 4% said that stormwater goes to a treatment plan, while 2% said that stormwater first goes to a treatment plant and then to Como Lake. “Don’t knows” accounted for only 11%.

In the second round KAP survey conducted in November 2011, 83% of all respondents replied that stormwater from their street drains directly into Como Lake. Only 5% stated that stormwater goes to the Mississippi River, 2% said that stormwater goes to a treatment plan, while 1% said that stormwater first goes to a treatment plant and then to Como Lake. “Don’t knows” accounted for only 1%. The number of respondents that chose to skip this question increased from 19 in the April survey to 85 in the November survey.



**Table 3**



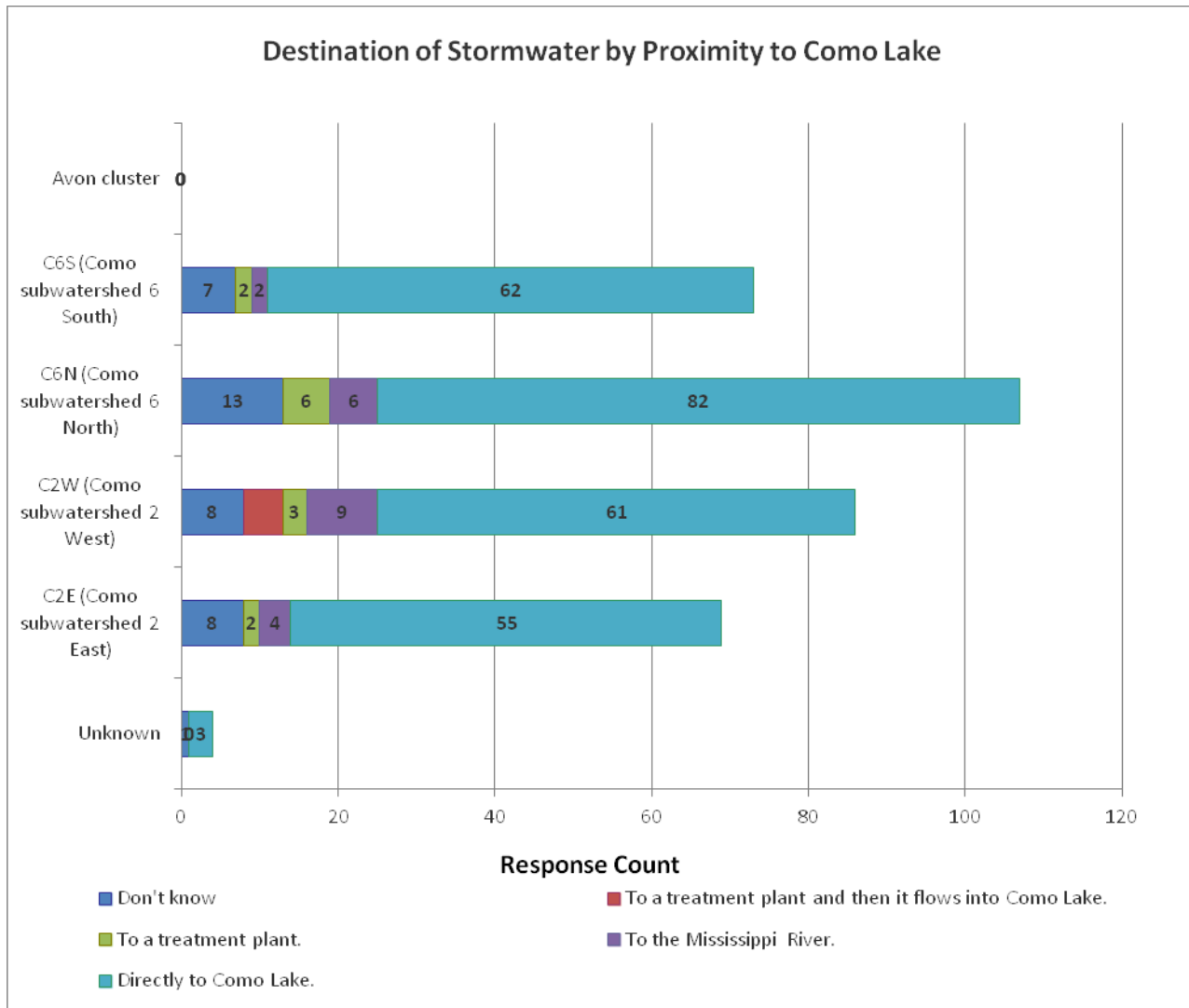
Mean: 1.5146

Standard deviation: 1.25223

This indicates very high awareness among residents that stormwater is conveyed directly into Como Lake without being treated. In November, less than 2% of respondents said that stormwater is conveyed to a treatment plant. Many stated that stormwater first runs into a “treatment pond” or the newly constructed rain gardens around Como Lake. A number of respondents seemed confused about the purpose of the rain gardens, and thought that they might somehow “treat” stormwater with a mechanical or chemical process before entering the lake. This presents an opportunity for an educational message about how rain gardens work (buffering sediment and phosphorus, but not chlorides, before stormwater enters Como Lake).

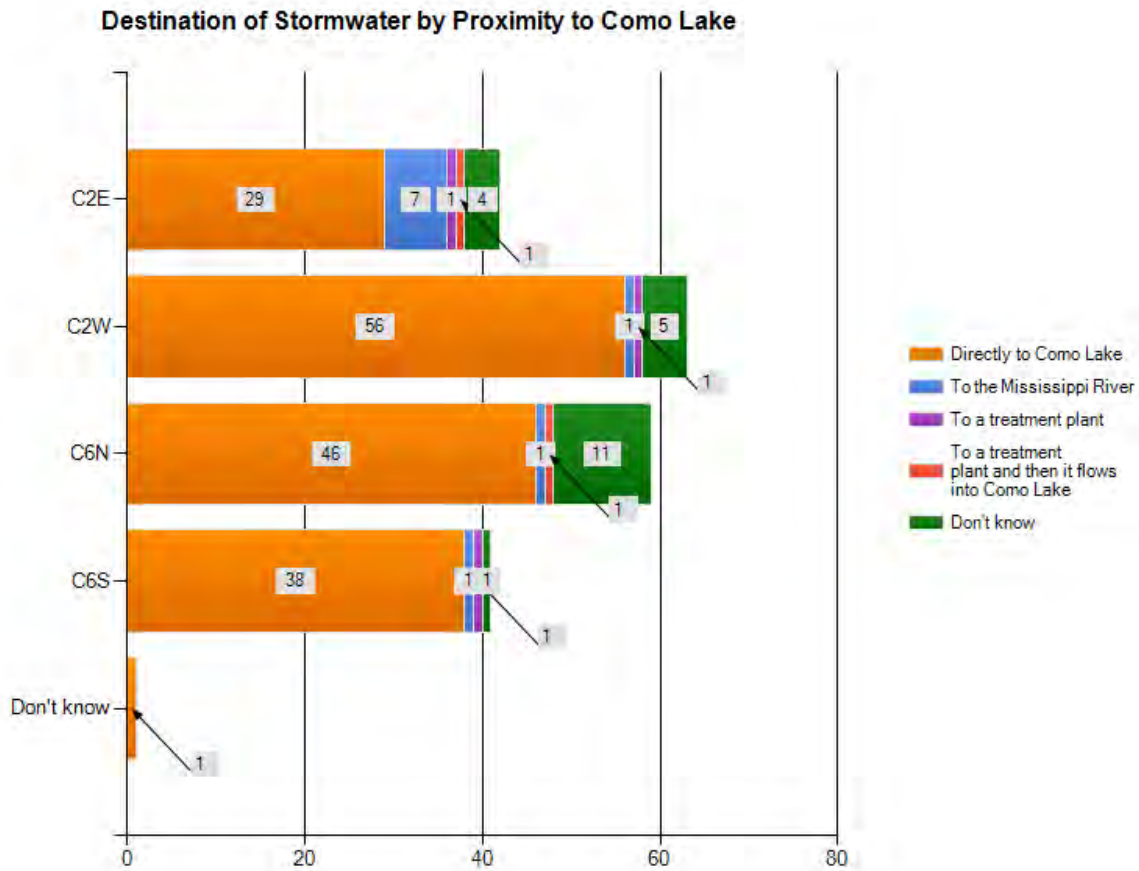
When comparing knowledge of where stormwater goes with the respondent’s proximity to the lake, the following cross-tabulated pattern emerged:

**Table 4:**



April 2011

**Table 5**



November 2011

Proportions for each category of response hold relatively steady for all four subwatersheds. One interesting feature of this crosstab is that a few residents of CS2W thought that stormwater goes to a treatment plant before flowing into Como Lake, although the number of residents with this belief was small (<6). No residents in the other subwatersheds expressed a similar belief.

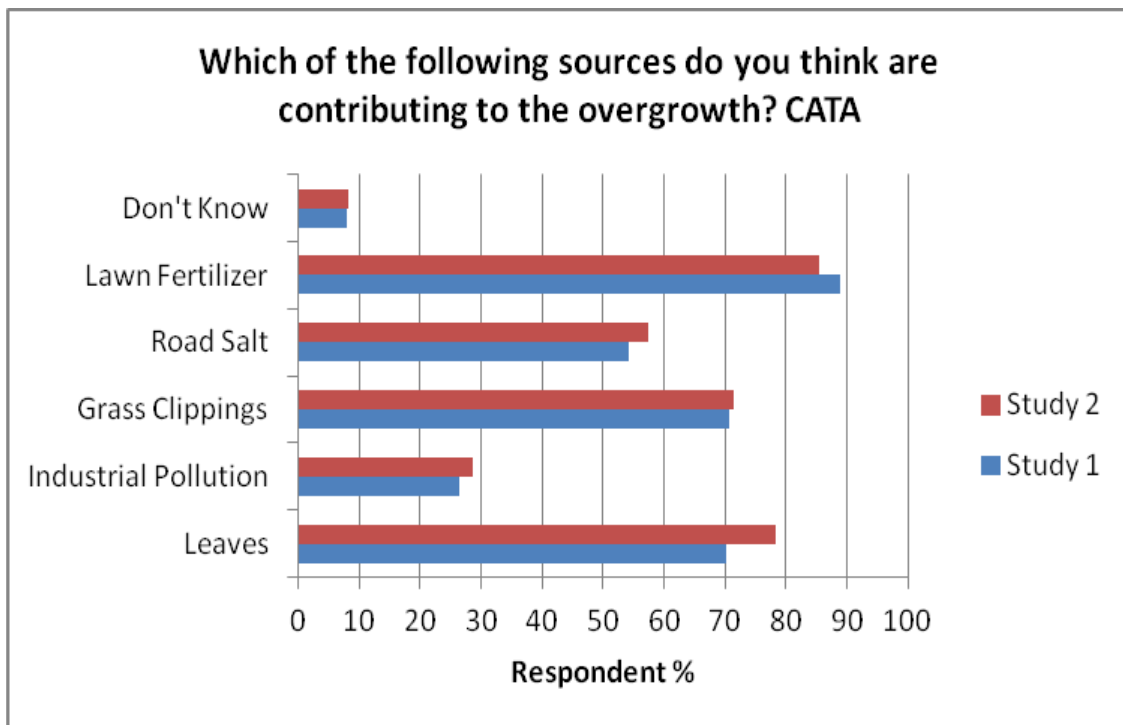
Regarding factors contributing to algae overgrowth in Como Lake (Q7), the most frequently named cause in both surveys (see Table 5 below) was lawn fertilizer at 89% in April and 86% in November (this was a multiple-choice, check-all-that-apply question). The percentage of respondents stating lawn fertilizer as an algae contributor decreased in the second round, but all other causes increased in response percentage.

In the first round survey in April, 70% correctly identified leaves as contributing to algae overgrowth, and 71% knew that grass clippings contribute to algae overgrowth. 54% identified road salt, and 27% identified industrial pollution as contributing factors. Only 8% could not name a contributing source. These findings suggest that while knowledge about leaves and grass

clippings contributing to algae overgrowth was initially good, there was some opportunity for education with more specific messages about the primary cause of algae overgrowth.

In the second round survey in November, 78% correctly identified leaves as contributing to algae overgrowth, and 71% knew that grass clippings contribute to algae overgrowth. 57% identified road salt, and 28% identified industrial pollution as contributing factors. Only 8% could not name a contributing source. Some respondents suggested that animal feces, specifically dogs and geese, are likely a major contributor of algae growth. A few others referenced the nearby golf course as a critical factor. These findings suggest that knowledge about leaves and grass clippings contributing to algae overgrowth has grown in the short time period between surveys. However, there continues to be some opportunity for education with more specific messages about the primary causes.

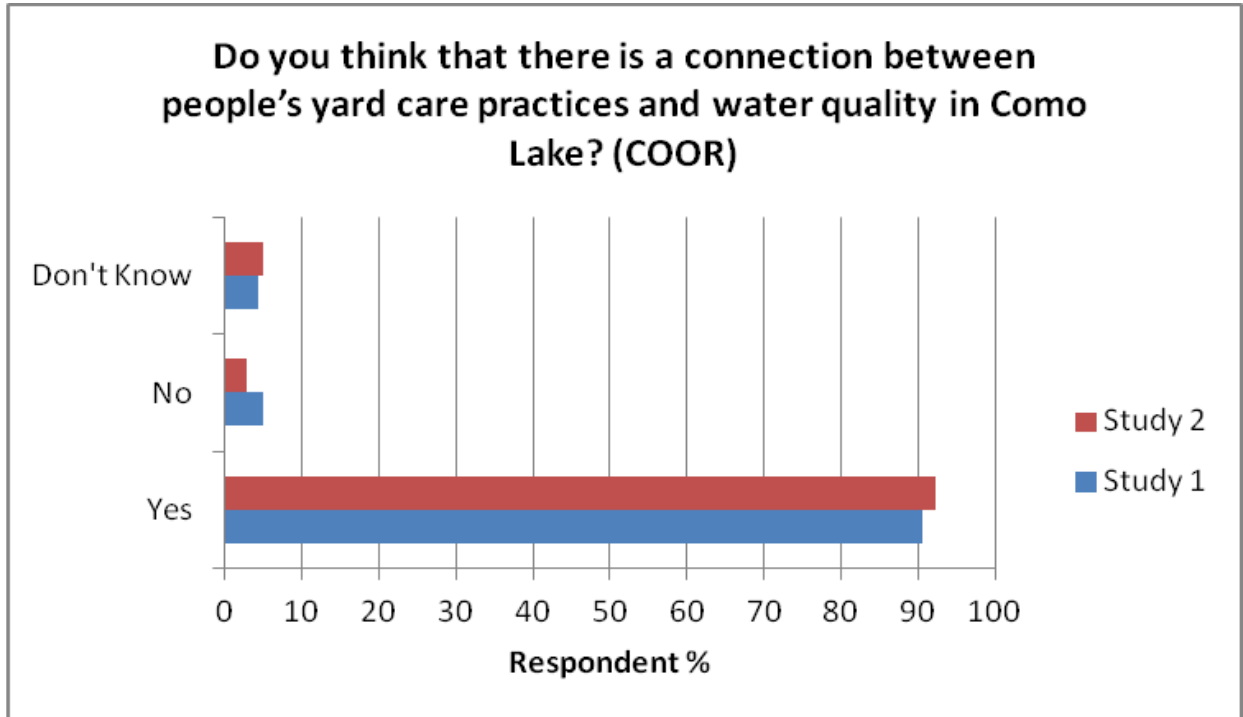
**Table 6**



Concerning the connection between people’s yard care practices and the condition of Como Lake (Q8), there was very widespread and clear awareness of a potential link. This question was posed in a single-response (mutually exclusive) format. In April, 91% of respondents said that there is a connection between people’s yard care practices and water quality in Como Lake. Only 5% responded “No” to this question, and only 4% did not know. These high values suggest that respondent knowledge was originally very high. The percentage of respondents

acknowledging the connection slightly increased in the second round survey. In November, 92% of respondents said that there is a connection between people's yard care practices and water quality in Como Lake. Only 2% responded "No" to this question, and 5% did not know.

