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RESEARCH RESULTS
1993 REPORT

U.S. ENVIRONMENTAL PROTECTION AGENCY
LAKE GUARDIAN PROGRAM

Prepared For
U.S. ENVIRONMENTAL AGENCY
by
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I INTRODUCTION

A. General Background

The research ship, Lake Guardian, has attracted increasing interest since the inception, in 1991, of the Lake Guardian cities tour. The public information office of the U.S. Environmental Protection Agency (EPA), has developed outreach programs to allow publics access to the ship and scientists, and to give the publics information and educational materials explaining the mission of the Lake Guardian, the scientists' work aboard the Lake Guardian, and the results of that work.

Targeted publics are the general public, and specifically teachers and students in public schools. Using a variety of communication methods, the public information office reached these publics to alert them to visits by the Lake Guardian and the availability of the ship at specific ports for tours by educators and their students and by the general public. Communication tools include: special educational materials developed for school use at various educational levels and programs; public media information using local newspapers, radio and television; informational materials for persons touring the Lake Guardian.

As the program of public information gained momentum, the U.S. EPA public information office recognized that as a public agency it was important to evaluate the program to determine the type and extent of impact upon the public. A research program was designed by Health Education Research, Inc. to determine whether, and how, the publics:

- Understand the EPA's Great Lakes conservation program
- Appreciate the Lake Guardian mission and the work of the scientists
- Learn from their experience with the Lake Guardian program
- Are satisfied with Lake Guardian outreach materials and tours.

The research was also designed to determine how public information and educational programs reached the publics and how programs can be improved.

B. 1992 -- The Test Phase

During the 1992 visits of the Lake Guardian to various Great Lakes port cities, a log book was kept with the adult visitors' names and phone numbers. All log book entries were voluntary on the part of the general public and educator visitors. For the 1992 test survey, 100 log book names were selected from a port visited in each of the Great Lakes. A random sample of 100 members of the general public was drawn to match each of the sites visited by the log book visitors.

A telephone survey to both the log book and random sample visitors was conducted in late November and December of 1992. The shipboard visits, however, had taken place during the summer and early fall months; a time hiatus that did not take place for the subsequent, 1993 survey.

Thirty-eight teachers' names were available from the log books. Teachers came from the U.S. and Canada, with their students, to tour the Lake Guardian. a mail survey was designed and conducted for the educators and their students. As with the telephone survey, there was a long time lag between the initial visit to the Lake Guardian and the actual survey; a time hiatus that did not take place for the 1993 survey.

Appropriate clearances from OMB to conduct the survey in the public interest were obtained; proper wording for OMB notification to the public on the educators' survey was included on the forms. Information was obtained from the U.S. EPA staff to be sure that the questions were relevant for the outcomes expected; that the concepts and technical information were correct.

C. Test Phase Results

A detailed report of the test phase results was developed in January, 1993 for the U.S. EPA. There were many findings that were put into immediate use to improve programs, such as the educators' and student materials and methods of contacting educators and providing them with the survey materials. However, the test phase was conducted principally to determine whether the survey methodology and instruments developed for the publics were useful and how these should be refined for the 1993 survey.

D. Comparability: The 1993 Survey As a Baseline

Throughout this report of the 1993 survey, reference will be made to the findings of the 1992 survey. There will be comparisons drawn between the two surveys' findings even though these two surveys are not comparable: The 1992 survey was a limited test; the 1993 survey was a full scale research effort with greatly increased data bases.

Although it was interesting to use the comparability factor for this report, it is important for the U.S. EPA to recognize that now, with the 1993 survey, there is a baseline document from which future surveys can be developed to test various aspects of the program:

- To see where there are improvements needed
- To determine the publics' attitudes and knowledge of the Great Lakes programs and issues pertinent to water quality
- To understand and act upon the needs and wants of the educators and student publics, and the general public.

II TELEPHONE SURVEY: 1993 Results

A. HIGHLIGHTS and KEY FINDINGS

1. Who are the publics of the U.S. EPA Great Lakes programs?

There are distinctively different publics for Great Lakes environmental programs:

THE LAKE GUARDIAN VISITOR PUBLIC: General Profile

One public is profiled by the persons who visited the Lake Guardian research ship. This is a self-selected group of persons who upon understanding public information communications from the U.S. EPA, were energized sufficiently to find the ship, tour it, and understand the messages given aboard ship. The Lake Guardian visitors are significantly younger than the general public; their median age is 38. These younger persons are more concerned with and perceive more environmental problems. The Lake Guardian visitors come from all sizes of community; they have significantly larger households, with a mean of 3.1; and there is a mean of 3.1 children under the age of 18 in almost half the households. The greatest number of four-person households are in large cities.

Lake Guardian visitors are twice as likely as the randomly called respondents, to indicate membership in an environmental organization, and they are most likely to belong to local activist groups. The logic and findings here are that the more problems perceived in the environment, the larger the proportion of persons who belong to an environmental organization. Lake Guardian visitors are more likely to have some college, to have completed college, or have some graduate education, than the general public.

Since the Lake Guardian visitors are young, they are not retired, but actively working and they are likely to be professionals: scientists, engineers, etc. Just a little over half the log book entries for Lake Guardian visitors were male. It is noteworthy that males are more likely to state that they see environmental problems than are females.

THE GENERAL PUBLIC: Random Respondent Profile

In general, the public represented by the random respondents is less tuned in to environmental problems, less aware of what problems there might be, and less likely to take action to become informed. These are the people who stayed home. Even though some of them received the EPA public information messages in their local newspapers or on radio or TV, they did not actually do

something about it. From whatever medium random respondents heard of the Lake Guardian, they did not come aboard to tour. But there is currently no way to know how many random respondents "tuned out" EPA messages for some reason.

The public group matched by community to the log book group, are older, with a median age of 43. They are mostly two person households; the mean for those called randomly is 2.9 persons per household. And two person families in this survey primarily were found in smaller communities. The random respondents are less likely to have children under the age of 18; the mean is 2.1 children per household. Most of the random respondents did not know whether anyone in their household belongs to an environmental organization, and of those who did know, only about half as many as the Lake Guardian visitors were said to belong to local, activist groups. The educational level of the random respondents is lower in general than for persons who signed the log book. The random respondents mostly stopped at high school, whereas few Lake Guardian visitors did so. But there are college graduates among this group.

There was a high (22%) percentage of retirees in the random respondent ranks. Homemaker was a greater response in the random respondent group to the question of their profession/occupation. Homemakers and retirees are the largest groups who see no problems with their lake's water quality. Part of the answer to the response of "homemaker" and the greater number of females in the random respondent group, is that women are generally the ones in the household who answer the phone and are willing to answer questions.

2. Do the publics "own" and use a Great Lake?

Lake Guardian visitors name a lake as "their own" more often than do those called randomly. It is the lake they live closest to, or the one they grew up near, that causes them to select it. People who live in small and medium sized communities view the lake closest to them as "theirs", far more often than do big city respondents.

That the Lake Guardian visitor group are younger and more active is seen in their activities at "their" lake, which more often than for the random group includes fishing, jogging, walking, swimming. Almost one-quarter of the random respondents said they never go to the lake at all. An even larger group, mostly the random respondents, one-third, don't go to the lake, and also don't see any problems with lake water quality.

The shoreline is the favorite place to go to spend time at the lake. More beach activities are reported from large city residents; more swimming and fishing reported from smaller communities.

That much remains to be found out about why the publics feel as they do about the lakes and their activities there, can be seen in just one small puzzle: about half of all respondents who consider it a major problem that lake fish are unsafe to eat, are as likely to say they go fishing as are people who don't consider it a problem. Fishing may be simply an activity not engaged in for the food; or the connections between unsafe fish and water quality and safe eating habits have just not been communicated and/or understood.

3. What do the publics think about Great Lakes water quality?

Lake Guardian visitors rate water quality in their lake higher than do those called randomly. Lake Guardian visitors are also more aware of lake water problems, yet they believe water quality is improving.. The random respondents may not know exactly what the problems are, but they tend to rate water quality lower, and they tend to believe water quality is getting worse.

Lake Superior gets the highest rating for good water quality from everyone; and even though Lake Michigan was not officially part of the 1993 survey, there were respondents who said they "owned" it and rate its water quality and beauty very highly. Lake Guardian visitors rank Lakes Erie, Huron and Ontario fair. Lake Erie gets high marks from Lake Guardian visitors who believe the water quality is improving; whereas they tend to think Lake Huron water quality is worsening. The general public does not have a good picture of the improvements in lake water quality; they only rate Lake Erie as showing improvements; the others are seen as worsening.

4. What do the publics think are the Great Lakes water quality problems?

It appears that the less specifics the publics know about what might pollute lake water, the more they are likely to think the lakes generally contaminated. The majority of respondents, both Lake Guardian visitor and random, simply name "contaminants" unspecifically as the greatest problem. Lake Guardian visitors give more specifics, such as zebra mussels, industrial wastes and ship traffic as pollution factors. Lake Guardian visitors were much more likely to see major problems--acid rain, chemical run-off, etc., than were random respondents. There are differences in how the publics view lake water quality problems, by lake, and there are differences by size of community.

These differences are discussed in detail under question 10. In general, chemicals washing into the lakes are great worries for persons from Lake Erie and Lake Huron; acid rain and pollution in sediments are the major problems seen in Lakes Ontario and Superior. There are differences in how persons residing in small, medium and large communities view lake water quality problems. For just one example: Small community respondents from both groups see fewer major problems in all but one--zebra mussels--of the ten potential problems in the lakes asked about during the survey. But there are many distinctive differences discussed in question 10.

5. How do the publics view their own and governmental responsibility for lake water quality?

There is a connection between going to the lake for activities and a feeling of responsibility to do something about lake water quality, and belonging to an environmental group. There is also a strong relationship between persons who perceive that there is something that they can do to help lake water quality and those who are aware of major problems either real or potential. Not surprisingly, the group willing to take responsibility for improving lake water quality are the Lake Guardian visitors, who generally are more active in using the lake facilities and who, when they think there is something positive to be done, in addition to proper waste disposal and increasing public awareness, will take actions such as recycling, beach clean-ups, writing to their congressmen, and joining environmental groups.