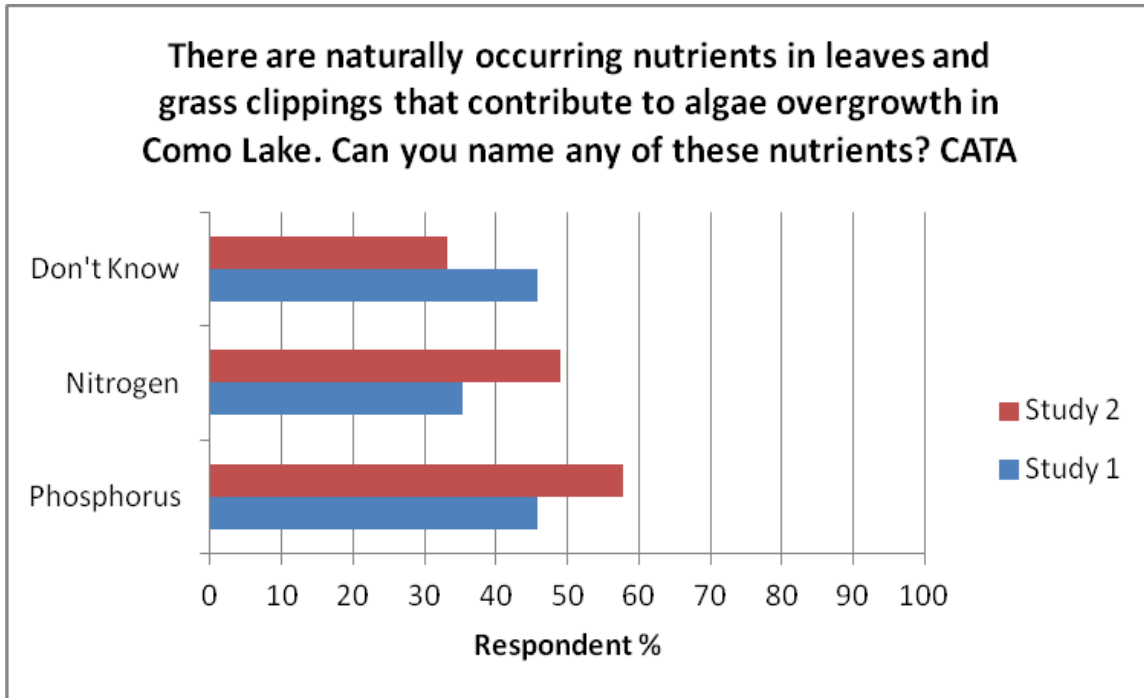
**Table 7**



Mean: 1.1197  
Standard deviation: .44456

Are respondents aware that phosphorus and nitrogen contribute to algae in Como Lake (Q17)? This question was a multiple-choice, check-all-that-apply question. The percentage of respondents able to name phosphorous and nitrogen increased in the second round survey. The total number of “Other” responses decreased in the second survey.

**Table 8**

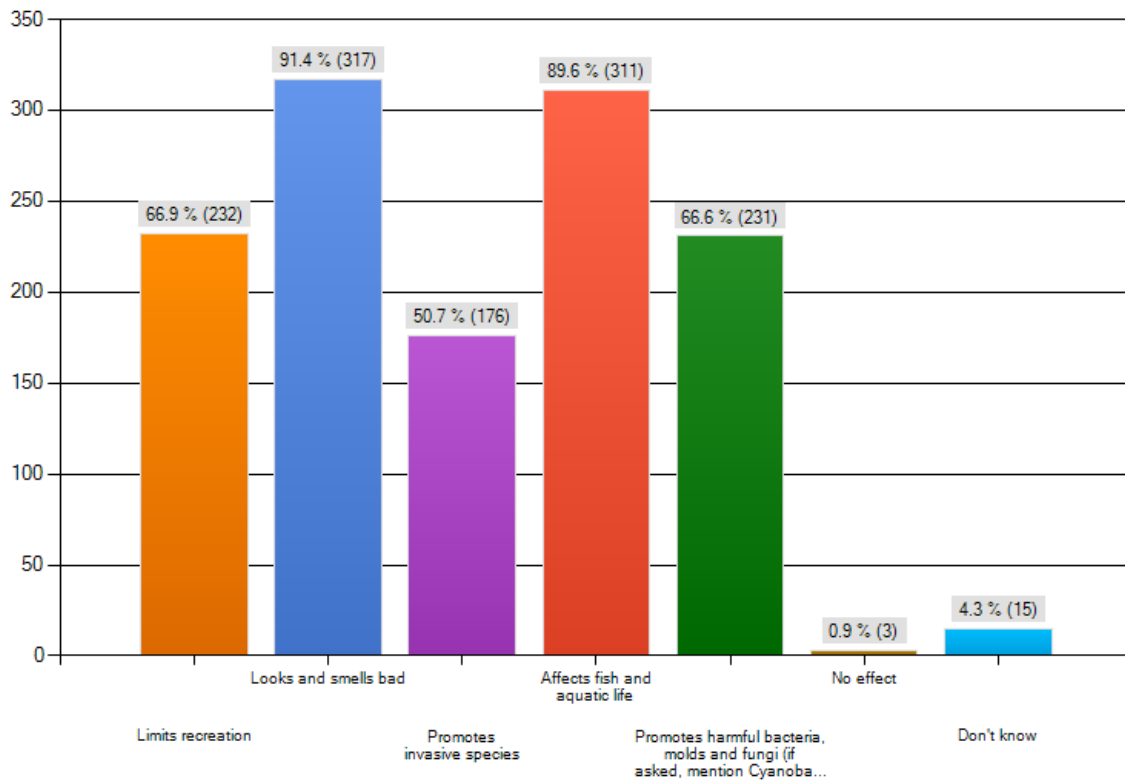


In April, 46% were able to specifically name phosphorus, and 35% could also name nitrogen. 46% could not name either nutrient. However, in November 58% were able to name phosphorus and 49% could name nitrogen. The respondent percentage that did not know any nutrients in leaves and grass clippings dropped to 33%. This knowledge value highlights the most significant knowledge gap among all respondents regardless of respondent proximity to the lake, and suggests that there is considerable scope for education about the presence and impacts of phosphorus and nitrogen on lake water quality. That knowledge values improved in the second-round KAP study is likely a result of targeted educational efforts during that time period. There may have also been a knowledge transfer as a direct result of respondents taking the survey, because they were informed about P and K after answering this question.

Q18 (check-all-that-apply) was not included in the second round survey in November, therefore, a first and second survey comparison cannot be made. In April, however, first round survey respondents very commonly responded that the lake looks and smells bad (91%); 90% believed that algae affects fish and aquatic life; 76% felt that it limits recreation; 67% believed that algae promotes harmful bacteria; and 51% said that algae promotes invasive species. Only three respondents (.9%) believe that excessive algae have no effect, and fifteen respondents (4%) didn't know.

**Table 9**

**I've mentioned that leaves and grass clippings act like fertilizer for algae in the lake. What other effects do you think there could be on Como Lake? Here's some options; tell me yes or no.**

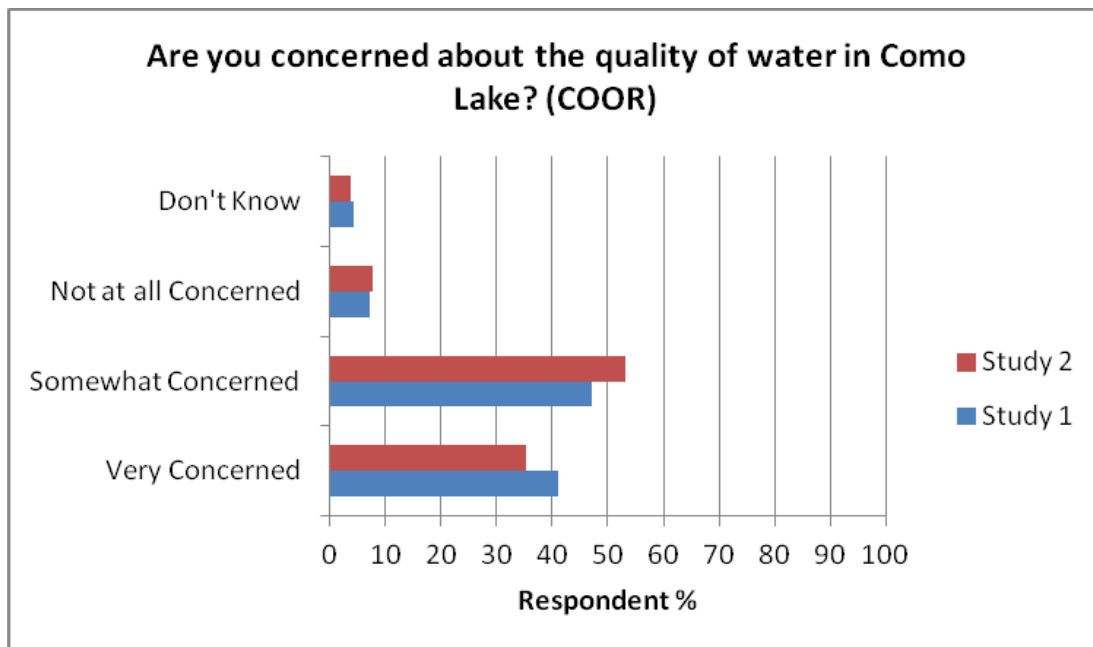


## Attitudes

There was a very high level of concern expressed across the board about water quality in Como Lake (Q5). In both surveys, the great majority of respondents said that they were either very concerned or somewhat concerned. In the first survey, very concerned residents (41%) and somewhat concerned residents (47%) totaled 88% of all respondents. In April 2011 only 7% were unconcerned, while 4% did not have an opinion.

In November, 35% stated that they were very concerned and 53% were somewhat concerned. During the second survey, relatively fewer respondents stated that they were very concerned, while more claimed that they were somewhat concerned. However, the total percentage of respondents with at least some concern about the condition of Como Lake remained constant at 88%. Only 8% of second survey respondents were not concerned at all and 4% did not have an opinion.

**Table 10**



Mean: 1.8042  
Standard deviation: .73755

In the second round survey, respondents were explicitly asked if they were more or less concerned about Como Lake than they were six months ago (Q9). This question was not posed in the first-round survey. The results are consistent with the previous attitude comparison. The majority of respondents had the same level of concern for Como Lake as they did six months prior (70%). The respondents that were more or less concerned about water quality in Como Lake were evenly divided. In total, 15% were less concerned, 13% were more concerned, and

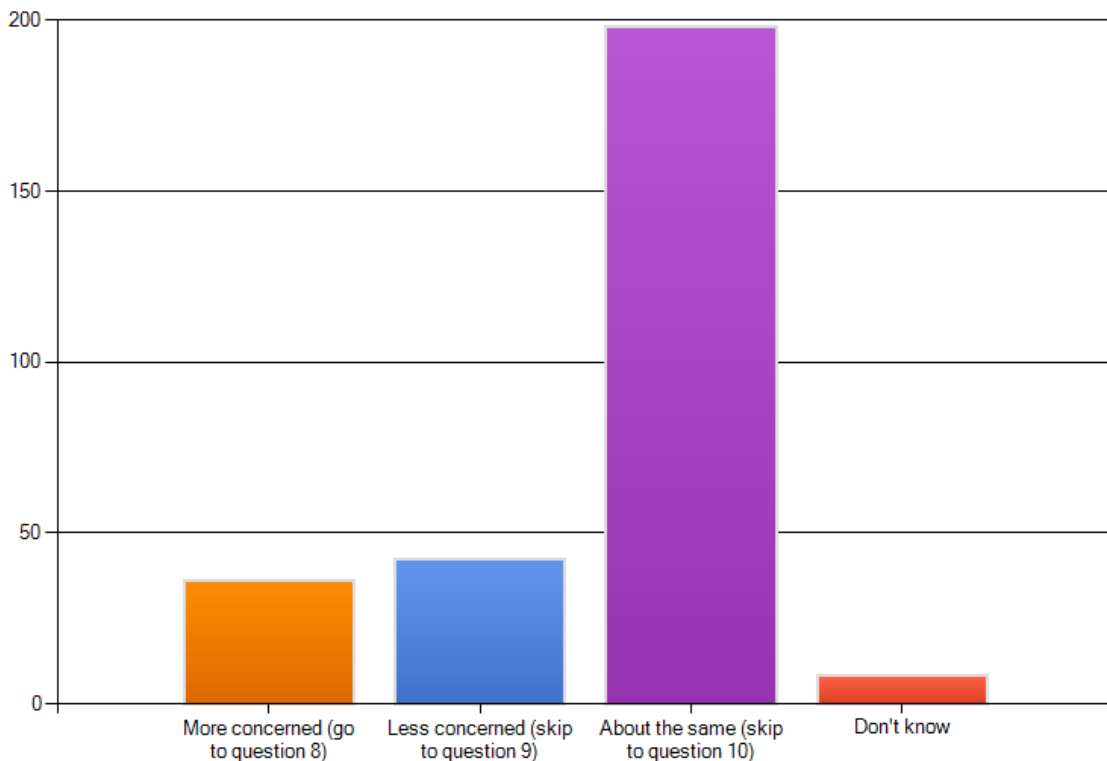


3% did not know. The respondents that were less concerned about Como Lake today referenced observed water quality improvements (sixteen people noted improvements in sight, smell, etc.) and twelve people noted increased mitigation efforts.

The respondents that were more concerned about Como Lake today also referred to negative water conditions (sight, smell, etc.), observing poor land care practices, and an increased awareness as contributing factors. Twelve people said that they had observed that lake conditions had declined during the summer of 2011. Six stated that they were more concerned because they were more educated or had seen new information.

**Table 11**

**Are you more concerned or less concerned today about Como Lake than you were six months ago? (Check only one response).**

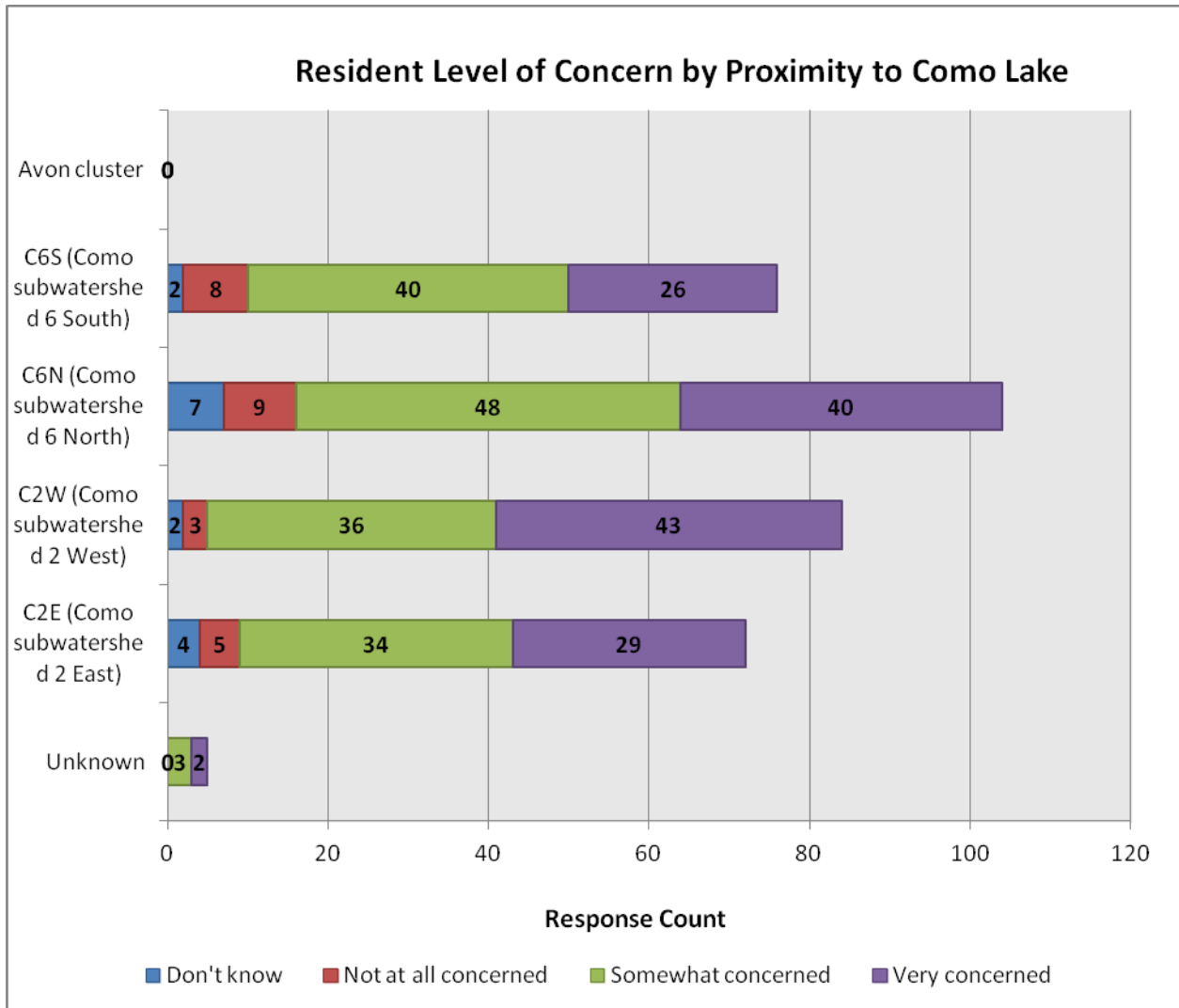


Mean: 2.6277

Standard deviation: .74004

The concern about water quality did not vary markedly by distance from Como Lake, as seen in the following cross-tabulated graph:

**Table 12**

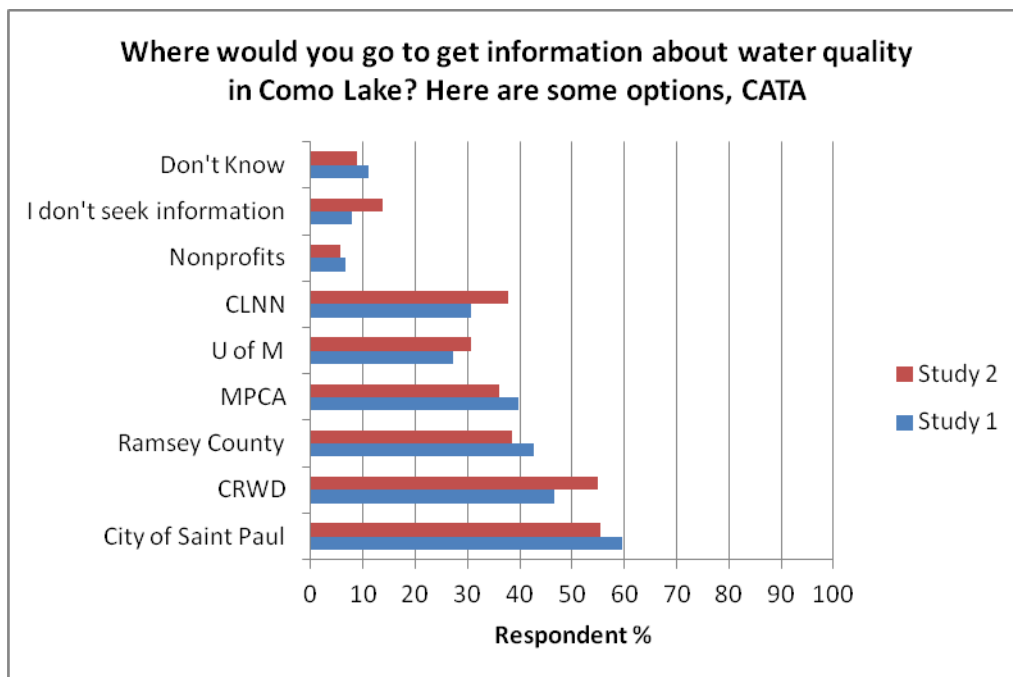


When adjusted for sample size in the control (CS6N and CS6S) and treatment (CS2E and CS2W) areas, relative proximity to the lake did not make a highly significant difference in responses. Overall, relative proportions held across subwatersheds. Both CS6N and CS6S expressed slightly lower concern than residents in CS2E and CS2W, which are closer to the lake.

Interestingly, virtually all residents on Larpenteur Avenue (farthest from the lake) verbally expressed very strong concern and fondness for Como Lake. Several of these residents are apparently members of families that have lived in the same home for several generations and have a historic association with the lake. Despite their relative distance from Como Lake, these residents were at least as passionate and vocal about the lake as residents along East Como Boulevard, which is immediately adjacent to the lake. There is likely a significant income disparity between these groups, but nevertheless both clusters expressed longstanding familial associations and very strong concern for Como Lake.

In April 2011, Question 9 asked respondents about their preferences for seeking information about water quality in Como Lake. This was a check-all-that-apply question, meaning that a respondent could name multiple sources of information. The question was repeated in November; results are summarized in the table below.

**Table 13**



In the first round survey, respondents' preferences for seeking information about water quality in Como Lake were named with the following percentages: City of Saint Paul (60%); CRWD (47%); Ramsey County (43%); MPCA (40%); CLNN (31%); U of M/Extension educators and researchers (27%); and nonprofits (7%). Eight percent of respondents stated that they do not seek information; and 11% responded "Don't know."

In the second round survey, information preference changed only slightly. Overall order of preference was almost identical to the first survey. In the order of preference, the second

survey resulted in the following percentage of information preferences: City of Saint Paul (55%); CRWD (55%); Ramsey County (39%); MPCA (36%); CLNN (38%); U of M/Extension educators and researchers (30%); and nonprofits (6%). Fourteen percent of respondents stated that they do not seek information; and 9% responded “Don’t know.”

In the second-round survey, both CLNN and CRWD increased as a source of information, and the U of M also increased slightly. This may be an artifact of conducting this KAP study. In both pre/post surveys, the frequencies decline somewhat according to the order of mention, so there may be some respondent burden or other artifact influencing the responses to this question.

Some respondents naming Ramsey County commented that since Como is a regional park the County should be the main source of information. Although the Internet was not listed as an option, over thirty respondents volunteered information that their first step would be to do an Internet search. Several respondents noted that they had previously done on-line searches but had not found much information about Como Lake. At least twenty respondents pointed out that the District 10 Community Council (not listed as a choice in this question) was a trusted local resource that should be engaged in any effort to improve water quality in the lake. About a dozen respondents said that they would first contact the DNR, five mentioned Saint Paul Parks and Recreation, three mentioned Saint Paul Regional Water Services, and one person mentioned the Minnesota Department of Agriculture. ADD

Regarding nonprofits, five respondents named Clean Water Action and two named the Sierra Club. Other nonprofits mentioned were Environment Minnesota, The Nature Conservancy, MPIRG, Earth Watch, and Friends of the Mississippi. None of the respondents specifically named The Freshwater Society in the April survey. Although 46% of respondents named CRWD in April 2011, dozens more said that they had never heard of CRWD, suggesting that there is somewhat limited awareness of CRWD and its role. Although 101 respondents were aware of CLNN, many dozens reported being unaware of it. These findings suggest that there is considerable scope for increasing the public profile of CRWD, The Freshwater Society and CLNN and the role of these actors in improving water quality in Como Lake.

Respondents named specific nonprofits and other agencies in the following order in the second-round survey:

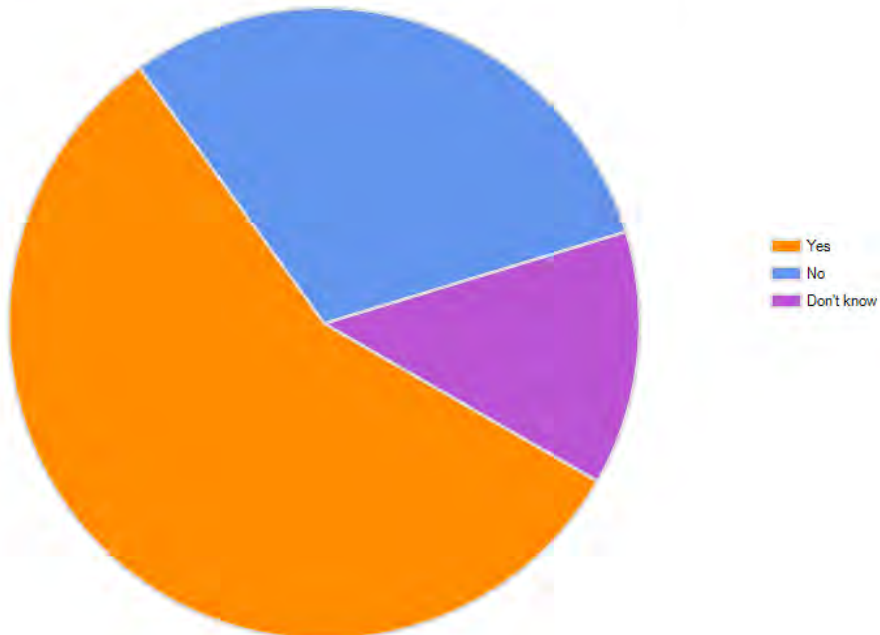
- DNR: 4
- District 10 Community Council: 14
- Friends of the Mississippi River: 1
- Minnesota Waters: 1
- Clean Water Action: 3
- Internet/Google: 12
- The Freshwater Society: 1
- Fire Department: 1
- Knights of Columbus: 1
- U of M: 4

Family/Friend: 4  
 Highland Park Lake Detective: 1  
 Minnesota Environmental Partnership: 1  
 Environment MN: 1  
 Eco building/State Fair: 2  
 Eureka (Recycling): 1  
 Institute on Agricultural Trade and Policy: 1  
 Pamphlets around lake: 1  
 Newspaper/Magazine: 1  
 Minnesota Conservation Corps: 1  
 Clean Water Minnesota: 1  
 USDA: 1

In the November survey, respondents were asked whether having an organized curb-cleaning effort among neighbors would make it more likely for them to clean debris from their curbs?

**Table 14**

Do you think that having an organized curb cleaning effort among neighbors would make it more likely for you to clean debris from your curb? (Check only one response).



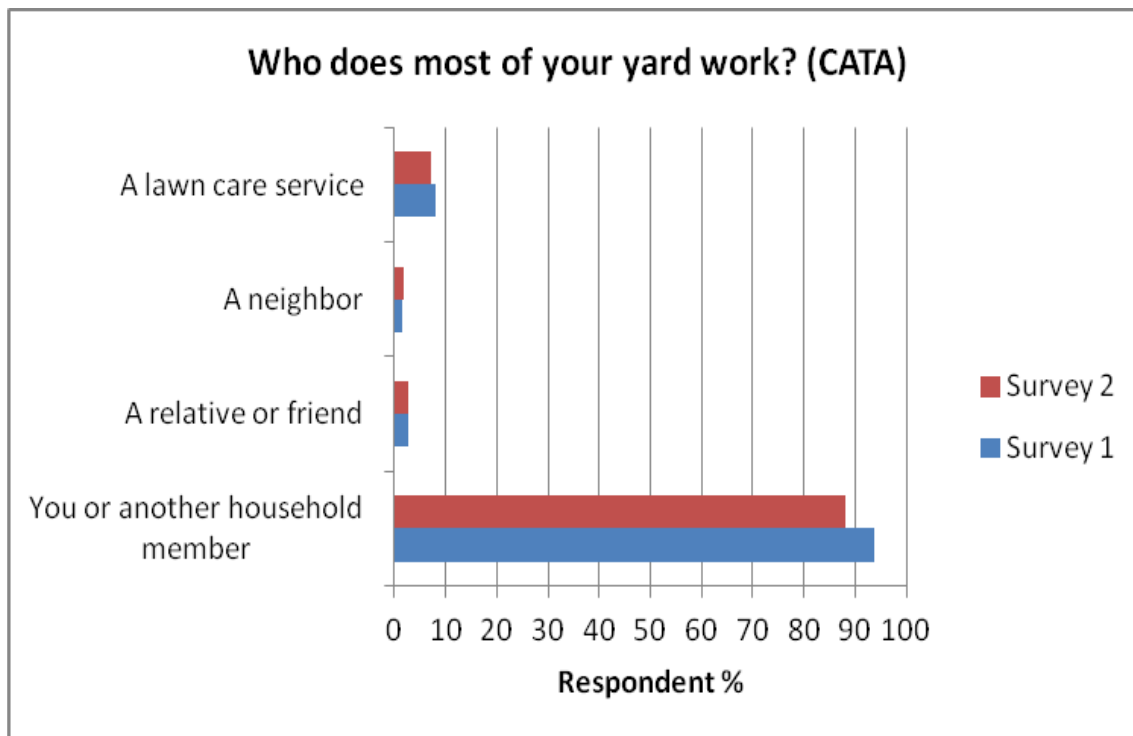
Mean: 1.5598  
 Standard deviation: .70936

## Practices

Question 10 was the first in a series of questions about yard care practices, and was posed in both surveys. It asked the identity of the person doing yard care. In April 2011, 94% of respondents reported doing their own yard work; 8% used a lawn care service; 3% relied upon a friend or relative; and 1% relied upon a neighbor<sup>4</sup>. A discrepancy in the data is noted in that very many respondents stated that they do yard work for elderly shut-in neighbors, probably higher than what is reflected in the chart below. It has already been noted that enumerators observed dozens of elderly residents who refused to answer the door, and it is possible that the number of neighbors helping neighbors is not being accurately captured in Q10. A conservative “guestimate” from the first-round verbal comments are that approximately thirty respondents, at a minimum, are voluntarily assisting neighbors with yard care (shoveling, mowing, raking, bagging leaves and moving bags to a compost site).