The Lake Guardian visitors are far more aware of the U.S. EPA than are random respondents. More than one-third of Lake Guardian visitors volunteered the information that monitoring water quality is what the U.S. EPA does. There are many differences between the Lake Guardian visitors and the general public in terms of how many problems they perceive and the size of community in which they live, correlated to their perception of what government agency is responsible for monitoring lake water quality. These are discussed in question 9. The U.S. EPA has the highest percentage of respondents from Lakes Erie and Ontario who believe that it is the responsible agency; the U.S. Federal Government is named by respondents from Lake Superior; and the DNR has a high percentage of respondents from Lake Huron who believe that agency is responsible for water quality.

Rule enforcement, restricting industry and chemicals, fining polluters and providing more education, are what the government agencies can do in the perceptions of both Lake Guardian and random respondents. Respondents who

believe that there are four or more major lake water quality problems are the persons, principally Lake Guardian visitors, who believe most strongly that they personally can do something to improve matters, and that government should take action to improve water quality. Almost no respondents were inclined to have current effort levels continue or to have fewer restrictions or enforcement; it was only persons who see no major problems with lake water quality who feel they personally and the government have no role to play.

6. The Lake Guardian Tour

Visitors to the Lake Guardian principally read about it in a local newspaper or saw it in the area and were drawn to it. Of the random respondents, it was principally persons from small communities who had read about the Lake Guardian in a local newspaper, who said they heard about the ship, but they had not come to tour.

The ship itself is still the major attraction, but interest in conservation and the environment, and taking children to the ship as an educational experience are also major reasons for touring the Lake Guardian. More than half the Lake Guardian visitors had other family members who also toured the ship.

What visitors to the Lake Guardian liked most was the labs and their equipment; next was the scientists and the work they are doing; the captain and crew also rank highly with visitors. There is a very high preference for scientific, experimental information as part of the tour.

The high recall of the elements of the tour and the unusually low "don't know" response indicates the excellence of the impression made on visitors. What they recall most are: measurement of water pollution, conducting experiments, measuring pollution in sediments, and operating as a non-polluting ship.

The tour of Lake Guardian is a positive experience for visitors. They came away with their questions answered, with brochures and fact sheets that were helpful, and no dislikes, except for a few who would have liked more time and more information.

Week-end afternoons were the most popular times to be aboard Lake Guardian.

7. The Role of the U.S. EPA

Visitors to the Lake Guardian were given the clear message that the U.S.

EPA owns and operates the Lake Guardian. There was an important increase in the percentage who remembered ownership; and a decrease in the "don't know" category.

That the U.S. EPA has a mandate to emphasize environmental work with the Great Lakes can be seen from the responses of the visitors to the Lake Guardian. More than half believe that the U.S. EPA is putting about the right amount of emphasis on Great Lakes environmental activities; but in addition, a high percentage also said U.S. EPA is now doing too little. The random respondents were surprisingly high in their responses to the question of what the U.S. EPA role should be: They were even higher in saying the U.S. EPA is now putting too little emphasis on Great Lakes environmental activities, but a good percentage think it's currently about right.

Only the respondents who think there are no lake water quality problems think the U.S. EPA is putting too much emphasis on environmental activities. As the perception of lake water quality problems increases, there is a dramatic increase in the percentage of respondents who wish the EPA would do more, and a dramatic decrease in the numbers who think there is too much emphasis on lake water quality activities.

The size of the community in which the Lake Guardian visitors live does not affect the response: They are significantly higher than random respondents in believing the emphasis is about right by the U.S. EPA in terms of Great Lakes environmental activities.

8. Differences by Great Lake

In the 1993 survey, significant differences in awareness and perceptions of lake water quality and many other questions show up, depending upon which of the Great Lakes the respondent chose as "theirs" or the nearest lake. Each of these differences is discussed in detail in the question summaries. In general, the responses show that Lake Erie residents tend to see their lake water quality improving, Ontario and Superior residents are also fairly positive about improvements in lake water quality, but Lake Huron residents are far less sure about it. Lake Superior residents are most inclined to think that current water quality is excellent or good; Lake Michigan respondents also rate water quality high. But residents near Lakes Huron, Erie and Ontario overall rate their lake water quality as fair or poor. However, Lake Guardian visitors are far more positive about the high level of lake water quality, regardless of what lake they come from. And they are also far more inclined to think their

lake is improving generally, rather than staying the same or getting worse.

Residents from small and medium sized communities view the lake closest to them as "their" lake far more often than residents of large cities. Respondents also "own" a Great Lake because they grew up there.

Lake Huron outdoes the others in terms of the percentage who swim, or fish; Lake Superior residents are highest on boating activities and walking or jogging at the beach All the lakes get a variety of activities, with Superior, Huron and Michigan highest for shoreline or beach activities; Erie and Ontario much higher on boating or deep-water activities.

Residents near Lakes Erie and Ontario are most inclined to think the U.S. EPA is responsible for monitoring the water quality of their lake; Lake Superior residents are highest in believing it's the U.S. Federal Government ; Lake Huron residents were most likely to think it was the Department of Natural Resources.

B. Recommendations

The following recommendations focus on the publics and research and what may be done to generate awareness and actions:

•Use the 1993 survey as a baseline from which to repeat this study to determine changes or movements in public perceptions of problems and issues important to the Great Lakes environmental program.

•Lake Guardian is clearly a fine public service program. It attracts a public group that can be counted on to support U.S. EPA programs and to understand them. These, the visitors to the Lake Guardian, are a key public of the U.S. EPA.

A program of communications to all log book persons is recommended. They could receive a newsletter, or up-dates on the Lake Guardian and on the issues revolving around water quality. They can be used as a test public for many issues and new programs.

From the log book lists, EPA can and should derive further data from focus groups, and mini-surveys. These are also key persons to provide input to EPA. Therefore, any communications directed to them should include a return postal-reply card, pre-paid, to allow for comments, suggestions, inquiries. The reply cards can be coded so that anonymous responses can still be followed as to city/state; the cards can contain questions of the yes/no variety for quick answers.

EPA needs more in-depth understanding of how their principal public feels about issues and what their level of awareness is. Focus groups can be planned, using the demographic outlines of the Lake Guardian visitor public from which to structure such research.

•The general public represented in this study by random respondents are a critical mass that must be seen in finer detail in terms of their demographic profiles, and how they respond to issues and communications important for Great Lakes water quality and for U.S.EPA programs generally. If they are avoiding listening to or understanding communications about environmental issues, finding and focusing on the groups that are most likely to become more aware should be a priority for public information programs. For example, environmental "clubs" need not be reserved as a good idea only for student groups; possibly retirees, homemakers, small community residents, could be interested in such projects and thereby become more aware of messages from the U.S. EPA. Literature and television programs as well as public service programs are all potential methods of communicating with the public. But what is important is to find out which groups--by age, profession, economic status, etc--are most likely to listen positively rather than negatively. These persons, like the visitors to Lake Guardian, are most likely to absorb information, retain it, and feel positive about receiving it.

•Much of what has been found out about the publics' perception of water quality and problems in the Great Lakes can be dealt with in the public information program. Residents of each of the Great Lakes can be profiled in terms of this report and further research. Such research, for example, as how the residents who do not live close to a lake understand environmental problems, and what they are willing to do about water quality issues.

•For special programs, such as restricting chemical run-off from industry or farms, the Lake Guardian visitor type of individual and other similar groups are most likely to understand and support special programs, and they should be the focus of public information programs.

•The publics want more information about conservation and the environment. Scientifically oriented articles and information should be prepared for widespread public distribution.

•EPA can do something for the groups wanting more detail. By changing the hours or by alerting the public that scientists and/or the ship captain will be available in the non-crowded hours and days (Mon-Fri--a.m. and p.m.) they may be able to draw attention of persons currently not satisfied with the shipboard tour.

•If Lake Guardian continues to visit ports where the public can be invited aboard, there are many techniques the public information program

may be able to use to draw the attention of persons not now self-motivating enough to come to the ship.

•Broaden the base of public media coverage, but at the same time continue to use local newspapers and television to send messages important to environmental programs. Sending messages to the public requires not just use of public media, but development of special media, such as newsletters, pamphlets, books, science stories. It may be possible to commission writers, or hold a contest for science writers, or university research persons who can contribute to the information flow on issues important to the U.S. EPA and for the environment.

•Revise the current video about Lake Guardian to make it more appealing and appropriate for all age groups. To do this, it is recommended that animation be used, together with the personality found most likable by all publics, the Lake Guardian's Captain. The Walt Disney studios might be interested in such a project as a public service. Short, modern videos on a variety of environmental subjects could be produced for showings on TV and cable, in schools and special group showings.

C.. TELEPHONE SURVEY: METHODOLOGY - 1993

•Surveys were completed with visitors who signed the log book of the Lake Guardian, as follows:

Sault St. Marie	15
Alpena	69
Detroit	65
Buffalo	37
Oswego	41
Duluth	84
Erie	78
Cleveland	60
Total	449

•Surveys were completed from random-digit dial samples, as follows:

Sault St. Marie	100

Alpena	100
Detroit	100
Buffalo	100
Oswego	32
Erie	51
Total	483

(See Port Location table, Survey Tables, Log Book vs. Random, Results by Lake)

The general tables showing findings of the survey have the Lake Guardian visitor (log book) and random respondent replies categorized in total, and by the four lakes: Erie, Huron, Ontario, and Superior, included in the 1993 survey.

•Statistical comparisons were made as follows:

•1992 Test versus 1993 Survey (1992 vs. 1993)
•1993 Survey Random sample versus Log Book sample (Random vs. Log)
•Significance testing was done on all statistical comparisons to determine:

NS	No significant differences
*	Significant differences at the .05 level = *significant*
**	Significant differences at the .01 level = *highly significant*
***	Significant differences at the .001 level = *very highly significant*

In reporting findings, each question will show, by the number of asterisks, at what level of significance, if any, there are differences.