Second-round responses were fairly consistent with the first round. In November 2011, 88% reported doing their own yard work; 7% used a lawn care service; 3% relied on a relative or friend; and 2% relied upon a neighbor. Some slight variances could be accounted for by the difference between spring and autumn lawn care chores.

**Table 15**

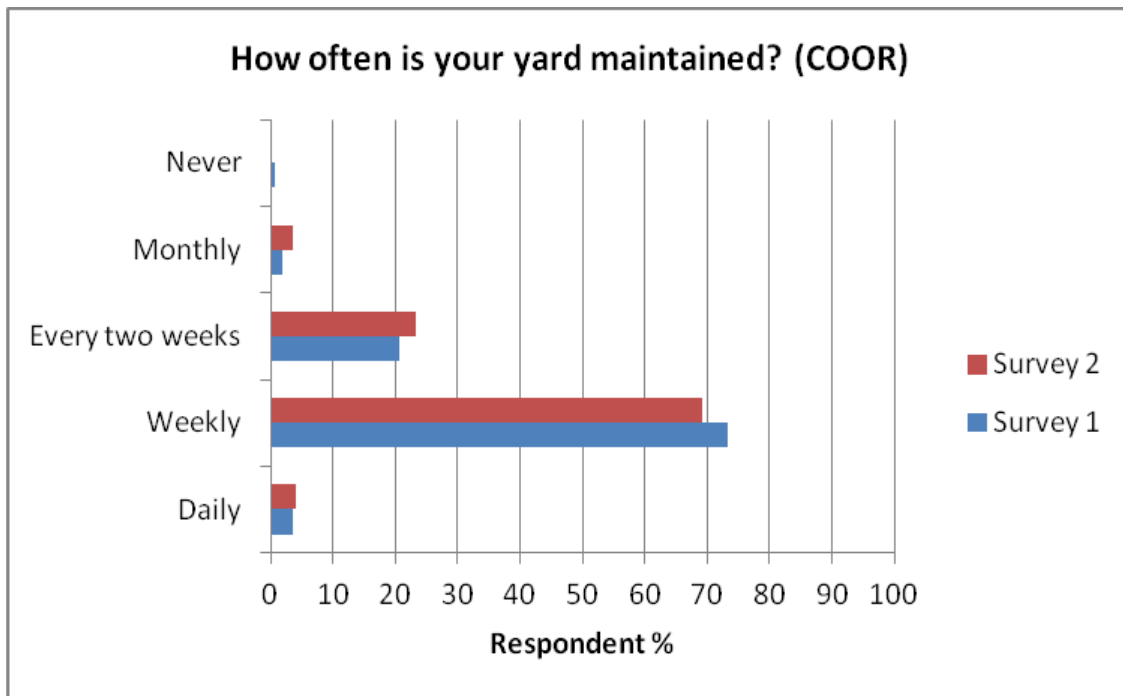


<sup>4</sup> This was a check-all-that-apply question, and some respondents had multiple responses.

Again, there were numerous comments volunteered about neighbors assisting other neighbors, particularly elderly residents, with yard chores.

With respect to frequency of yard maintenance (Question 11), in the first-round survey 73% maintained their yards weekly; 21% every two weeks; 4% daily; 2% monthly; and 1% responded “never.” In November 2011, 69% reported doing yard work weekly; 23% every two weeks; 4% daily; 4% monthly; and 9% responded “Never.”

**Table 16**

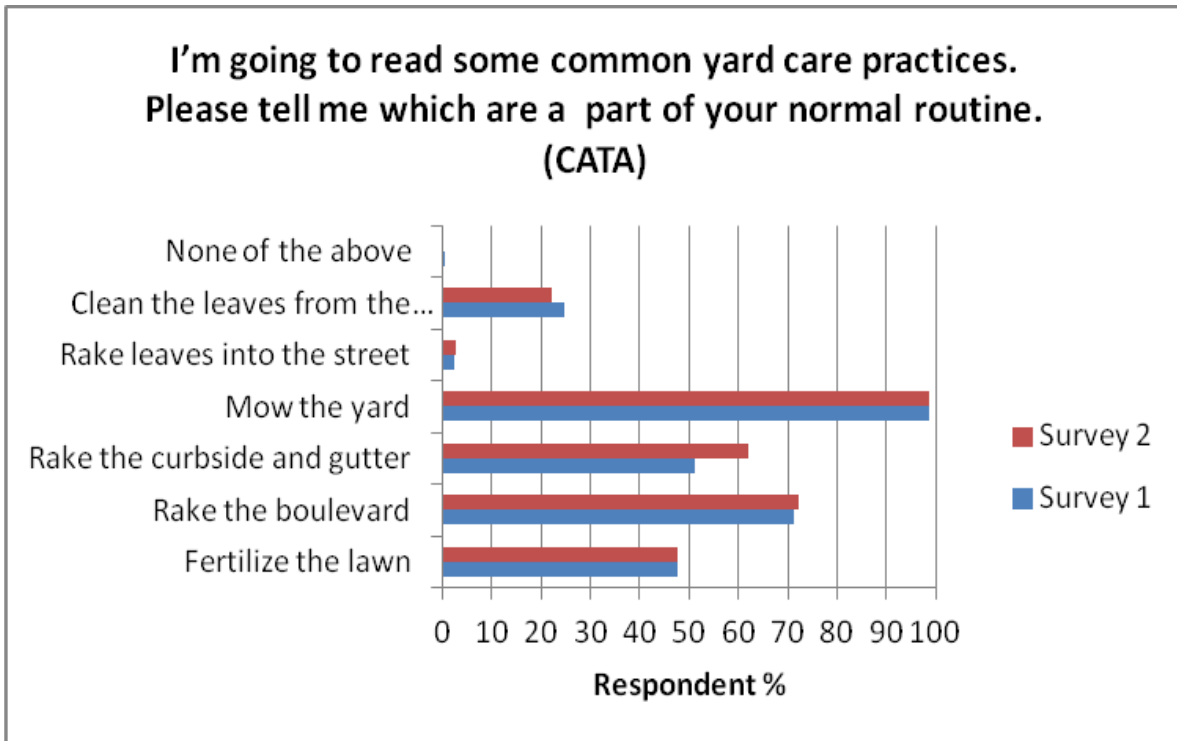


Mean: 2.2664  
Standard deviation: .59161

Question 12 concerned common yard care practices. In the first-round survey, fully 99% of respondents mowed their yards; 71% raked the boulevard; 51% raked the curbside and gutter; 48% fertilized their lawns; and 25% cleaned leaves from the nearest storm drain. As noted, less than 3% (nine individuals) reported raking leaves into the street. A few commented that they had converted their yards to perennials and do no mowing or raking. Again, many comments were made about assisting an elderly or shut-in neighbor with yard care. There were some comments made about neighbors sharing yard care chores, mainly mowing, shoveling, raking and hauling leaves to compost sites. In the second-round survey, 99% mowed their yards; 72% raked the boulevard; 62% raked the curbside and gutter; 48% fertilized their lawns; and 22% cleaned leaves from the nearest storm drain. Again, less than 3% reported raking leaves into

the street (8 individuals). These results show a ten percent increase in numbers of respondents who rake the curbside and gutter, and a slight decline in those cleaning leaves from the nearest storm drain.

**Table 17**

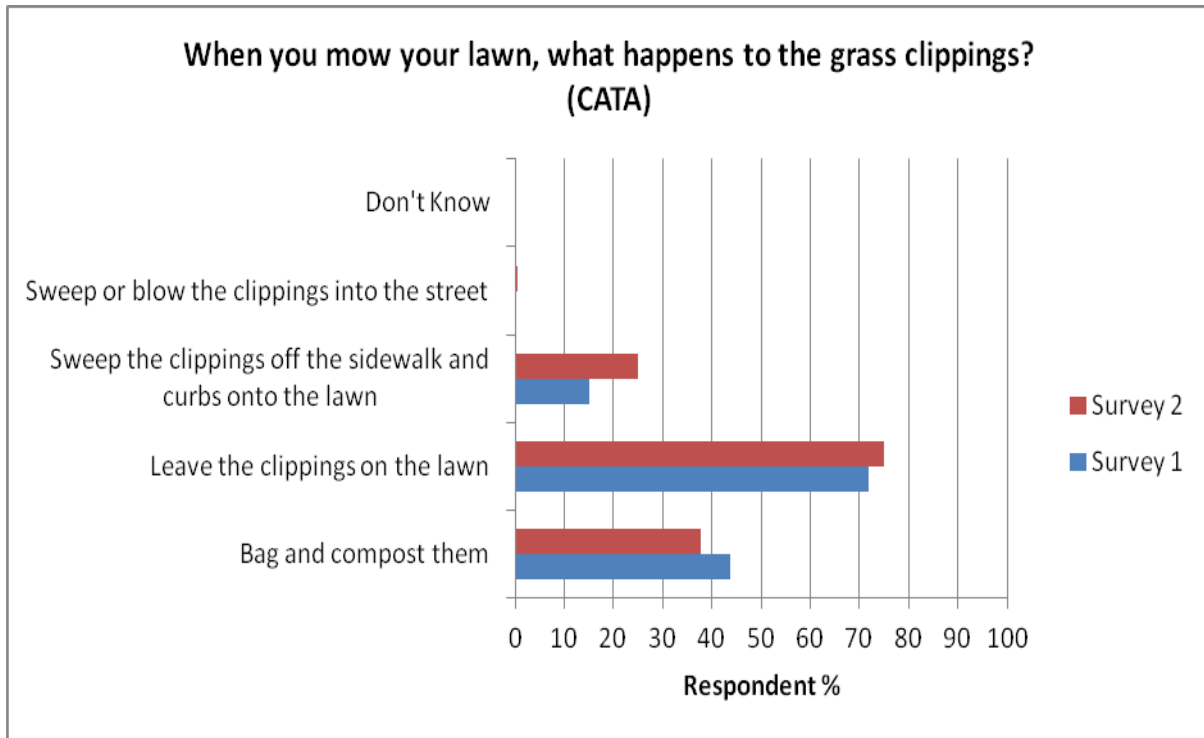


For respondents who fertilize their yard, most qualified their answer by saying that they only fertilize once (rarely twice) each year, and that they use phosphorus-free fertilizer.

Concerning disposition of grass clippings (Q13), in the April survey 72% leave clippings on the lawn, while 44% bag and compost. 15% sweep clippings off the sidewalks and curbs into the lawn. Only one respondent reported sweeping grass clippings into the street. This was a multiple-choice, check-all-that-apply question. In the November survey, 75% reported leaving the clippings on the lawn; and 38% reported bagging and composting them. 25% reported sweeping grass clippings off the sidewalks and curbs and onto the lawn. As in the April survey, only one person reported that they sweep grass clippings into the street.

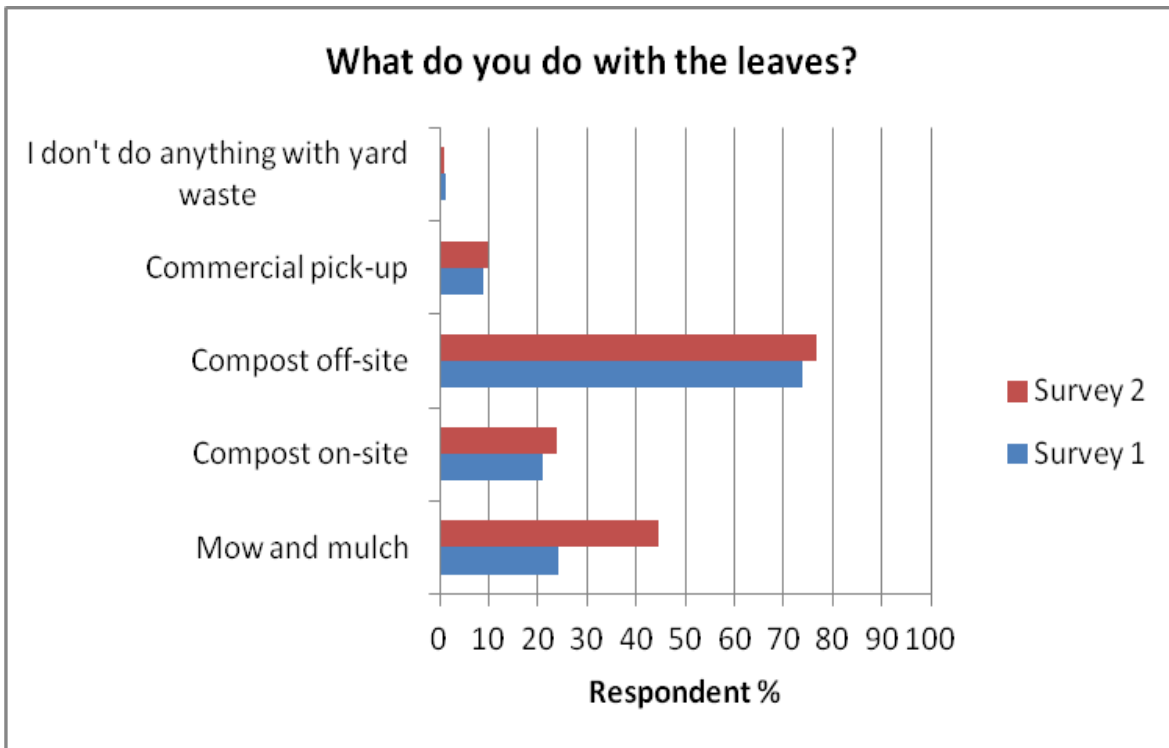


**Table 18**



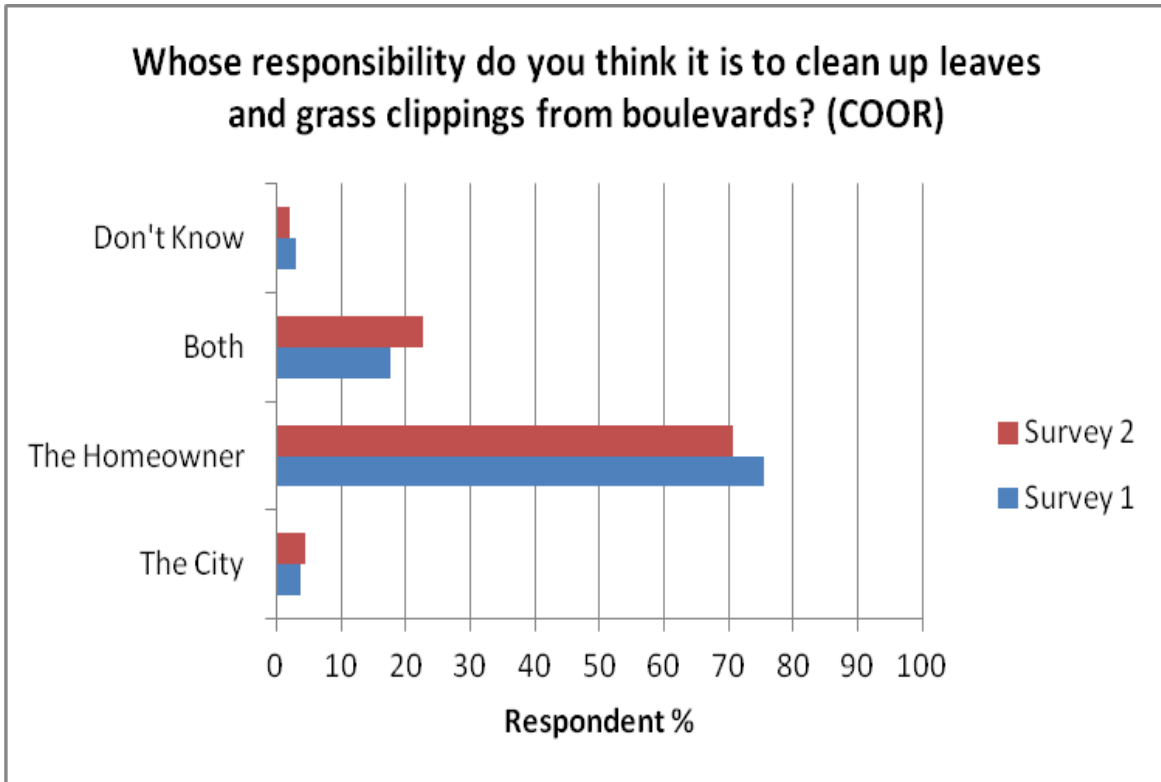
Regarding leaves (Q14), fully three-quarters (74%) of respondents in the April survey reported bagging and composting off-site. 24% mow and mulch leaves; 21% compost on their own property; 9% use a commercial service; and 1% (four individuals) do nothing with yard waste. This was a check-all-that-apply question. In the November survey, 77% reported bagging and composting off-site; 45% reported mowing and mulching; 24% reported composting on-site; and 10% used a commercial service. 1% (three individuals) do nothing with yard waste.

Table 19



Two questions were posed about responsibility for cleaning leaves and grass clippings from either boulevards or curbsides and storm drains. Regarding boulevards (Q15), the majority (76%) of respondents in the April survey felt that cleaning leaves and grass clippings from boulevards is the homeowner's responsibility. 18% feel that responsibility is shared by the homeowner and the City; 4% feel that it is the City's responsibility; 3% responded "Don't know." In the November survey, 71% felt that cleaning leaves and grass clippings from boulevards is the homeowner's responsibility. 23% feel that responsibility is shared between the homeowner and the City. Less than five percent felt that this is a City responsibility.

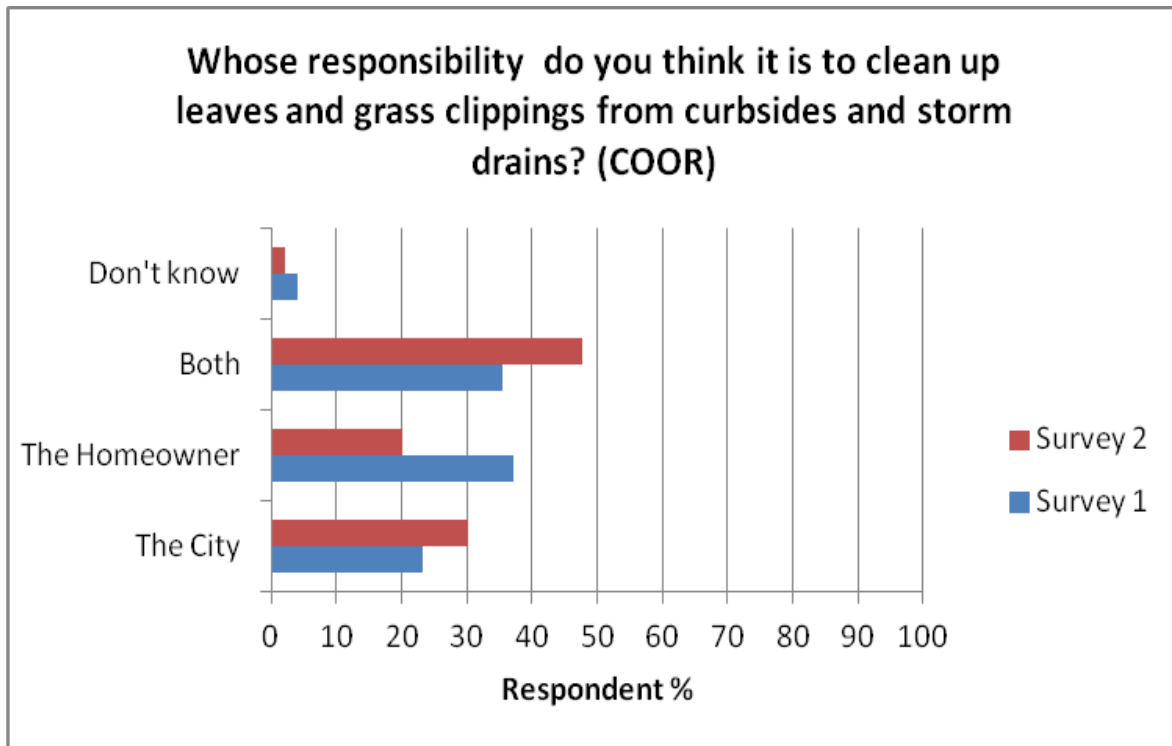
Table 20



November 2011  
Mean: 2.2203  
Standard deviation: .55289

Concerning responsibility for cleaning leaves and grass clippings from the curbside and storm drains (Q 16), responses were much more evenly divided in the April survey. 37% feel that it is the homeowner's responsibility; 35% feel that it is a shared responsibility; 23% feel that it is the City's responsibility; and 4% didn't know. Again, numerous comments were received about the lack of boulevards, curbs, gutters, or storm drains on respondents' blocks. Residents commonly qualified their response by noting that curb and storm drain maintenance is the City's responsibility, but that the City lacks resources to do so. In the November survey, 20% felt that it is the homeowner's responsibility; 48% feel that it is a shared responsibility; and 30% feel that it is the City's responsibility.

Table 21



November 2011  
Mean: 2.2155  
Standard deviation: .90674

Cross-tabulations were done of questions 19 and 20 (responsibility questions) with the practices question (Q12). The following results were obtained:

**Table 22**

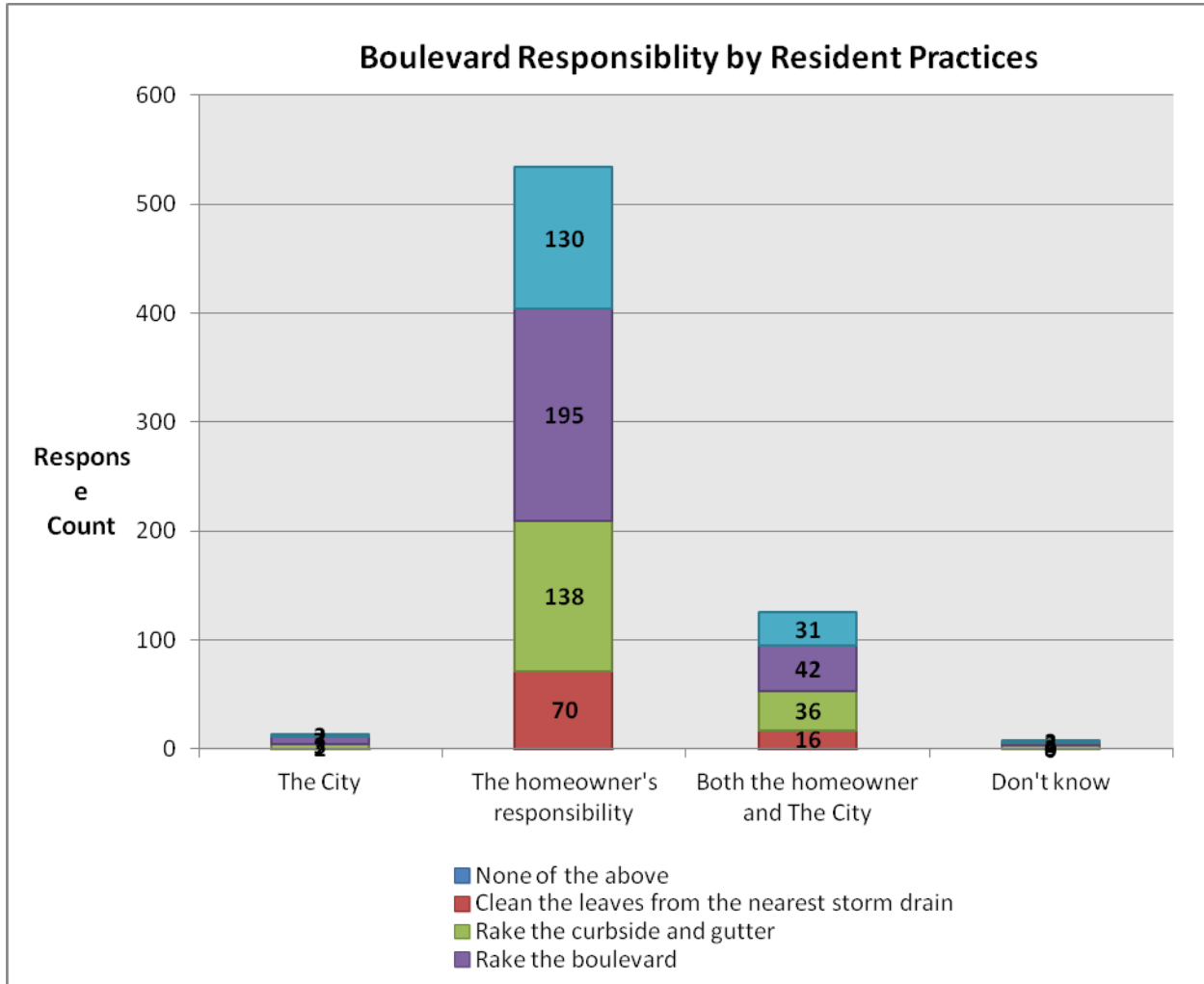
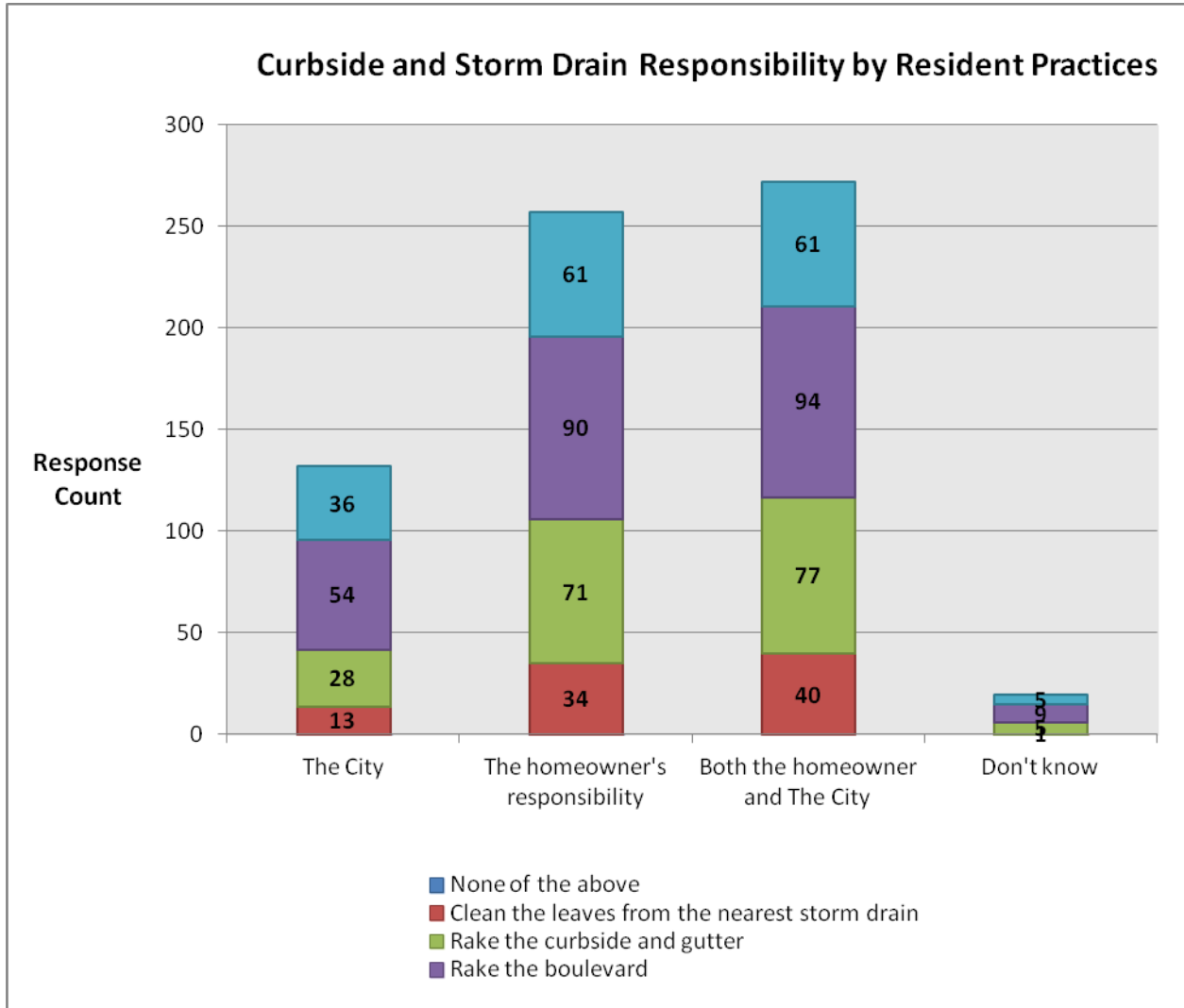