•For the 1993 survey, a number of statistical tests were undertaken that were not possible to do for the 1992 survey results. These include:

Special Tables "a"--Perceptions of the intensity with which people regard problems as major (question 10), to determine whether there are differences in how people feel about lake problems and how that may

affect the outcome of the data.

Special Tables "b"--Deriving data on the differences between persons from small, medium and large communities. This test was done to determine whether residence, by size of the community, affected the outcome of the data. The three categories of community that were used are based on the actual community sizes from which the Lake Guardian and the random respondents were surveyed. The population of these communities: 1)small--under 50,000 ; 2)medium--50,000 to 100,000; and 3)large--300,000 or more. There were no communities with a population between 100,000 and 300,000. All of the large communities are from Lake Erie.

Special Table "c"--Differences, by lake chosen as "my lake" to see whether ownership of Lake Erie, Huron, Ontario and Superior affect the outcome of data in questions relating to environmental issues.

Special Tables "d" -- Differences by both "my lake" and "nearest lake" to determine how the perception of ownership and closeness affects the data in specific questions; this set of tables includes all five Great Lakes.

D. SURVEY FINDINGS: Final Results by Question

NOTE: Instructions to the telephone survey personnel are included with the questions so that it is easy to see whether the questions have prompted a free response, or have been part of a structured format.

The visitors to the Lake Guardian are referred to as such in the explanations of each question, or as "log book" respondents. The control group are referred to as random respondents or randomly called members of the public..

Question 1: Do you consider one of the Great Lakes to be your Lake? (IF YES) Which one?

The question of possible feelings of "ownership" in a Great Lake, and the possibility of the visit of the Lake Guardian enhancing such "ownership" feelings, prompted question 1.

Visitors to Lake Guardian named a lake as "their own" more (86.2%) than those chosen at random (79.7%)

There is a statistically significant (*) difference between persons who had visited the Lake Guardian and those called at random for both the 1992 and 1993 surveys.

In the test results the random respondents said either "no" or "don't know" 26% when asked if they consider one of the Great Lakes to be "their" lake; whereas in the 1993 results, 20% responded either "no" or "don't know". Lake Guardian respondents in the 1992 results said "no" only 10%, but in the 1993 results, 14% said no or don't know.
When looked at by choice of lake, the Lake Guardian visitors from Lake Erie are highest in saying "no" or "don't know" which is their lake (17.1%) and are lowest (69.2%) on claiming Erie is "theirs" (***).

A factor that changed the responses to the final survey results is the large proportion of persons from the log book living in the Lake Erie region. This factor in the 1993 survey shows up in the questions directly relating to where the individual lives in relation to a specific Great Lake. In both the random and log book responses, 37% of respondents are in the Lake Erie area; only 21% of the log book and 15% of the random calls elicited Lake Superior as "home" lake; 16% Lake Huron; and much smaller responses from Lake Ontario.

Lake Guardian did not visit Lake Michigan ports during the 1993 tour; therefore, Lake Michigan responses were not intended for either the Lake Guardian visitors or the random respondents. Nevertheless, there are Lake Michigan responses. To account for this unexpected outcome and to look at other outcomes of the data in terms of the individual lakes, a series of special tables were developed (tables d). looking at all of the Great Lakes in terms of two questions in the survey--Q. 1--which Great Lake is "your" lake? and Q. 3 --which Great Lake do you live nearest to?

To see what happened statistically in terms of Lake Michigan and the other Lakes, by analyzing the results of Tables d, it is important to know how the survey data were derived. Q.1 asked which is "your" lake; then Q. 2 asked why do you feel it is your lake? Among the answers to Q. 2 was one often given, with no prompting, "because it is closest to us". When this answer was given, the surveyor by-passed Q. 3, which lake is "nearest", and went directly Q. 4., what activities do you and your family do at "your" lake, actually naming "their" lake as given in Q. 1, from this question onwards.

Table 1-d looks at the results of both questions: --1 "your" lake and 3 "nearest" lake. Looking at these two questions together shows that there are respondents for each lake, who name lakes other than "their own" as being "nearest" to them. Lake Superior respondents chose Huron, Erie, and Michigan as nearest (2%); Lake Huron respondents chose Superior, Michigan, and Erie (6.9%); Lake Michigan respondents thought they lived nearest to Superior, or Erie (7.3%); Lake Erie respondents thought Lake Michigan was nearest (3.5%) but also chose Huron, Superior, and Ontario (3%). Lake Ontario respondents thought they were nearest to Erie or Superior (3.7%).

Lake Michigan: It can be seen in table 1-d that 49 persons said Lake Michigan is "their" lake. In Table 1 the data show that almost 74% of these 49 persons are from the random respondents; the other 26% are from the Lake Guardian visitors. In Table 1-d it is possible to see that in question 3, only 41 respondents said Lake Michigan was "nearest". The reason is that in Q. 2, there were 22 respondents who volunteered that Lake Michigan was "their" lake because it was "nearest". Another 19 persons, when asked in question 3 which lake is "nearest", answered Lake Michigan. For question 4 and thereafter, the total used for Lake Michigan is 62 respondents (6.66% of all respondents) which includes the original 49 who said it was "their" lake plus the 19 who named it as their nearest. The "mystery" of obtaining responses regarding Lake Michigan in the 1993 survey, even though the ship did not visit ports in that lake, appears to be related to a variety of perceptions of ownership and nearness to one of the Great Lakes. Some of these issues are explained in the next question.

Question 1 was the lead-in to the following questions about knowledge of EPA environmental work with water and the Great Lakes generally.

Question 2. Why do you feel that Lake_____is your Lake? (DO NOT READ) (MARK ALL RESPONSES)

As in the test results, the Great Lake closest to the respondents was clearly their choice of "ownership" in a Lake (87%). Both the persons who had visited the Lake Guardian and those called at random state that it is the lake closest to where they live, or grew up, that causes them to select it. The numbers of persons selecting the 25 other reasons are too small to make a significant impact on results, however, it does appear that beauty and the use of the lake and facilities such as the beach, boating, swimming and fishing make up most of the remaining 10%. Multiple responses were generally given by the respondents.

The residents of larger cities, primarily on Lake Erie for the 1993 survey, were less likely to say they "own" a lake; instead they responded principally with lists of recreational activities. There is a statistically significant difference (*) for both the random respondents and those who visited Lake Guardian in terms of their perception of "ownership" in a lake -- persons who come from small and medium communities view the lake closest to where they live as "their" lake, far more often than residents of large cities. (See table 2b)

Table 2-d shows in detail for each of the Great Lakes, the feelings respondents expressed as to why they chose "their" lake specifically. It is interesting to note that while all the lakes are chosen because they are either closest or the respondent grew up there, Lake Michigan has a higher than expected response for these factors: grew up there (20.4%); beauty (16.3%), family outings and boating (10.2% each).

Question 3. Which one of the Great Lakes do you live nearest to? (Read List)

Since the ports visited by the Lake Guardian in the 1993 survey were all

different from those in the 1992 test phase, there is no comparability of result. Further, because of the preponderance of respondents living in cities near Lake Erie, the response is overwhelmingly for that Lake, whereas in the test phase, it was fairly evenly divided between all five Lakes. There was no significant difference between answers from those chosen at random and those selected from the log books.

The distribution of respondents by size of community is shown in table 3b.

Question 4. What activities do you or your family do at the lake? (Lake #__) (DO NOT READ LIST) (PROBE FOR ALL ACTIVITIES)

Clean water is the factor on which depends most of the activities important to the respondents. These include: swimming, fishing, beach activities, etc. Respondents gave multiple responses. There is no significant difference between 1992 and 1993 survey results. There are significant differences (*), however, for three responses in the 1993 survey results: 1) 34% of log book respondents report they go fishing, whereas only 27% of random respondents fish*; 2) 15% of log book respondents walk or jog, whereas only 10% of randomly called respondents do so; and 3) while 24% of those called randomly say they never go to the lake for activities, only 9% of the log book respondents report no activities at their lake.

To see what connections there might be between respondents' perceptions of the major problems with the Great Lakes (question 10) and the activities they engage in, statistical tests (chi-square) were performed with the responses of all respondents--log book and random (see table 4a) There is a significant difference (*) between persons who perceive no problems with the lakes (34.3%), and those who see 1 or more problems (13.l%; 15.3%; 13.4%). One-third, (34%) of people who perceive no problems never go to the lake--these are primarily the persons who were called randomly. In contrast, 14% of people who see 1 or more problems say they never go to the lake. Also, people who see no problems with the lakes are less inclined to go swimming, fishing, boating, camping, or to have family outings at the lake, but they do walk or jog and engage in shore activities. There appears to be little difference in the activities engaged in by people who perceive 1 or 2 major problems; 4 to 7 major problems or 8 to l0 major problems.

**The following analysis was done to show the detail possible with the statistical tables gleaned from the survey.*

There are 413 persons (log and random) who consider it a major problem that lake fish are unsafe to eat, yet they are as likely to name fishing as an activity they do at the lake, as are persons who do not feel this is a problem. This is somewhat puzzling, unless fishing is simply an activity and not done for the sake of eating the fish. Persons who have "no opinion" about the safety of lake fish, do not tend to fish as an activity at the lake; a less puzzling statistic.

There are significant differences (*) in the responses from small and large communities; more swimming and fishing is reported in small communities; more beach activities are engaged in by respondents from large communities. For both the Lake Guardian visitors and the random respondents, more persons from the large communities never go to the lake. (See table 4b)

Question 5. Where do you spend most of your time when you are at Lake _____? Would you be.... (Read list: 1) In deep water-boating, sailing or fishing; 2) At the shoreline or on the beaches; 3) Away from the shoreline in a park or on jogging trails; 4) other.