Table 23

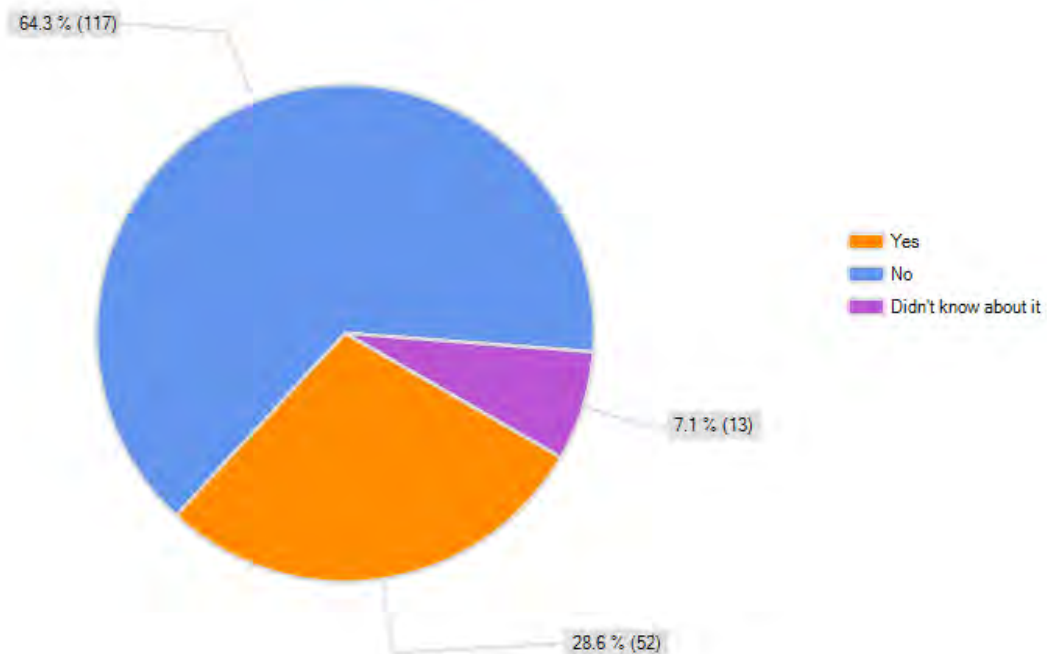


Again, relative proportions remain stable, and the majority of homeowners accept responsibility for maintaining boulevards.

Of the respondents in CS2E, 29% in the April survey reported having previously participated in a CLNN, while 64% have not (Q 22). 7% did not know about it. In the November survey, 37% reported participating in a curbside clean-up; 61% had not; and 1.6% did not know about it. Numerous comments were given about the inconvenient timing of the clean-ups. These findings suggest that there is considerable scope to improve participation in future years.

**Table 24**

**THIS QUESTION IS FOR SUBWATERSHED TWO RESIDENTS ONLY: Have you previously participated in a Como Lake Curbside Cleanup? Check only one response.**



November 2011:  
 Mean: 1.6429  
 Standard deviation: .51325

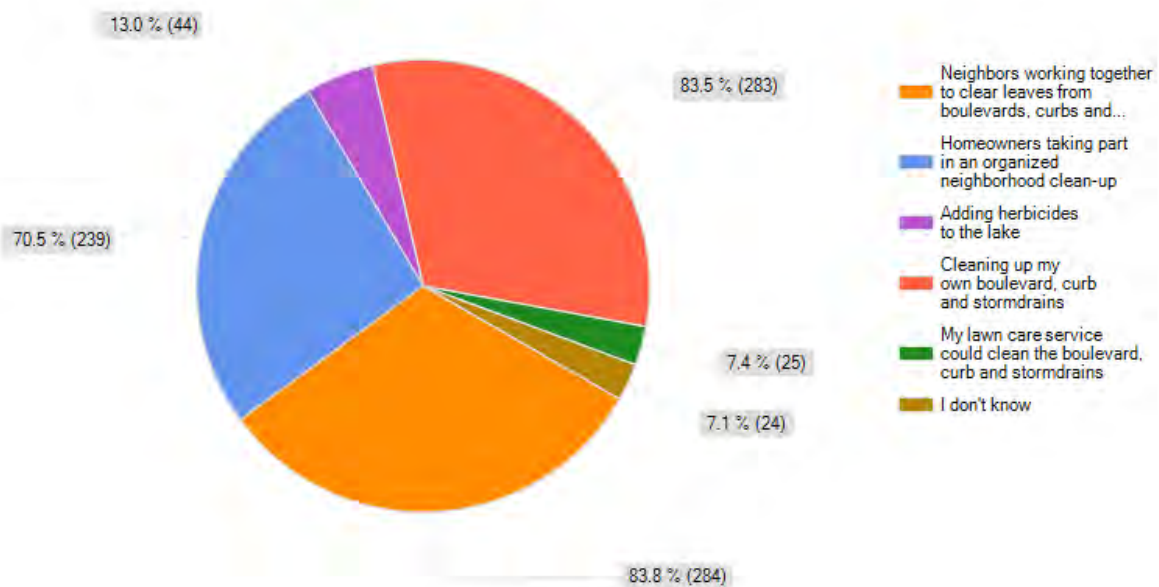
Q28 (November survey) asked whether the respondent plans to participate in the future in an organized curb cleaning effort. Sixty percent (69 people) responded affirmatively; 14% said “no;” 10% did not know; and 16% said “Maybe – would like to know more about it.”

## Perceived Actions

Turning to actions that might help water quality in Como Lake, Question 19 offered a multiple-choice, chose-all-that-apply menu of options. The most frequently selection option (84%) was “neighbors working together to clear leaves from boulevards, curbs and storm drains” and an equal number also responded to “cleaning up my own boulevard, curb and storm drain.” 71% responded positively to taking part in an organized neighborhood clean-up. 7% noted that their lawn care service could participate in these activities. 7% did not know. These results suggest that respondents would be receptive to organized leaf clean-ups. This question was not repeated in the November survey.

**Table 25**

**Which of the following actions do you think might help to improve water quality in Como Lake? Check all that apply**



It is worth noting that the interviewers found some resistance to the idea of leaf clean-ups, where some respondents stated that clean-ups would not significantly improve water quality in the lake. In general, there seemed to be a lot of discontent and frustration about the perceived failure of successive Como Lake projects to address water quality issues. Most of this was directed toward the City of Saint Paul, although some residents specifically named the DNR (for fish kills), CCM (for removing large old trees adjacent to Como Lake and replacing them with rain gardens) and CLNN (for community organizing). Several residents felt that internal phosphorus loading was a more serious problem that would require a major environmental effort



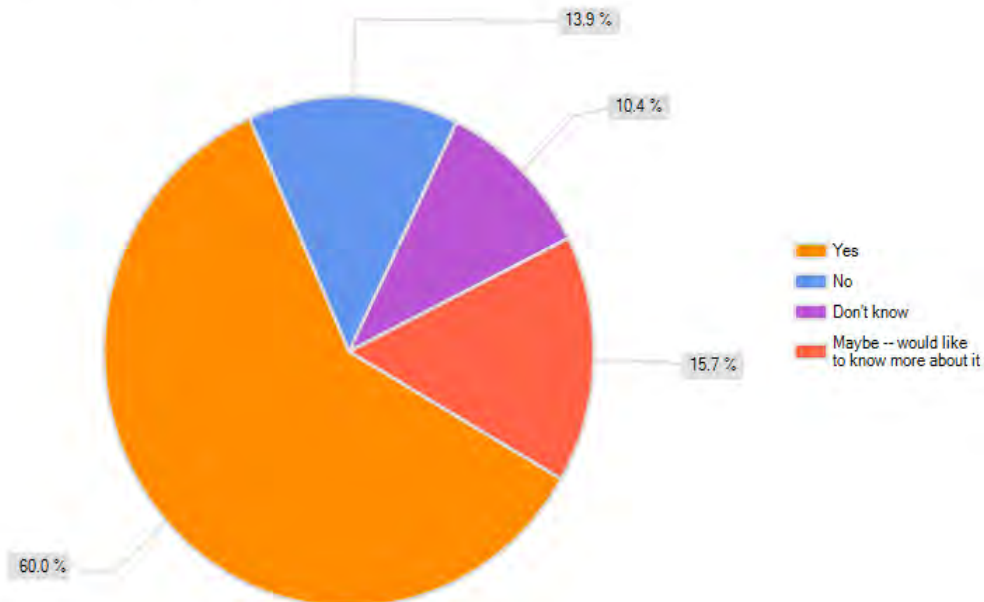
(such as draining and clearing the lake of vegetation). A number of people felt that water quality had declined since the DNR (?) carried out a fish kill a few decades ago. A small number (<five) of respondents stated that the leaf clean-ups were initiated by a few highly motivated neighbors that did not represent the majority. While these types of comments were not very numerous, they were voiced in very strident terms.

Several comments were made about why it is important to participate in a neighborhood clean-up. Nine people said that it was a personal responsibility; and eight cited convenience. Nine people specifically referenced their concern for Como Lake. Seven said that it was important for community building. Two people mentioned that the clean-up was free, and three mentioned peer pressure. Two people said that they were curious, and one said that their personal compost was full.

In the November 2011 survey a question was posed as to future intentions to participate in a CCWQ:

**Table 26**

**Do you plan to participate in future organized curb cleaning events in the future? (Check only one response)**

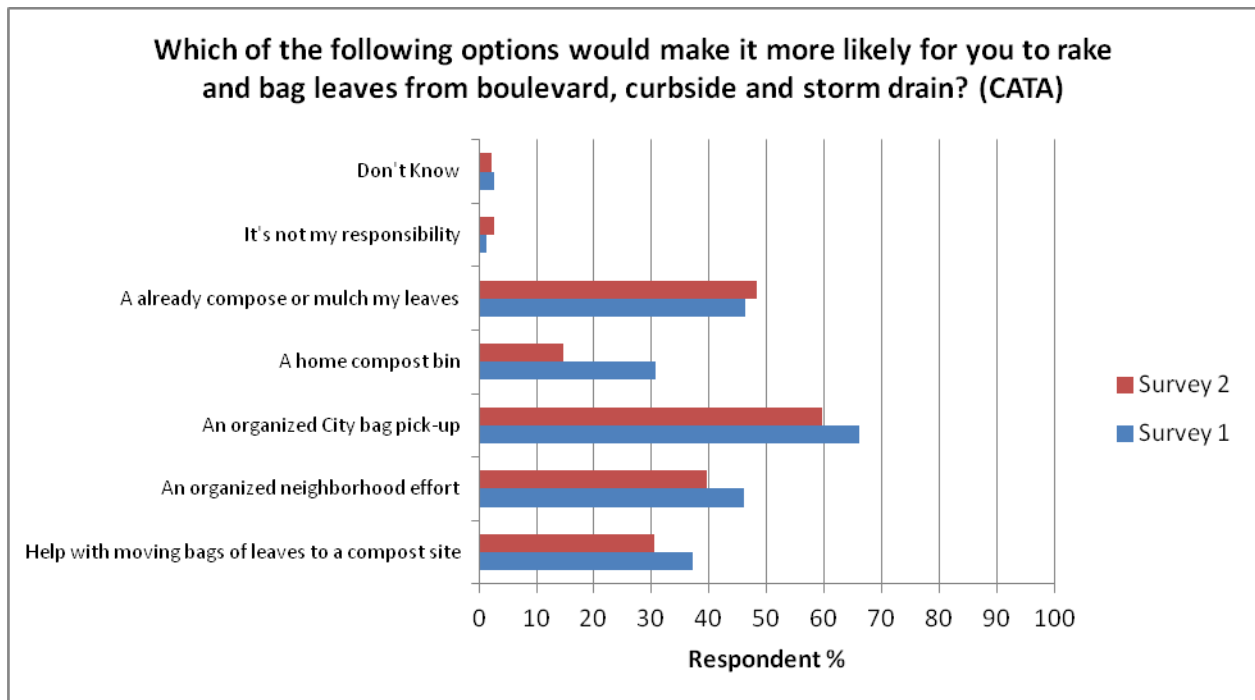


Mean: 1.8174

Standard deviation: 1.14388

Q21 asked what would make it more likely for the respondent to rake and bag leaves from the boulevard, curb and storm drains. The most frequent response (66%) in the April survey was “an organized City bag pick-up.” However, many also noted that lack of City resources would be an issue, although many noted that it should be a policy priority, similarly to curbside recycling. 47% indicated “an organized neighborhood effort” and an equal number said that they already compost or mulch their leaves. 37% indicated that help with moving bags to a compost site would help them; and 31% said that a home compost bin would help them. 3% didn’t know, and 1% said that it is not their responsibility.

**Table 27**



It was discovered that probing for open-ended comments in Q21 yielded many creative ideas from respondents. These are summarized in the Tables below.<sup>5</sup>

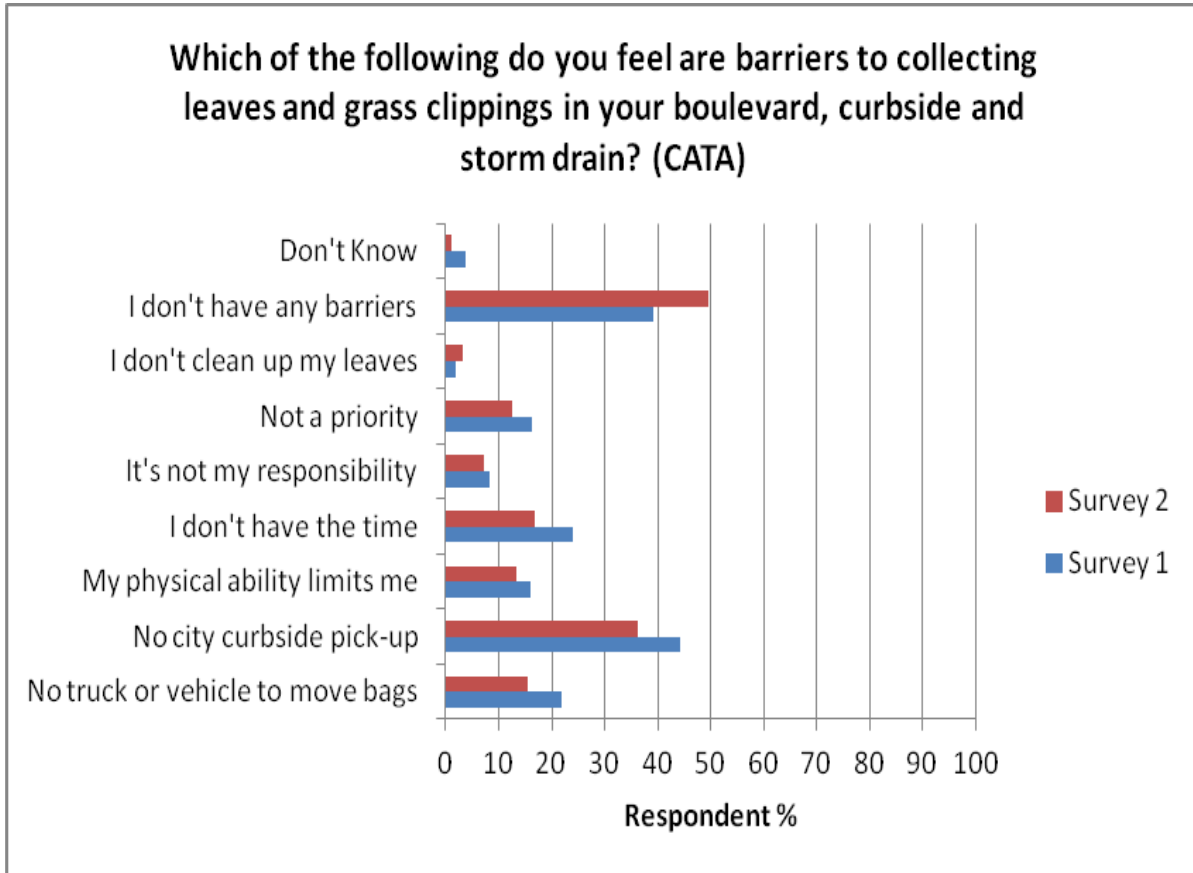
**Barriers and constraints**

Question 20 posed a multiple choice question about constraints to collecting leaves and grass clippings. The first-ranked was “no city curbside pick-up” (44%) followed by “I don’t have any barriers” (39%). 24% reported time limitations, and 22% reported “no truck or vehicle to move bags.” 16% said that collecting leaves and grass clippings is not a priority; while 16% said that

<sup>5</sup> Comments have been slightly edited for clarity

their physical ability limits them. 8% reported that it is not their responsibility; 4% said that they don't know; and 2% said that they don't clean up their leaves.