No significant differences emerge between 1992 and 1993 survey results. The shoreline remains the favored place at which both log book and random respondents state they spend most of their time. Second in choice is deep water boating, sailing or fishing.

There were no significant differences between the persons who perceive ten major problems or even no major problems with the lakes, in terms of where they spend time at a lake--the shoreline is favored over both deep water activities or park activities.

By lake, there is a significant difference (*) in the log book respondents' choice of place for activities: Superior (74.5%) and Huron (68.7%) respondents are highest on shoreline preference; Erie (30.8%) and Ontario (40.6%) highest on

deep water preference. There were no significant differences in the random respondents answers.

Question 6. How would you rate the water quality in Lake ____? (Near shoreline) (See #5)

There is a significant difference (*) between those who visited Lake Guardian and those phoned at random concerning their opinion on water quality--but no significant difference between 1992 and 1993 survey results. Those who visited Lake Guardian rate water quality in their lake higher than those called randomly. Lake Guardian visitors rate water quality excellent or good 61%, whereas those called randomly give a 47% excellent or good rating to water quality.

There is a significant (***), strong relationship, and a very logical one between the opinions held by all respondents (visitors and random) in terms of their perception of water quality and the numbers of major problems they see in the lakes. The correlation is this: the highest ratings about water quality--excellent or good--are held by the respondents who see no major problems or few (fewer than 8) major problems. Conversely, those who see 8 to 10 major problems with the lakes, believe that water quality is only fair or poor. (See table 6a)

There is a significant (***) relationship between the size of community and perceptions about water quality. These perceptions may be related to the lake on which the community is located. The small communities were primarily on Lakes Huron and Superior, with some Erie and Ontario--they tended to believe the water quality was excellent or good. The medium communities differed from log book to random response, with far more excellent perceptions of lake water quality from the log book respondents who were from both Lake Superior and Lake Erie. The random respondents in medium sized communities gave very low excellent ratings; over half rated water quality in their lake, principally Lake Erie, as fair or poor and good water quality received a 41% rating.. In general, the large, Lake Erie communities rated water quality good, fair or poor. (See table 6b)

A critical issue is how Lake Guardian visitors and the general public called at random rank current water quality for "their" lake. Lake Superior clearly has

the top ranking for both sets of respondents (***), with Lake Guardian visitor ratings of excellent (30.3%) and good (51.5%), and random respondent ratings of excellent (26%) and good (45%). Lake Guardian visitors from Ontario give far lower ratings of excellent (4.9%) and good (39%); random respondents give Ontario excellent (9.4%) and good (25%). It should be noted that Ontario had far fewer respondents in both categories which may have affected the results.

Looked at on a scale of excellent=4, good=3, fair=2, poor=1, it is clear that Lake Superior residents give "their" lake the best marks: Lake Guardian visitors rank Lake Superior good+, at 3.2; random respondents rank Lake Superior 3--good. Lake Guardian respondents rank Lakes Erie, Huron and Ontario, fair+ -- Erie gets a surprising 2.6; Huron 2.5 and Ontario 2.4. The general public random respondents also see their lakes as fair+, and like Lake Guardian visitors, give Lake Huron a 2.5; but rank Lake Erie as a 2.3 and Lake Ontario 2.2 (See table 6c). When looked at by the four lakes "officially" part of the survey, that is without Lake Michigan, there is no change in the ratings for either the Lake Guardian or random respondents. (See table 6cc)

Rating water quality by "your" lake for all respondents shows a significant (**) difference in perceptions, with Lakes Superior and Michigan rated excellent and good, while Lakes Huron, Erie and Ontario are rated fair to poor. (See table 6d)

Question 7. Over the past ten years, would you say that the water quality of Lake ____ is improving, is it getting worse, or is it staying about the same?

As in question 6, visitors to Lake Guardian have a positive and significant (**) difference in perception of improvements in water quality from those chosen at random: 47.2% of Lake Guardian visitors believe it is improving, vs. only 25.7% of those called randomly. On the other hand, those called randomly tend to believe water quality is getting worse, 27%, vs. only 14.7% of visitors to Lake Guardian.

There are significant (***) differences in both the Lake Guardian and random respondents perceptions of water quality, by "their" lake. Lake Erie is highest on "improving" for both groups (62.9%) log book; (36.3%) random respondents.

Huron is rated by both groups as highest in "getting worse" (33.3%) log book; (37%) random respondents; whereas Erie is lowest (8.3%) log book and (22.7%) random respondents.

There is a significant (***), strong and logical relationship between respondents' ideas about how many major problems there are in the lakes and whether the quality of the water is improving. People who see few problems, tend to see water quality improving, whereas those who see many problems, tend to believe water quality is getting worse. (See table 7a)

There is a significant (***) relationship between the size of community, and the respondents' perceptions of whether water quality is improving. This is probably due to the fact that large cities were principally on Lake Erie. Respondents from both the Lake Guardian and those chosen randomly from large and medium sized communities, are very much more inclined to believe their lake water quality is improving, than are respondents from small communities. (See table 7b) This may mean that there is a perception that Lake Erie water quality has been worked on and has as a result, improved.

To check the perceptions of respondents regarding whether water quality is or is not improving --the direction of change in water quality-- by lake, was determined on a scale of: Improving =+1, staying the same =0, worsening =-1. Lake Guardian visitors perceptions of "their" lake is that Lake Erie is indeed improving, with a score of +.6, Lake Ontario ranks next for improvement, +.5, and Lake Superior also ranks as improving, +.1. Lake Huron is the only one with a negative score, meaning residents who visited Lake Guardian believe Lake Huron is worsening, -.1. Much work needs to be done to improve the general public perceptions of whether the lakes are improving, or not. The randomly called respondents said only Lake Erie is showing improvement in water quality, with a score of +.1. Seen as worsening are Lake Superior and Lake Huron, both have a score of -.2. Lake Ontario ranks .0; staying the same. (See table 7c) Looked at through the prism of the four official lakes in the study, there is a change in the Lake Guardian visitor perceptions: Huron goes down to -.2 and Ontario goes down to .4. The random respondents' answers remained the same except for Erie which improved to .2. (See table 7cc).

Looking at water quality perceptions by all respondents, in terms of "their" lake, both Lakes Erie and Ontario are significantly (**) higher on the "improving" opinion; Lakes Huron, Michigan and Superior are generally seen as

"about the same". (See table 7d)

Question 8. What do you think are the biggest problems concerning Lake ____ water quality? (DO NOT READ LIST) (MARK ALL RESPONSES)

Both the Lake Guardian visitors and those called randomly gave multiple responses. While contaminants/pollution remain highest on the list, this response dropped a significant(*), 10% in the 1993 survey from the test results. In the test results 70% of Lake Guardian visitors cited contaminants/pollution; in the 1993 results it was 60.1%. Persons called randomly in the test focused on contaminants 67%, in the 1993 survey, it dropped to 56.3%. A probable reason for the higher percentage of Lake Guardian visitors noting contaminant/pollution emerges from the significant difference (*) in the "don't know" response, with Lake Guardian visitors at only 13.6% and those called randomly at 22.4%. In other words, Lake Guardian visitors believe they know what lake water quality problems are; random respondents tend not to know and state "no opinion". Zebra mussels remain highest on the list of contaminants specified by all respondents in the 1993 results, but paper mills, industrial wastes and ship traffic are much higher than the test results, which had pesticides second as a pollution factor.

Respondents who think there are many major problems in the lakes (4 to 10) believe the biggest problem in their lake is contaminants/pollution. The correlation is: the more problems, the higher the percentage of respondents who chose contaminants/pollution rather than a specific problem such as zebra mussels or paper mills, etc. It appears that the less specifics one knows, the more likely to consider the lakes generally very contaminated. Conversely, the very high percentage of respondents who said, in responding to question 8, there are no problems or they do not know what problems there might be, are significantly (*) more inclined to perceive in responding to question 10, that there are no, or perhaps just 1 or 2, major problems.

Another interesting response is in regard to pesticides: persons who responded to question 10 by saying they perceived 8 to 10 major problems with the lakes, were those most inclined to think pesticides were the biggest problem; conversely, those who saw no major problems, did not mention pesticides at all

as a problem. (See table 8a)

Problems perceived by individual lake also show some interesting responses: Lakes Erie and Ontario have the most respondents who think Zebra Mussels are a big problem; Lake Superior has the highest percentage of respondents who think ship traffic is a big problem; Lake Michigan respondents have by far a higher percentage who name pesticides as the big problem with their lake; while Lakes Superior and Huron have the highest percentages of respondents who say there are no problems with their lakes. (See table 8d)

Question 9. Who do you feel is responsible for monitoring the water quality of Lake ____? (DO NOT READ LIST) (MARK ALL RESPONSES)

For the 1993 survey, the list of possible agencies was not read to respondents. (During the test, respondents were divided into those to whom the list was read and those who gave their own responses.) There are significant differences (*) in the responses from Lake Guardian visitors and random respondents. The US Environmental Protection Agency is still most often "delegated" the task of monitoring water quality (33.6%) by visitors to the Lake Guardian, whereas random respondents attributed to the state government (15.9%) and Department of Natural Resources (15.7%), the task of monitoring water quality, and only 13% to the US/EPA. Another significant difference (*) is in the perception of those who think the US Federal Government is in charge of water quality monitoring, with 15.1% of Lake Guardian visitors, but only 8.3% of random respondents who believe that. And finally, there is a significant difference (*) in the rate of "don't know" responses, with only 21.1% of Lake Guardian visitors claiming not to know, while 32.3% of random respondents don't know who is responsible for monitoring water quality.