**Table 28**



In terms of absolute numbers, there were 364 total barrier responses for this check-all-that-apply question. These included 75 responses for “No truck or vehicle,” 152 for “No City bag pick up,” 55 for “My physical ability limits me,” and 82 for “No time.” There were two attitudes values imbedded in this question: “Not a priority” with 56 responses, and “Not my responsibility” with 28 responses.

**Table 29: Respondents' Suggestions for Community Clean-ups for Water Quality  
(First-round survey – April 2011)**

- Help with moving bags - can't pay for it. An organized city bag pickup would be great. Home compost bin- we use the neighbor's. In favor of paying city employees to do this- jobs!
- Re a City bag pick up: do a big one-time pick up. Tarps instead of bags would be nice.
- Suggested maybe a "block compost bin" instead of personal home ones.
- City should do like Roseville and get a leaf vacuum truck.
- Knowing who/where the elderly neighbors are to help them bag their leaves and grass clippings.
- District 10 newsletter with an information campaign.
- It would be nice to have bag pick up 2-3 times a year. Tap into/coordinate with D10 block leaders.
- More awareness and education about phosphorus-free fertilizers; Anti-littering campaign with signage around the lake; Provide more trash cans around the lake.
- Increase educational efforts; Organize walking tours of the storm drain outlets into Como Lake; Offer classes about Como Lake.
- Education! Provide simple, clear, attractive informational communication pieces. Could include TV, brochures, or "broadside" piece in the mail that folds open in three different sizes (six sides). It could contain a message like "Ten Ways to Improve Como Lake." Also storm drain stenciling.
- Establish a demonstration garden next to the lake with two patches of lawn: one with phosphorus and one without, so that people can see and compare. Also: put screens on all storm drains; old storm drains should be replaced. Organize a competition between the subwatersheds to reduce phosphorus, and check phosphorus levels at the outlets at the lake. Also, have signage around the lake and storm drains showing animals with high appeal (turtles, herons), and noting the impact of phosphorus on their habitat.
- Contact block leaders to send out email blasts. Provide information/outreach at annual block parties. Distribute lawn signs that read "*Rake your leaves, Darn-it!*" Promote storm drain stenciling. Have an "Adopt a Storm Drain" program.
- Have a clearer message about who should do what (whose responsibility it is to clean curbs and gutters). CRWD should do enforcement for those who blow leaves into the street. Install curbs and gutters (30% of blocks have none). Promote rain gardens on boulevards.
- Obtain barley pellets or bales to improve water clarity. Get a weed bailer. Re: shoreland buffers – keep doing that. Keep the aerator on all year, or have a fountain like Central Park in NYC.
- Install storm drain covers; provide education about causes; increase street sweeping.
- Cleanups won't help as much as wetland restoration.
- Leaves on Avon/Wheelock get ground up by many school visitors who park on that street corner– lots of compacted debris ends up around those storm drains. Parking should be restricted by those storm drains on that specific corner.

**Table 30: Respondents' Suggestions for Community Clean-ups for Water Quality  
(Second-round survey – November 2011)**

- Provide tarps for neighbors upon which to rake leaves, which would make bagging easier.
- Schedule more frequent clean-ups, and spread out the events over the entire leaf-fall season (late September to early December).
- Signage
- Partner with a neighborhood organization.
- Provide assistance with bagging and hauling.
- Education (26 people made this suggestion)
- Youth involvement
- City street clean-ups (with specific reference to the City of Roseville)
- Help for seniors
- Fines and enforcement action
- Clean up Como Park
- Turn areas into wetlands
- Prohibit dogs
- Street competitions

## DISCUSSION

There is clearly a widespread awareness of the connection of lawns to larger ecosystems and water bodies (such as Como Lake and the Mississippi River). In general, residents demonstrated very high levels of knowledge and concern about water quality in Como Lake in this study. Respondents clearly associate yard care practices with the condition of the lake, even on the streets most distant from the lake. The second-round survey did show some improvements changes in knowledge values for some of the key knowledge questions (Q6, Q7, Q8).

Residents self-report a very high level of “correct” practices, such as raking and composting leaves. 44% of respondents bag and compost grass clippings, and fully 95% bag and compost leaves either on or off-site. 72% rake the boulevard, and about half (52%) rake the curbside and storm drain. While these numbers are good, there is room for improvement, particularly in the disposal of grass clippings.

The KAP study findings suggest that a strong stewardship ethic exists in the study area, demonstrated not only by high levels of concern, but also high levels of “correct” practices. The data and our informal observations strongly show that residents are already highly aware, motivated, and for the most part, are doing the “correct” practices. When examined together, the

practices data show that respondents report doing the “correct” practices more than perhaps expected by the project team. Possible explanations could be that the respondents were guessing the “correct” answer or not being entirely truthful about their behavior, or that the survey design team wrongly assumed that “incorrect” practices are more widespread than they actually are. Do respondents accurately self-report their behaviors? We did not have the resources to employ quantitative observation methods. However, during the fall survey we noted large numbers of residents raking leaves each day and evening.

A stewardship-oriented and reward-based approach is likely to be better received by residents than messages with a more punitive, admonishing or negative connotation. In light of the findings that the majority of respondents are already reporting “correct” behaviors, it may be beneficial to highlight and build upon the underlying ethic of stewardship that appears to be present among most respondents. Concerning yard care norms, there is clearly an expressed social ethic to rake and to compost yard waste, and our field crews felt that most residents actually practice these norms (based on our informal field observations).

Concerning negative practices, only nine respondents (2.5%) report that they rake leaves directly into the street, and only one reports sweeping grass clippings into the street. This is in slight contrast with the anecdotal evidence given by respondents, who generally pointed to one individual on almost every block that consistently rakes leaves into the street, totaling about ten “offenders”. With about thirty city blocks included in this study, one would expect that about 30 respondents would report raking leaves or clippings into the street, based upon anecdotal reports. The difference might be explained by the large number of refusals, some of whom might be included in the “offender” category. Interestingly, several of the “offenders” (as identified by neighbors) repeatedly refused to take part in the survey, and one or two were quite hostile (one individual threatened to spray the CCM crew with his garden hose).

Conversely, most blocks have one or two “good Samaritans” that rake and bag the leaves of their neighbors, particularly for elderly or shut-in residents. One woman in CS2W rakes and bags nearly all of her elderly neighbors’ leaves from East Como Boulevard to Victoria, delivering them in multiple trips to the Ramsey County compost site with her mini-van. The project team might consider recognizing such individuals as watershed stewards or Como Lake stewards.

In November 2011 many respondents reported having raked four and five times during the autumn months, and leaves were still falling. We heard numerous reports that the CCWQ cleanups were not well-timed related to actual leaf fall. Different tree species drop leaves at different times. Residents reported that leaves began falling in late September, and continued to drop as the survey was being conducted in mid-November. We noted that many oaks had not begun to drop their leaves. Residents often suggested scheduling repeated rakings and bag collections, and to offer alternatives to Saturday clean-ups when many are out of town.

As the KAP study was being conducted in the spring of 2011, and as data was being analyzed over the winter of 2011-2012, researchers noted another practice with significant potential to

damage water quality in Como Lake. Excessive quantities of chloride-based de-icing chemicals were frequently observed being applied to the streets surrounding Como Lake in March-April 2011. In November and December our crews noted that there were large amounts of chemicals deposited near the storm drains in the Como Park Pavilion parking lots adjacent to the lake (see photos below). Residents also expressed concern about the quantity of de-icing chemicals and seemed aware that chemicals were being transported to Como Lake through the sewer shed.



Photo 1: Excessive application of de-icing chemicals, Pavilion parking lot.



Photo 2: Excessive application of de-icing chemicals near a storm drain that drains into Como Lake.

One small pile of chlorides swept up by the survey crew weighed eighty pounds, which was brought to SPPR to be returned to the salt pile. About one teaspoon of salt can pollute five gallons of water forever (MPCA 2006). Once dissolved it becomes invisible, is carried by stormwater into the lake, and settles on the lake bottom where it can impair all aquatic life. This is a preventable pollution problem that depends on humans changing their knowledge, attitudes and behaviors (Eckman, Fortin, Nuckles and Were 2011).



## Recommendations

The KAP study points to some complementary activities and strategies to the Como Lake CCWQ, as follows:

1. **CLNN, FWS and CRWD should reconsider the timing of CCWQ events** to reflect prolonged leaf drop during the autumn.

1. Respondents' comments and suggestions demonstrate that the District 10 Community Council and the block leaders are clearly trusted local resources. The project team should **explore ways to partner more closely with D10** to publicize clean-ups and information, and with the block leaders when organizing future clean-up related efforts. CLNN reports that D10 has been a key partner in the cleanups from the beginning and the district had made great efforts to help publicize events through their webpage and newsletters. However, CLNN notes that this is not getting noticed by some neighbors, so increasing awareness of D10's partnering role in the cleanups is needed. CLNN further reports that there was an effort to engage D10 block club leaders in the most recent cleanup, but that there was a low response. Findings ways to better engage block club leaders, therefore, is also an area for exploration.

2. The study shows that the single most valued action by respondents would be an **organized neighborhood bag pick-up**, and 37% need help with moving bags to a compost site. While the City budget may preclude this, it is worthwhile to brainstorm with D10 about how an organized bag pick-up could be organized and financially supported.

3. **Block-based composting** might be another option to explore for those blocks that have an adequate site and willing volunteers. There were many suggestions for more education and outreach about water quality in Como Lake, and some creative suggestions for publicizing water quality messages (see Table 1 above) that may be worthy of consideration by the project team.

4. The KAP values show that specific **educational messages for respondent knowledge gaps** could be developed that explain how phosphorus and nitrogen function in Como Lake. While the great majority of residents understand that stormwater flows directly into the lake, their understanding about the role of nutrients in algae growth could be elevated. Since respondents appear to have different levels of understanding of nutrient loading, a tiered message structure with simple, intermediate, and more complex messages could be considered.

5. **Complementary educational activities** might be considered to expand upon messages and provide residents with additional opportunities to become involved. For example, walking tours of the lake's storm drain system, or a workshop or tour of the lake's rain garden/buffer system might be considered. Another option might be to sponsor a Como Lake learning lab, where residents could examine algae samples, perform simple water tests, view invertebrates in a microscope, etc.

6. That so many residents are already motivated and aware of the relationship between stormwater and the condition of Como Lake presents some opportunities for the project partners. For example, *an “Adopt a Storm drain” activity could be considered*, whereby residents could sign up to maintain a storm drain on their block (many already do).

7. *Offer a stewardship award or recognition* to residents who go “above and beyond” to protect and conserve Como Lake. The study identified a number of individuals that assist shut-in neighbors, mow and shovel, and rake and bag leaves for their neighbors. These individuals could be somehow recognized and rewarded, for example, with a gift certificate to a local restaurant, shop or hardware store. A “Como Lake Steward” yard sign could be considered for those residents adopting a storm drain. These positive examples will help to demonstrate best practices.

8. One possibility would be to contact those respondents who offered the creative suggestions summarized in Table 3, and invite them to engage in a *citizen brainstorming session*. At least two of these respondents are retired advertising executives with a strong interest in environmental causes. They might be able to assist in developing education/outreach materials.

9. The condition of many of the storm drains in the study area is of concern. CRWD may want to *consider a discussion with City staff about inspecting, maintaining, repairing or replacing storm drains* in the area.

10. *Inappropriate application of de-icing chemicals by City workers needs to be addressed*, possibly by training and certification in winter maintenance practices for SPPR employees.

Finally, the findings also suggest that there is considerable scope for increasing the profiles and public awareness of CRWD, Freshwater Society and CLNN in the Como neighborhood as key “go-to” resources for improving water quality.

To summarize, the KAP study highlights a very strong, underlying sense of concern and stewardship among respondents for Como Lake, considerable “neighborly” goodwill, and strong attitudinal intent to “do the right thing.” The KAP values show very high levels of knowledge and self-reported “correct” practices for a majority of respondents. The study identified some areas where educational messages could be developed to target knowledge gaps. The study also identified a number of suggestions and ideas made by respondents to address stormwater issues in the subwatershed.

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**Annex 1: CRWD First-Round Introductory Letter**



# Capitol Region Watershed District

1410 Energy Park Dr., Suite 4 St. Paul, MN 55108

Phone: (651) 644-8888 Fax: (651) 644-8894 [www.capitolregionwd.org](http://www.capitolregionwd.org)

March 1, 2011

Dear Como Neighborhood Resident:

## Como Lake Neighborhood Survey

Week of March 14-18 - Conservation Corps of Minnesota

Week of March 21-25 - University of Minnesota students (follow-up of those missed the previous week)

The Capitol Region Watershed District, the Freshwater Society, and the Como Lake Neighbor Network have joined together in a partnership to improve and protect the water in Como Lake. The partners will be conducting a study to better understand the knowledge, needs and concerns in your community regarding water that runs off lawns, streets and roofs. As a resident, your insights are particularly important to us. We would greatly appreciate your participation in an upcoming neighborhood survey to help us understand how to support you in protecting Como Lake.