There is a correlation between the percentage of respondents who believe that there are major problems in the lakes, and the percentage who believe that the US/EPA or the State government are responsible for monitoring water quality. Conversely, those respondents who don't know who is responsible for monitoring water quality see no major problems or few major problems. (See table 9a)

There are a number of significant differences (*) between perceptions of who is responsible for monitoring the water quality of the lakes, in terms of size of community from which the respondents came: Lake Guardian visitors are twice

as likely to attribute monitoring to the US/EPA in all three sizes of community, than are random respondents; Lake Guardian visitors from large communities are far more likely to believe the US/EPA is responsible, than are Lake Guardian visitors from small communities; those from large communities are more likely to attribute responsibility to state government than are those from medium communities; and Lake Guardian respondents from small communities said they didn't know who was responsible significantly (*) more than persons from medium or large communities. In both the Lake Guardian visitor and random respondent groups, the small community residents see the Department of Natural Resources as responsible, far more than persons from large communities. (See table 9b)

The US/EPA has the highest percentage of respondents from Lakes Erie and Ontario who believe that is the responsible agency for monitoring water quality. The US Federal Government is named by respondents from Lake Superior; the DNR has a very high percentage of respondents from Lake Huron who believe that agency is responsible for water quality. (See table 9d)

Question 10. Now I'm going to read you a few things that some people believe are problems. Other people believe these are <u>not</u> problems. As I read each one, please tell me whether you consider it to be a major problem, a minor problem, or not a problem at all. (ROTATE FROM MARKED ITEM)

Responses to this question were quite different in the 1993 survey from the test results, in terms of how Lake Guardian visitors and random respondents answered. In the test results, there were few differences between the two groups. In the 1993 result, Lake Guardian visitors are more conscious of the potential major threat of many problems than the random respondents, and they are less likely to have a "no opinion" response.

Lake Guardian visitors were significantly different (*) in their assessment of all 10 environmental problems tested. For all 10 problems, visitors rated the problem more seriously than random respondents rated them. For 8 problems, Lake Guardian visitors were significantly (*) more likely to rate them as "major". For the other 2 problems, Lake Guardian visitors were significantly more likely to rate them "minor". The 8 major problems were: acid rain, pollution in the bottom mud, chemicals washing into the lake from farms,

chemicals washing into the lake from cities, industries dumping chemicals in the lake, PCBs in the lake, DDT in the lake, lake fish unsafe for swimming. Lake Guardian visitors found these problems to be more of a major threat than did the random respondents. For the other 2 problems, Lake Guardian visitors were significantly (*) more likely to rate them as minor, and less likely to say they were not a problem. This was the case for safety of fish to eat and zebra mussels.

As in the test results, Lake Guardian visitors and those called at random place chemicals at the top of the potential pollution list. Industries dumping chemicals in the lake is first, (74.6% for log book; 69.4% for random) and chemicals washing into the lake from cities was second highest with both groups (72.4% for log book; 64.2% for random) --this was exactly the same ranking as in the test results. The only major change was a significant drop in the tendency of random respondents to think of industries dumping chemicals in the lake as a major problem (69.4%) in the 1993 survey vs. (83%) for the test results.

Lake Guardian visitors were less likely in general to say they had "no opinion" than random respondents. But as in the test results, there is a high "no opinion" by both groups for PCBs and DDT in the lake as pollutants.

Looked at for differences by lake, there is an interesting pattern that emerges in the two sets of respondents. The Lake Guardian visitors responses show significant differences in all but the issues of PCBs, DDT, and Zebra Mussels, which apparently are such global issues that they affect all lakes and all respondents equally. The random respondents show significant differences by lake for each of the issues.

For the more local issues, the Lake Guardian visitors from Lake Huron rate acid rain the lowest (27.5%) of major problems; it is lowest on pollution in bottom mud (37.7%); lowest on chemicals washing into the lake from farms (34.8%); but goes almost as high as Erie on chemicals washing into the lake from cities (72.5%) and industries dumping chemicals into the lake (78.3%) The random respondents follow about the same pattern for Lake Huron. Chemicals washing into the lake are rated highest from both groups for Lake Erie and pollution in the bottom mud also worries Lake Erie residents. For both groups of respondents from Lake Ontario and Lake Superior, acid rain and pollution in the bottom mud are major problems, as are chemicals washing into the lake,

but somewhat lower in ratings.

The random respondents/general public from Lake Ontario are concerned about PCBs, DDT and exotic species, seeing these as a major problems; residents from Lake Erie also rank these three factors high as major problems.

Small community respondents from both Lake Guardian visitor and random calls, see fewer major problems in all but one--zebra mussels-- of the ten potential problems in the lakes. The differences between small and large communities is generally statistically significant (*) and often very highly significant (***) in how they perceive lake problems. Respondents from the medium communities sometimes resemble or are similar to the opinion of the small community respondents; sometimes the larger community responses.

Some of the more interesting and significant differences are:
•l) Acid rain is principally seen as a major problem in both log and random by the medium and large community residents;
•2) Pollution in the bottom mud below the water is considered a major problem significantly (*) more by large community residents for both log and randomly called;
•3) For all 3 items -- chemicals washing into the lake from farms, from cities and from industries-- Lake Guardian visitors separate into small and medium vs. large communities; random respondents separate into small vs. medium and large. Chemicals are considered by both groups of respondents to be major problems (***).
•4) PCBs, DDT and zebra mussels in the lake are considered major problems by random respondents from large cities significantly (**) more than small and medium community residents;
•5) Lake fish are considered unsafe to eat significantly (***) more by randomly called residents from medium and large communities than from small communities;
•6) Lake Guardian visitors and randomly called respondents from small and medium communities do not consider the lake unsafe for swimming significantly (**) more than do residents of large communities and conversely, large city residents consider this to be a major problem. (See table 10b)

Lake Guardian visitors are more aware of major lake water problems than the general public represented by randomly called respondents. Of the l0 issues cited in this question, just looking at "major" problems shows that Lake Guardian visitors see Lake Erie as having 5.5 major problems, Lake Ontario, 4.9,

Lake Huron, 4.7, and Lake Superior, 4.2 major problems. The randomly called respondents see the major problems on the same type of sliding scale, but at lower numbers of major problems: Lake Erie, 5, Lake Ontario, 4.7, Lake Huron, 3.5 and Lake Superior, 3.3. (See table 10c) Changes based on the four "official" lakes are virtually imperceptible. (See Table 10cc)

When looked at from the point of view of responses by lake ownership, there are differences: Lake Huron has the lowest (27.5%) rating for acid rain as a major problem for Lake Guardian visitors; farm run-off is considered a major problem for Lake Erie (64.2%) by Lake Guardian visitors, they also rate urban run-off and industry dumping more of a major problem than Lake Guardian visitors from other lakes; PCBs are considered more of a major problem for random respondents from Lake Ontario than other lakes or Lake Guardian visitors; DDT as a problem has low ratings over-all, but lowest from random respondents for Lake Superior; exotic species as a major problem has moderate ratings from Lake Guardian visitors, but is increasingly troublesome to random respondents from a low (26%) for Superior to a high (62.5%) for Ontario. Lake Guardian visitors from both Superior (12.1%) and Huron (13%) consider their lake has no major problem with safety for swimming, while those from Erie (35.4%) and Ontario (36.6%) perceive their lakes' water quality less safe for swimming. Random respondents from Superior (7%), Huron (11%) and Ontario (12.5%) do not consider their lakes have a major problem for swimming; only respondents from Lake Erie rate their lake (34.7%) to have a major problem. (See table 10d)

Question 11. Do you feel there is anything you can do to help improve Lake ___water quality? What is that? (DO NOT READ LIST)

Lake Guardian visitors are more likely than random respondents to feel that there are things they can do to help improve water quality in their lake. Especially significant (*) are the positive responses about proper waste disposal (28.3%) for Lake Guardian visitors vs. (21.7%) random respondents; and positive responses about increasing public awareness (16.5%) for Lake Guardian visitors vs. (10.4%) random respondents. On the other hand, Lake Guardian visitors only said "no" (20%) there was nothing they could do to help improve water quality, whereas random respondents were more likely to be negative (31.7%) about being able to help improve water quality. There was,

however, in the 1993 survey, a significant (*) increase in Lake Guardian visitors who said "no" they did not feel there was something they could do to improve water quality in their lake. There had been only an 8% "no" response in the test results.

When Lake Guardian visitors do think there is something positive to be done about lake water quality, other than proper waste disposal and increasing public awareness, it includes personal actions, such as recycling (9.1%), beach clean ups (7.6%), writing to their congressmen (7.3%), and joining environmental groups (7.3%). More and better government controls were lower on the list (4.2%) in the 1993 survey, than in the test (7%).

There is a strong relationship between the perception of respondents that they can do something to help improve their lake's water quality and their perceptions of the numbers of major problems they perceived in question 10. The higher the number of problems, the more the respondents were inclined to feel there should be proper waste disposal, an increase in public awareness, and recycling, etc. Conversely, respondents who saw nothing they could do to help improve water quality in their lake, or did not know what to do, either saw no problems in question 10, or a smaller number of problems. Only on the question of more and better government controls is there a very small but almost uniform response from all respondents, across the entire range of perceived major problems However, government controls are not high on any list about 4% average. (See table 11a).

There are some significant differences (*) between how Lake Guardian visitors and random respondents from varying size communities view their ability to improve water quality. Large city residents are far more positive about recycling as a step they can take. But random respondents from both large and medium sized communities, state that they don't know what they can do; the large city random respondents are significantly (*) more unsure or say "no" there's nothing they can do far more than the Lake Guardian visitors. (See table 11b)

Question 12. Do you feel there is anything the government can do to help improve Lake _____ water quality? What is that? (DO NOT READ LIST)

Better rule enforcement by government agencies had a significant (**) rise in the 1993 survey from the test results. The Lake Guardian visitors think rule enforcement is the government's job (47.2%); randomly called persons also believe government must enforce rules (42.2%). Restrictions on chemicals also had a significant (*) increase in the 1993 survey; it is third highest in the beliefs about what government agencies must do for both Lake Guardian visitors (19.2%) and persons called randomly (16.1%). Second highest, and probably closely tied to both rule enforcement and restrictions on chemicals, is the belief by both Lake Guardian visitors (28.5%) and random groups (30.2%) that industry must have more restrictions placed on it by government.

These answers fit with the responses from question 10, in which the severity of problems indicates how much people feel that chemicals from any source are a major contribution to pollution in the lakes, but especially point up their belief that industries dumping chemicals into the lakes are a problem. An idea favored in exactly the same degree (12.2%) by both Lake Guardian and random groups, is government action on fines for polluters.

On the positive action side, Lake Guardian visitors are more inclined (10.5%) than randomly called respondents (5.8%) to believe in more education; both groups call for more more laws, more clean up, more research. All of the programs--punitive or positive--require more funds, and both groups included programs requiring funding in their beliefs about government actions.

When the question of what government can do to help improve lake water quality is looked at in terms of question 10, how many problems did respondents perceive in the lakes -- the results are very strong and positive. Two-thirds of the respondents feel that 4 or more problems are major, and of these persons, two conclusions can be drawn: 1) 2/3 are willing to personally do something about it, and 2) 88% of these persons feel government can (and should) take action to improve water quality. Almost no respondents were inclined to have current effort levels continue or to have fewer restrictions or enforcement. Persons who responded that the government can't do anything or that they did not know what government could do, were primarily the respondents who saw no major problems in the lakes. (See table 12a).

Better rule enforcement and more restrictions on industry are the principle methods all respondents, from small, medium and large communities see as the governmental role in improving water quality in the Great Lakes. There are a

few significant differences between the respondents. Lake Guardian visitors from large communities want fines for polluters significantly (*) more than do others. Lake Guardian visitors from medium sized communities want more laws significantly (*) more than visitors from small communities. From the random respondents in large communities there is a very low percentage (2.5%) who believe there is nothing the government can do to help improve the lakes; it is significantly (*) different from the random respondents in small communities, who say "no" (12.l%) to government actions to improve lake water quality. (See table 12b)

Question 13. Have you heard or read anything about an environmental research ship named Lake Guardian?

This question was, of course, asked only of random respondents. Almost 15% of respondents had heard of Lake Guardian; but a slightly higher percentage than in the test results, (81.8%) said they had not. None of the respondents who had heard of the ship volunteered the statement that they had toured it.

Small community residents were significantly (***) the majority (24.1%) of persons called randomly who had heard or read about the Lake Guardian. Only 4.5% from large communities and 11.8% from medium communities had heard about the ship. (See table 13b) This, of course, ties neatly to the fact that (see question 14) local newspapers are a major source of information especially in small communities.

Question 14. Can you recall where you heard about the research ship Lake Guardian? Was it in a local newspaper, on the radio, or TV, or from someone else?

Evidently Lake Guardian attracts attention when it is in a port that provides visibility, or where the residents make it a habit to drive by or somehow find out what's happening at the ports. The two highest ranking recall items for learning about Lake Guardian, are local newspapers (32.3%) for Lake Guardian visitors and (38%) for random respondents, and "saw it in area". There is a significant difference (*) between responses to "saw in area" from Lake Guardian visitors (32.3%) and random respondents (21.1%).

Although local newspapers still greatly outrank all other media, TV is a high second as a public information resource. There is a significantly (*) higher proportion of random respondents (19.7%) who saw it on TV than did Lake Guardian respondents (8.5%). Word of mouth is third highest in both groups' responses.

The only change in responses in the 1993 survey were the miscellaneous lists of how one or two individuals heard of Lake Guardian, including this time, three persons who heard of it through the Sierra Club.

Local newspapers outrank all other media in all sizes of community, for their ability to attract attention to the Lake Guardian visit. However, it is significantly (*) higher for the small community resident to have seen it in the local newspaper; but significantly (*) higher for medium to large community residents to have found out about Lake Guardian by seeing it in the area. (See table 14b)

Lake Guardian visitors from Superior and Ontario were significantly higher (***) in responding that they read about the ship in their local newspaper. Lake Erie residents were highest (***) on having seen it in the area.

Question 15. Are you aware that public tours are available on the Lake Guardian?

Of the 15% random respondents who had heard of Lake Guardian, over half (55%) knew there were public tours available. This is a slightly lower response rate from the test results, but not significantly so.

Small community residents from the randomly called respondents were significantly (*) more aware that public tours are available on Lake Guardian, than were either the medium or large size community residents. (See table 15b)

Lake Superior and Lake Huron residents were significantly (*) higher in responding that they were aware of public tours on Lake Guardian.

Question 16. Have you personally toured the Lake Guardian?

Fewer random respondents in the 1993 survey were aware of public tours and only one person responded that they had toured the Lake Guardian. The number

of persons responding positively in the test results was also small. This may indicate a need to have some type of publicity and promotional effort, such as distribution of "mock" tickets for a tour, to encourage visitors. Of all the visitors who signed the log book, only one person did not actually tour after signing in. (See table 16b)

Question 17. What was the main reason you toured the ship? (DO NOT READ LIST) (IF CURIOSITY, ABOUT WHAT?)

The ship, Lake Guardian, is clearly the big draw in the results of the 1993 survey (56%) as it was in the test results (59%). And similarly, interest in conservation and the environment is the second most important reason people toured the ship (42.9%). Very much the same results in the 1993 survey as in the test show that touring the ship is considered desirable as an educational experience for themselves and as a learning experience for children.

Residents of all sizes of community toured Lake Guardian because of interest in the ship itself, but there is a significantly (*) higher response in this regard from medium to large size communities. There is an odd response to touring the ship as an educational experience, with residents of medium sized communities significantly (*) lower (4.9%) in this regard than small (22%) and large (18%) community residents. (See table 17b)

Question 18. Have any other members of your family toured the Lake Guardian?

More than half the Lake Guardian visitors (53.3%) said that other family members also toured the ship; this is the same result as in the test. Of the few random respondents who knew about the tours, only 25.6% indicated a family member had toured.

Lake Guardian visitors from Superior and Huron were most likely (***) to have answered that other members of their families toured the Lake Guardian.

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

6. How would you rate the water quality in Lake ___?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Excellent	57	12.7%	30	30.3%	9	13.0%	16	6.7%	2	4.9%
Good	213	47.4%	51	51.5%	26	37.7%	120	50.0%	16	39.0%
Fair	122	27.2%	12	12.1%	24	34.8%	70	29.2%	16	39.0%
Poor	38	8.5%	1	1.0%	10	14.5%	23	9.6%	4	9.8%
No opinion	19	4.2%	5	5.1%			11	4.6%	3	7.3%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Excellent	56	11.6%	26	26.0%	12	12.0%	15	6.0%	3	9.4%
Good	172	35.6%	45	45.0%	34	34.0%	85	33.9%	8	25.0%
Fair	154	31.9%	17	17.0%	33	33.0%	90	35.9%	14	43.8%
Poor	68	14.1%	5	5.0%	17	17.0%	42	16.7%	4	12.5%
No opinion	33	6.8%	7	7.0%	4	4.0%	19	7.6%	3	9.4%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

5. Where do you spend most of your time when you are at Lake ___?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Spend time at a lake	404	100.0%	94	100.0%	67	100.0%	211	100.0%	32	100.0%
In deep water-boating, sailing or fishing	115	28.5%	18	19.1%	19	28.4%	65	30.8%	13	40.6%
At the shoreline or on the beaches	255	63.1%	70	74.5%	46	68.7%	124	58.8%	15	46.9%
Away from the shoreline in a park or on jogging trails	34	8.4%	6	6.4%	2	3.0%	22	10.4%	4	12.5%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Spend time at a lake	368	100.0%	84	100.0%	74	100.0%	187	100.0%	23	100.0%
In deep water-boating, sailing or fishing	91	24.7%	18	21.4%	19	25.7%	49	26.2%	5	21.7%
At the shoreline or on the beaches	245	66.6%	60	71.4%	51	68.9%	117	62.6%	17	73.9%
Away from the shoreline in a park or on jogging trails	32	8.7%	6	7.1%	4	5.4%	21	11.2%	1	4.3%

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4. What activities do you or your family do at the lake?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Swimming	184	41.0%	36	36.4%	44	63.8%	93	38.8%	11	26.8%
Fishing	152	33.9%	30	30.3%	33	47.8%	76	31.7%	13	31.7%
Boating	138	30.7%	28	28.3%	26	37.7%	71	29.6%	13	31.7%
Beach activities	71	15.8%	9	9.1%	6	8.7%	53	22.1%	3	7.3%
Family outings	75	16.7%	16	16.2%	6	8.7%	42	17.5%	11	26.8%
Walking jogging	68	15.1%	36	36.4%	9	13.0%	22	9.2%	1	2.4%
Camping	27	6.0%	7	7.1%	2	2.9%	16	6.7%	2	4.9%
Enjoy scenery	27	6.0%	12	12.1%	1	1.4%	12	5.0%	2	4.9%
Skiing	16	3.6%	3	3.0%	3	4.3%	10	4.2%		
Water sports	17	3.8%	3	3.0%	1	1.4%	12	5.0%	1	2.4%
Shore activities	7	1.6%	3	3.0%			4	1.7%		
None, never go there	40	8.9%	5	5.1%	2	2.9%	24	10.0%	9	22.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Swimming	179	37.1%	50	50.0%	43	43.0%	74	29.5%	12	37.5%
Fishing	129	26.7%	38	38.0%	33	33.0%	52	20.7%	6	18.8%
Boating	130	26.9%	33	33.0%	27	27.0%	63	25.1%	7	21.9%
Beach activities	64	13.3%	7	7.0%	11	11.0%	41	16.3%	5	15.6%
Family outings	54	11.2%	13	13.0%	5	5.0%	33	13.1%	3	9.4%
Walking jogging	48	9.9%	14	14.0%	12	12.0%	20	8.0%	2	6.3%
Camping	22	4.6%	6	6.0%	5	5.0%	9	3.6%	2	6.3%
Enjoy scenery	6	1.2%	2	2.0%			2	.8%	2	6.3%
Skiing	15	3.1%	4	4.0%	2	2.0%	9	3.6%		
Water sports	10	2.1%	1	1.0%	1	1.0%	6	2.4%	2	6.3%
Shore activities	8	1.7%			1	1.0%	7	2.8%		
None, never go there	115	23.8%	16	16.0%	26	26.0%	64	25.5%	9	28.1%