### Neighborhood door-to-door survey in March

The partners in this project are collaborating with the Conservation Corps Minnesota (CCM) and the University of Minnesota Water Resources Center to conduct a voluntary, door-to-door survey in your neighborhood. During the week of March 14-18, several two-person teams of Conservation Corps Minnesota staff will be conducting the door-to-door neighborhood survey. The week of March 21-25, students from the University of Minnesota will be in your neighborhood to survey any residents we might have missed the week before. U of M students will be supervised by a U of M faculty member.

### Survey details

The reason for two crews over two different weeks is so that we can make sure we include as many residents in our survey as possible, and incorporate your input into our study. You will be able to identify the survey teams easily by either their Conservation Corps Minnesota (CCM) caps and jackets or the U of M name badges that students and faculty supervisors will wear. The interview should take less than ten minutes and will be conducted during the afternoon and early evening hours. If you will be away during the weeks of the survey, but would like to participate, please contact us at 763-219-1252 so that we can find a time that is convenient for you.

### Survey follow-up

**Your participation in this survey is entirely voluntary.** We want to assure you that your responses will be kept entirely confidential and secure. The results will be released only as summaries, so that individual responses cannot be identified. We ask that the survey be completed by the person in your home that makes most of the lawn and yard care decisions, and is at least 18 years old.

If you have any questions about this survey, please contact Peggy Knapp at the Freshwater Society, [pknapp@freshwater.org](mailto:pknapp@freshwater.org) or 763-219-1252. Thank you in advance for your help!

Best regards,



Mark Doneux, Administrator

*"Our mission is to protect, manage, and improve the water resources of the Capitol Region Watershed District."*

## Annex 2: First-round KAP Questionnaire

1. Enumerator team:
2. Date of interview:
3. Location of household:
  - C2E (Como subwatershed 2 East)
  - C2W (Como subwatershed 2 West)
  - C6N (Como subwatershed 6 North)
  - C6S (Como subwatershed 6 South)
4. Street address of the respondent
5. First, I'd like to ask some questions about your views of the condition of Como Lake. Are you concerned about the quality of water in Como Lake? (Check only one response)
  - Very concerned
  - Somewhat concerned
  - Not at all concerned
  - Don't know
  - Other (please specify)
6. What do you think happens to the water that runs off your street and into that storm drain? (point to nearest storm drain). Does it go...(Check only one response)
  - Directly to Como Lake
  - To the Mississippi River
  - To a treatment plant
  - To a treatment plant and then it flows into Como Lake
  - Don't know
  - Other (please specify)
7. The Capitol Region Watershed District has found that Como Lake has a significant overgrowth of algae. Which of the following sources do you think are contributing to the overgrowth? (Check all that apply)
  - Leaves
  - Industrial pollution
  - Grass clippings
  - Road salt
  - Lawn fertilizer
  - Don't know
  - Other (please specify)
8. Do you think that there is a connection between people's lawn care practices and water quality in Como Lake? (Check only one response)
  - Yes
  - No
  - Don't know
  - Other (please specify)
9. Where would you go to get information about water quality in Como Lake? (Check all that apply)
  - City of Saint Paul
  - Capitol Region Watershed District
  - Ramsey County
  - Minnesota Pollution Control Agency
  - University of Minnesota Extension educators and researchers
  - Como Lake Neighbor Network
  - Nonprofits (if so, name one)
  - I don't seek information

- Don't know
  - Other (please specify)
10. We have a few questions about your yard and boulevard. Here is a photo that shows a typical yard and boulevard. Who does most of your yard work? (Check all that apply).
- You or another household member
  - A relative or friend
  - A neighbor
  - A lawn care service
  - Other (please specify)
11. How often is your yard maintained? (Check only one response)
- Daily
  - Weekly
  - Every two weeks
  - Monthly
  - Never
  - Other (please specify)
12. I'm going to read some common yard care practices. Please tell me which of the following are a part of your normal routine. (Check all that apply)
- Fertilize the lawn
  - Rake the boulevard
  - Rake the curbside and gutter
  - Mow the yard
  - Rake leaves into the street
  - Clean the leaves from the nearest storm drain
  - None of the above
  - Other (please specify)
13. When you mow your lawn, what happens to the grass clippings?
- Bag and compost them
  - Leave the clippings on the lawn
  - Sweep the clippings off the sidewalk and curbs and onto the lawn
  - Sweep or blow the clippings into the street
  - Don't know
  - Other (please specify)
14. What do you do with yard waste? (Check all that apply)
- Mow and mulch
  - Compost on-site
  - Compost off-site
  - Commercial bag pick-up
  - I don't do anything with yard waste
  - Other (please specify)
15. Looking again at our photo...whose responsibility do you think it is to clean up leaves and grass clippings from boulevards? (Check only one response)
- The City
  - Your responsibility
  - Both you and the City
  - Don't know
  - Other (please specify)
16. On this photo you can also see a typical curbside and storm drain. Whose responsibility do you think it is to clean up leaves and grass clippings from curbsides and storm drains? (Check only one response)

- The City
- Your responsibility
- Both you and the City
- Don't know
- Other (please specify)

17. There are naturally occurring nutrients in leaves and grass clippings that contribute to algae growth. Can you name any of these nutrients? (Check all that apply)

- Phosphorus
- Nitrogen
- Don't know
- Other (please specify)

After the respondent answers, read the following text:

When leaves and grass clippings decompose, nutrients like phosphorus stored in the leaves are released. This decomposed material is carried by stormwater into storm drains, which empty directly into Como Lake. Those nutrients fertilize the algae in the lake.

18. I've mentioned that leaves and grass clippings act like fertilizer in the lake. What other effects do you think there could be on Como Lake? Here's some options, tell me yes or no (Check all that apply):

- Limits recreation
- Looks and smells bad
- Promotes invasive species
- Affects fish and aquatic life
- Promotes harmful bacteria, molds and fungi (if asked, mention Cyanobacteria, Stachybotrys or black mold, and Blastomycosis)
- No effect
- Don't know
- Other (please specify)

19. Which of the following actions do you think might help improve water quality in Como Lake? (Check all that apply)

- Neighbors working together to clear leaves from boulevards, curbs and storm drains
- My taking part in a neighborhood effort
- Adding chlorine to the lake
- Cleaning up my own boulevard, curb and storm drains
- My lawn care service could clean the boulevard, curb and storm drains
- I don't know
- Other (please specify)

20. Which of the following do you feel are barriers to collecting leaves and grass clippings in your boulevard, curbside and storm drain? (Check all that apply)

- No truck or vehicle to move bags
- No City curbside pick-up
- My physical ability limits me
- I don't have the time
- It's not my responsibility
- Not a priority
- I don't clean up my leaves
- I don't have any barriers
- Don't know
- Other (please specify)

21. Which of the following options would make it more likely for you to rake and bag leaves from the boulevard, curbside and storm drain? (Check all that apply)



- Help with moving bags of leaves to a compost site
- An organized neighborhood effort
- An organized City bag pickup
- A home compost bin
- I already compost or mulch my leaves
- It's not my responsibility
- Don't know
- Other (please specify)

22. This question is for subwatershed 2 residents only:

Have you previously participated in a Como lake Curbside Cleanup? (Check only one response)

- Yes
- No
- Didn't know about it
- Other (please specify)

### **Annex 3: Second-Round Letter to Respondents**



1410 Energy Park Dr., Suite 4 St. Paul, MN 55108  
Phone: (651) 644-8888 Fax: (651) 644-8894 www.capitolregionwd.org

November 7, 2011

Dear Como Neighborhood Resident:

**Como Lake Autumn Neighborhood Survey**  
Nov. 14-28 – Conservation Corps of Minnesota conduct survey  
Nov. 21-25 – U of M team conduct follow-up survey from previous week  
Nov. 26-27 – Questionnaires delivered to your home in case we missed you.

Capitol Region Watershed District, the Freshwater Society, and Como Lake Neighbor Network are partnering to improve and protect Como Lake. Last March, partners conducted a study to better understand the knowledge, needs and concerns in your community regarding water that runs off lawns, streets and roofs. This fall, the partners will conduct a follow-up study to learn how practices, needs and concerns in the community might have changed as the seasons changed. As a resident, your insights are particularly important to us. We greatly appreciate your participation in the upcoming neighborhood survey to help us understand how to continue to support you in protecting Como Lake.

Neighborhood door-to-door survey in November

The partners in this project are collaborating with the Conservation Corps Minnesota (CCM) and the University of Minnesota Water Resources Center to conduct a voluntary, door-to-door survey in your neighborhood. During the week of November 14-18, several two-person teams of Conservation Corps Minnesota staff will be conducting the door-to-door neighborhood survey. The week of November 21-25, University of Minnesota faculty will be in your neighborhood to survey any residents we might have missed the week before. If we happen to miss you, we will leave a blank questionnaire and stamped envelope for you to fill out and return.

Survey details

The reason for two surveys in two different seasons is so that we can understand and compare residents' lawn care practices over time, and document your needs and concerns as the seasons change. You will be able to identify the survey teams easily by either their Conservation Corps Minnesota (CCM) caps and jackets or the U of M name badges that faculty will wear. The interview should take less than ten minutes and will be conducted during the afternoon and early evening hours. If you will be away during the weeks of the survey, but would like to participate, please contact us at 763-219-1252 so that we can find a time that is convenient for you.

Survey follow-up

**Your participation in this survey is entirely voluntary.** We want to assure you that your responses will be kept entirely confidential and secure. The results will be released only as summaries, so that individual responses cannot be identified. We ask that the survey be completed by the person in your home that makes most of the lawn and yard care decisions, and is at least 18 years old. If you have any questions about this survey, please contact Peggy Knapp at the Freshwater Society, [pknapp@freshwater.org](mailto:pknapp@freshwater.org) or 763-219-1252. Thank you in advance for your help!

Best regards,

Mark Doneux  
Administrator  
Capitol Region Watershed District

*"Our mission is to protect, manage, and improve the water resources of the Capitol Region Watershed District."*

**Annex 4: Second-Round Questionnaire**

1. Enumerator team:
2. Date of interview:
3. Location of household:
  - C2E (Como subwatershed 2 East)
  - C2W (Como subwatershed 2 West)
  - C6N (Como subwatershed 6 North)
  - C6S (Como subwatershed 6 South)
4. Street address of the respondent
5. Did you participate in the survey last April? (Check only one response)
6. First, I'd like to ask some questions about your views of the condition of Como Lake. Are you concerned about the quality of water in Como Lake? (Check only one response)
  - Very concerned
  - Somewhat concerned
  - Not at all concerned
  - Don't know
  - Other (please specify)
7. Are you more concerned or less concerned today about Como Lake than you were six months ago? (Check only one response)
8. Why are you more concerned than before?
9. Why are you less concerned than before?
10. What do you think happens to the water that runs off your street and into the nearest storm drain?. Does it go...(Check only one response)
  - Directly to Como Lake
  - To the Mississippi River
  - To a treatment plant
  - To a treatment plant and then it flows into Como Lake
  - Don't know
  - Other (please specify)
11. The Capitol Region Watershed District has found that Como Lake has a significant overgrowth of algae. Which of the following sources do you think are contributing to the overgrowth? (Check all that apply)
  - Leaves
  - Industrial pollution
  - Grass clippings
  - Road salt
  - Lawn fertilizer
  - Don't know
  - Other (please specify)
12. Do you think that there is a connection between people's lawn care practices and water quality in Como Lake? (Check only one response)
  - Yes
  - No
  - Don't know
  - Other (please specify)
13. Where would you go to get information about water quality in Como Lake? (Check all that apply)
  - City of Saint Paul
  - Capitol Region Watershed District
  - Ramsey County
  - Minnesota Pollution Control Agency

- University of Minnesota Extension educators and researchers
  - Como Lake Neighbor Network
  - Nonprofits (if so, name one)
  - I don't seek information
  - Don't know
  - Other (please specify)
14. Who does most of your yard work? (Check all that apply).
- You or another household member
  - A relative or friend
  - A neighbor
  - A lawn care service
  - Other (please specify)
15. How often is your yard maintained? (Check only one response)
- Daily
  - Weekly
  - Every two weeks
  - Monthly
  - Never
  - Other (please specify)
16. I'm going to read some common yard care practices. Please tell me which of the following are a part of your normal routine. (Check all that apply)
- Fertilize the lawn
  - Rake the boulevard
  - Rake the curbside and gutter
  - Mow the yard
  - Rake leaves into the street
  - Clean the leaves from the nearest storm drain
  - None of the above
  - Other (please specify)
17. When you mow your lawn, what happens to the grass clippings?
- Bag and compost them
  - Leave the clippings on the lawn
  - Sweep the clippings off the sidewalk and curbs and onto the lawn
  - Sweep or blow the clippings into the street
  - Don't know
  - Other (please specify)
18. What do you do with yard waste such as leaves? (Check all that apply)
- Mow and mulch
  - Compost on-site
  - Compost off-site
  - Commercial bag pick-up
  - I don't do anything with yard waste
  - Other (please specify)
19. (Reference to photo of boulevard, curb and storm drain)...whose responsibility do you think it is to clean up leaves and grass clippings from boulevards? (Check only one response)
- The City
  - Your responsibility
  - Both you and the City
  - Don't know
  - Other (please specify)

20. Looking again at our photo, whose responsibility do you think it is to clean up leaves and grass clippings from curbsides and storm drains? (Check only one response)

- The City
- Your responsibility
- Both you and the City
- Don't know
- Other (please specify)

21. There are naturally occurring nutrients in leaves and grass clippings that contribute to algae growth. Can you name any of these nutrients? (Check all that apply)

- Phosphorus
- Nitrogen
- Don't know
- Other (please specify)

After the respondent answers, read the following text:

When leaves and grass clippings decompose, nutrients like phosphorus stored in the leaves are released. This decomposed material is carried by stormwater into storm drains, which empty directly into Como Lake. Those nutrients fertilize the algae in the lake.

22. Which of the following do you feel are barriers to collecting leaves and grass clippings in your boulevard, curbside and storm drain? (Check all that apply)

- No truck or vehicle to move bags
- No City curbside pick-up
- My physical ability limits me
- I don't have the time
- It's not my responsibility
- Not a priority
- I don't clean up my leaves
- I don't have any barriers
- Don't know
- Other (please specify)

23. Which of the following options would make it more likely for you to rake and bag leaves from the boulevard, curbside and storm drain? (Check all that apply)

- Help with moving bags of leaves to a compost site
- An organized neighborhood effort
- An organized City bag pickup
- A home compost bin
- I already compost or mulch my leaves
- It's not my responsibility
- Don't know
- Other (please specify)

24. Can you suggest any other ideas for the watershed district to help people clean up leaves and grass clippings?

25. Do you think that having an organized curb cleaning effort among neighbors would make it more likely for you to clean debris from your curb? (Check only one response).

26. This question is for subwatershed 2 residents only:

Have you previously participated in a Como lake Curbside Cleanup? (Check only one response)

- Yes
- No
- Didn't know about it
- Other (please specify)

27. Why did you decide to participate?

28. Do you plan to participate in future organized curb cleaning events in the future?
- Yes
  - No
  - Don't know
  - Maybe- would like to know more about it