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3. Which one of the Great Lakes do you live nearest to?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Lake Superior	102	22.7%	96	97.0%	1	1.4%	5	2.1%		
Lake Huron	86	19.2%			66	95.7%	20	8.3%		
Lake Michigan	8	1.8%	2	2.0%	1	1.4%	5	2.1%		
Lake Erie	208	46.3%	1	1.0%	1	1.4%	206	85.8%		
Lake Ontario	45	10.0%					4	1.7%	41	100.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Lake Superior	87	18.0%	82	82.0%	1	1.0%	4	1.6%		
Lake Huron	101	20.9%	11	11.0%	79	79.0%	11	4.4%		
Lake Michigan	33	6.8%	6	6.0%			27	10.8%		
Lake Erie	226	46.8%	1	1.0%	20	20.0%	202	80.5%	3	9.4%
Lake Ontario	36	7.5%					7	2.8%	29	90.6%

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2. Why do you feel that Lake ___ is your lake?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	388	100.0%	89	100.0%	62	100.0%	200	100.0%	37	100.0%
Closest to us	303	78.1%	67	75.3%	55	88.7%	149	74.5%	32	86.5%
Grew up there	34	8.8%	12	13.5%	2	3.2%	18	9.0%	2	5.4%
Beauty	15	3.9%	5	5.6%	3	4.8%	7	3.5%		
Fishing	11	2.8%	6	6.7%	1	1.6%	3	1.5%	1	2.7%
Family outings	14	3.6%	2	2.2%			11	5.5%	1	2.7%
Boating	9	2.3%			2	3.2%	7	3.5%		
Recreation	8	2.1%	2	2.2%	2	3.2%	4	2.0%		
Quality of water, shore areas	6	1.5%	2	2.2%	2	3.2%	2	1.0%		
Swimming	6	1.5%	1	1.1%	1	1.6%	3	1.5%	1	2.7%
Drinking water	8	2.1%	3	3.4%			4	2.0%	1	2.7%
Economic factor	1	.3%					1	.5%		
No response	1	.3%					1	.5%		

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	385	100.0%	78	100.0%	89	100.0%	196	100.0%	22	100.0%
Closest to us	299	77.7%	56	71.8%	79	88.8%	145	74.0%	19	86.4%
Grew up there	37	9.6%	12	15.4%	7	7.9%	15	7.7%	3	13.6%
Beauty	19	4.9%	4	5.1%	1	1.1%	13	6.6%	1	4.5%
Fishing	14	3.6%	4	5.1%	2	2.2%	7	3.6%	1	4.5%
Family outings	9	2.3%	2	2.6%	1	1.1%	6	3.1%		
Boating	12	3.1%	1	1.3%			11	5.6%		
Recreation	6	1.6%					5	2.6%	1	4.5%
Quality of water, shore areas	6	1.6%	2	2.6%			3	1.5%	1	4.5%
Swimming	5	1.3%	2	2.6%			3	1.5%		
Drinking water	3	.8%	2	2.6%			1	.5%		
Economic factor	1	.3%			1	1.1%				
No response										

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

1. Do you consider one of the Great Lakes to be your lake?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
No Don't know	62	13.8%	10	10.1%	7	10.1%	41	17.1%	4	9.8%
Lake Superior	97	21.6%	85	85.9%	3	4.3%	8	3.3%	1	2.4%
Lake Huron	72	16.0%	2	2.0%	57	82.6%	13	5.4%		
Lake Michigan	13	2.9%	2	2.0%	2	2.9%	9	3.8%		
Lake Erie	166	37.0%					166	69.2%		
Lake Ontario	39	8.7%					3	1.3%	36	87.8%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
No Don't know	98	20.3%	22	22.0%	11	11.0%	55	21.9%	10	31.3%
Lake Superior	74	15.3%	66	66.0%	4	4.0%	3	1.2%	1	3.1%
Lake Huron	76	15.7%	3	3.0%	63	63.0%	10	4.0%		
Lake Michigan	36	7.5%	6	6.0%	3	3.0%	27	10.8%		
Lake Erie	176	36.4%	3	3.0%	19	19.0%	151	60.2%	3	9.4%
Lake Ontario	23	4.8%					5	2.0%	18	56.3%

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Port Location

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Sault St. Marie	15	3.3%	15	15.2%						
Duluth	84	18.7%	84	84.8%						
Alpena	69	15.4%			69	100.0%				
Detroit	65	14.5%					65	27.1%		
Buffalo	37	8.2%					37	15.4%		
Erie PA	78	17.4%					78	32.5%		
Cleveland	60	13.4%					60	25.0%		
Oswego	41	9.1%							41	100.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Sault St. Marie	100	20.7%	100	100.0%						
Alpena	100	20.7%			100	100.0%				
Detroit	100	20.7%					100	39.8%		
Buffalo	100	20.7%					100	39.8%		
Erie PA	51	10.6%					51	20.3%		
Oswego	32	6.6%							32	100.0%

1. Basic Tables: Totals and by Lake

C. Telephone Survey Tables

1. Basic Tables:Totals and by Lake

2. Special Tables:

A -- Perceived Major Problems
B -- Community Size
C -- "Owned Lake" Differences
D -- "Owned" by "Nearest" Lake

2. Special Table

B -- Community Size

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1b. Do you consider one of the Great Lakes to be your lake?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
No Don't know	8.8%	8.6%	22.8%
Lake Superior	12.0%	45.7%	4.9%
Lake Huron	47.2%		8.0%
Lake Michigan	3.2%		5.6%
Lake Erie		45.7%	56.8%
Lake Ontario	28.8%		1.9%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
No Don't know	18.5%	3.9%	26.5%
Lake Superior	30.6%		1.5%
Lake Huron	28.4%	2.0%	4.5%
Lake Michigan	3.9%		13.5%
Lake Erie	10.8%	92.2%	52.0%
Lake Ontario	7.8%	2.0%	2.0%

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2b. Why do you feel that Lake ___ is your lake?

Log Book

	Small	Medium	Large
Base: All respondents	114	149	125
Closest to us	86.0%	80.5%	68.0%
Grew up there	6.1%	10.7%	8.8%
Beauty	3.5%	3.4%	4.8%
Fishing	2.6%	4.0%	1.6%
Family outings	.9%	2.7%	7.2%
Boating	1.8%	2.0%	3.2%
Recreation	1.8%	1.3%	3.2%
Quality of water, shore areas	1.8%	1.3%	1.6%
Swimming	1.8%	1.3%	1.6%
Drinking water	.9%	2.0%	3.2%
Economic factor			.8%
No response			.8%

Random Sample

	Small	Medium	Large
Base: All respondents	189	49	147
Closest to us	81.5%	83.7%	70.7%
Grew up there	11.6%	4.1%	8.8%
Beauty	3.2%		8.8%
Fishing	3.7%	4.1%	3.4%
Family outings	1.6%	2.0%	3.4%
Boating	.5%		7.5%
Recreation	.5%	4.1%	2.0%
Quality of water, shore areas	1.6%	2.0%	1.4%
Swimming	1.1%	4.1%	.7%
Drinking water	1.1%		.7%
Economic factor	.5%		
No response			

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

3b. Which one of the Great Lakes do you live nearest to?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Lake Superior	10.4%	51.9%	3.1%
Lake Huron	52.8%		12.3%
Lake Michigan	2.4%		3.1%
Lake Erie	1.6%	48.1%	79.0%
Lake Ontario	32.8%		2.5%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Lake Superior	35.8%		2.0%
Lake Huron	38.8%	2.0%	5.0%
Lake Michigan	2.6%		13.5%
Lake Erie	10.3%	96.1%	76.5%
Lake Ontario	12.5%	2.0%	3.0%

4b. What activities do you or your family do at the lake?

Log Book

	Small	Medium	Large
Base: All Respondents	125	162	162
Swimming	51.2%	39.5%	34.6%
Fishing	40.8%	38.3%	24.1%
Boating	33.6%	34.0%	25.3%
Beach activities	9.6%	14.8%	21.6%
Family outings	15.2%	17.9%	16.7%
Walking jogging	10.4%	23.5%	10.5%
Camping	4.0%	5.6%	8.0%
Enjoy scenery	2.4%	9.3%	5.6%
Skiing	3.2%	3.1%	4.3%
Water sports	1.6%	2.5%	6.8%
Shore activities		1.9%	2.5%
None, never go there	8.8%	5.6%	12.3%

Random Sample

	Small	Medium	Large
Base: All Respondents	232	51	200
Swimming	45.3%	39.2%	27.0%
Fishing	33.2%	21.6%	20.5%
Boating	28.9%	25.5%	25.0%
Beach activities	9.9%	9.8%	18.0%
Family outings	9.1%	7.8%	14.5%
Walking jogging	12.1%	11.8%	7.0%
Camping	5.6%	2.0%	4.0%
Enjoy scenery	1.7%		1.0%
Skiing	2.6%	3.9%	3.5%
Water sports	1.7%	2.0%	2.5%
Shore activities	.4%	3.9%	2.5%
None, never go there	22.0%	21.6%	26.5%

5b. Where do you spend most of your time when you are at Lake ___?

Log Book

	Small	Medium	Large
Base: Spend time at a lake	114	153	137
In deep water-boating, sailing or fishing	31.6%	29.4%	24.8%
At the shoreline or on the beaches	61.4%	62.7%	65.0%
Away from the shoreline in a park or on jogging trails	7.0%	7.8%	10.2%

Random Sample

	Small	Medium	Large
Base: Spend time at a lake	181	40	147
In deep water-boating, sailing or fishing	23.2%	27.5%	25.9%
At the shoreline or on the beaches	70.7%	57.5%	63.9%
Away from the shoreline in a park or on jogging trails	6.1%	15.0%	10.2%

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6b. How would you rate the water quality in Lake ___?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Excellent	12.0%	21.6%	4.3%
Good	39.2%	50.6%	50.6%
Fair	32.8%	17.3%	32.7%
Poor	12.0%	6.2%	8.0%
No opinion	4.0%	4.3%	4.3%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Excellent	17.7%	2.0%	7.0%
Good	37.5%	41.2%	32.0%
Fair	27.6%	31.4%	37.0%
Poor	11.2%	21.6%	15.5%
No opinion	6.0%	3.9%	8.5%

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7b. Over the past ten years, would you say that the water quality of Lake ___ is improving, is it getting worse, or is it staying about the same?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Improving	33.6%	42.0%	63.0%
About the same	24.8%	32.7%	20.4%
Getting worse	24.8%	13.0%	8.6%
No opinion	16.8%	12.3%	8.0%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Improving	14.2%	37.3%	36.0%
About the same	43.1%	29.4%	25.5%
Getting worse	31.5%	27.5%	21.5%
No opinion	11.2%	5.9%	17.0%

8b. What do you think are the biggest problems concerning Lake ___ water quality?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Contaminants pollution	67.2%	60.5%	54.3%
Zebra Mussels	6.4%	11.7%	10.5%
Paper mills	4.8%	6.8%	3.7%
Industrial waste	3.2%	4.9%	8.0%
Ship traffic	6.4%	7.4%	3.1%
Dirty beaches	1.6%	2.5%	4.3%
Pesticides	1.6%	1.9%	7.4%
People's behavior, attitudes	.8%	1.9%	2.5%
Chemical waste	1.6%	3.1%	3.7%
Public utility waste		1.9%	4.9%
Oil spills	2.4%	.6%	1.9%
Acid rain	2.4%	1.2%	1.2%
Biological effects	2.4%	3.7%	.6%
Harm to wildlife, fish	.8%	.6%	2.5%
Managing lake quality		1.2%	1.9%
There are no problems	2.4%	3.1%	
Don't know	15.2%	13.0%	13.0%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Contaminants pollution	55.2%	56.9%	57.5%
Zebra Mussels	3.9%	9.8%	5.0%
Paper mills	6.0%	7.8%	3.0%
Industrial waste	4.3%	9.8%	3.5%
Ship traffic	2.2%	2.0%	3.5%
Dirty beaches	5.6%		4.5%
Pesticides	.9%		4.0%
People's behavior, attitudes	3.0%		3.0%
Chemical waste	.9%		2.0%
Public utility waste	2.6%		
Oil spills	1.3%	2.0%	2.5%
Acid rain	.9%		2.5%
Biological effects	.9%	2.0%	.5%
Harm to wildlife, fish	.4%	2.0%	
Managing lake quality		2.0%	1.0%
There are no problems	7.8%	2.0%	2.5%
Don't know	20.7%	19.6%	25.0%

9b. Who do you feel is responsible for monitoring the water quality of Lake __

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
US Environmental Protection Agency	24.0%	36.4%	38.3%
State government	14.4%	8.0%	17.9%
US Federal Government	12.0%	19.8%	13.0%
Department of Natural Resources	13.6%	5.6%	2.5%
Local government	6.4%	5.6%	11.7%
All of us	12.8%	9.9%	7.4%
Industry	4.0%	6.8%	4.9%
Environment Canada	2.4%	4.3%	3.7%
Other government group	2.4%	4.3%	3.7%
Non-government group	1.6%	.6%	.6%
Don't know	28.8%	19.8%	16.7%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
US Environmental Protection Agency	12.1%	15.7%	13.5%
State government	11.6%	17.6%	20.5%
US Federal Government	6.0%	3.9%	12.0%
Department of Natural Resources	22.4%	2.0%	11.5%
Local government	10.8%	5.9%	12.0%
All of us	9.1%	3.9%	7.0%
Industry	2.6%	7.8%	2.0%
Environment Canada	3.0%	2.0%	4.0%
Other government group	3.0%	3.9%	3.5%
Non-government group	.4%		
Don't know	31.9%	43.1%	30.0%

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10b. How much of a problem is: A. Acid Rain

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	36.0%	41.4%	44.4%
Minor	28.8%	33.3%	37.0%
Not at all	12.8%	13.6%	9.3%
No opinion	22.4%	11.7%	9.3%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	26.3%	35.3%	33.0%
Minor	30.2%	31.4%	38.0%
Not at all	24.6%	11.8%	10.5%
No opinion	19.0%	21.6%	18.5%

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10b. How much of a problem is: B. Pollution in the bottom mud below the water

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	40.8%	48.8%	58.6%
Minor	31.2%	28.4%	27.8%
Not at all	4.8%	9.3%	3.1%
No opinion	23.2%	13.6%	10.5%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	34.9%	39.2%	54.5%
Minor	26.3%	45.1%	24.5%
Not at all	15.1%	2.0%	4.0%
No opinion	23.7%	13.7%	17.0%

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10b. How much of a problem is: C. Chemicals washing into the lake from farms

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	40.8%	43.2%	68.5%
Minor	37.6%	38.9%	22.8%
Not at all	11.2%	8.6%	3.1%
No opinion	10.4%	9.3%	5.6%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	33.6%	49.0%	50.0%
Minor	32.3%	31.4%	23.5%
Not at all	22.8%	5.9%	10.0%
No opinion	11.2%	13.7%	16.5%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10b. How much of a problem is: D. Chemicals washing into the lake from cities

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	68.0%	65.4%	82.7%
Minor	19.2%	25.3%	12.3%
Not at all	6.4%	3.7%	.6%
No opinion	6.4%	5.6%	4.3%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	58.2%	72.5%	69.0%
Minor	23.7%	15.7%	19.0%
Not at all	10.3%		2.0%
No opinion	7.8%	11.8%	10.0%

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10b. How much of a problem is: E. Industries dumping chemicals in the lake

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	74.4%	67.3%	82.1%
Minor	15.2%	23.5%	13.6%
Not at all	3.2%	4.3%	.6%
No opinion	7.2%	4.9%	3.7%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	63.4%	78.4%	74.0%
Minor	14.7%	13.7%	14.5%
Not at all	9.5%		2.5%
No opinion	12.5%	7.8%	9.0%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10b. How much of a problem is: F. PCBs in the lake

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	54.4%	46.9%	54.9%
Minor	16.8%	23.5%	21.0%
Not at all	5.6%	6.8%	3.7%
No opinion	23.2%	22.8%	20.4%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	38.4%	39.2%	51.5%
Minor	20.7%	13.7%	19.5%
Not at all	9.9%		5.0%
No opinion	31.0%	47.1%	24.0%

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10b. How much of a problem is: G. DDT in the lake

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	32.8%	34.0%	42.0%
Minor	28.0%	26.5%	28.4%
Not at all	12.8%	13.0%	6.8%
No opinion	26.4%	26.5%	22.8%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	25.4%	23.5%	42.0%
Minor	20.3%	27.5%	23.0%
Not at all	17.7%	3.9%	7.5%
No opinion	36.6%	45.1%	27.5%

10b. How much of a problem is: H. Exotic species like the Zebra mussels

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	50.4%	46.9%	49.4%
Minor	30.4%	32.1%	35.8%
Not at all	7.2%	9.9%	6.2%
No opinion	12.0%	11.1%	8.6%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	37.1%	62.7%	53.0%
Minor	28.4%	19.6%	24.0%
Not at all	17.7%	2.0%	7.0%
No opinion	16.8%	15.7%	16.0%

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10b. How much of a problem is: I. Lake fish unsafe to eat

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	44.8%	42.0%	53.1%
Minor	32.0%	36.4%	30.9%
Not at all	13.6%	16.0%	8.6%
No opinion	9.6%	5.6%	7.4%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Major	31.9%	54.9%	50.5%
Minor	28.0%	27.5%	24.0%
Not at all	33.2%	7.8%	18.5%
No opinion	6.9%	9.8%	7.0%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10b. How much of a problem is: J. Lake unsafe for swimming

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Major	20.8%	21.6%	37.0%
Minor	35.2%	34.0%	35.8%
Not at all	37.6%	38.9%	20.4%
No opinion	6.4%	5.6%	6.8%

Random Sample

	Small	Modium	Large
Base: All respondents	232	51	200
Major	9.5%	31.4%	35.5%
Minor	31.5%	45.1%	28.5%
Not at all	54.7%	13.7%	28.0%
No opinion	4.3%	9.8%	8.0%

11b. Do you feel there is anything you can do to help improve Lake ___ water quality? What is that?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
No	23.2%	21.0%	16.7%
Don't know	20.8%	18.5%	14.8%
Proper waste disposal	29.6%	29.6%	25.9%
Increase public awareness	16.8%	16.7%	16.0%
Recycle	3.2%	10.5%	12.3%
Beach clean ups	3.2%	10.5%	8.0%
Write to congressman	4.0%	5.6%	11.7%
Join environmental group	5.6%	4.9%	11.1%
More/better government controls	4.0%	1.9%	6.8%
Other personal action	3.2%	3.1%	3.1%
More tax funds		.6%	.6%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
No	38.8%	21.6%	26.0%
Don't know	10.3%	33.3%	24.5%
Proper waste disposal	25.0%	13.7%	20.0%
Increase public awareness	8.2%	17.6%	11.0%
Recycle	2.6%	5.9%	11.0%
Beach clean ups	9.1%	5.9%	6.0%
Write to congressman	6.0%	5.9%	9.0%
Join environmental group	6.0%		2.5%
More/better government controls	3.0%	5.9%	5.0%
Other personal action	3.4%		5.5%
More tax funds	.9%		

12b. Do you feel there is anything the government can do to help improve Lake ___ water quality? What is that?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
No	4.8%	6.2%	4.3%
Don't know	13.6%	10.5%	8.0%
Better rule enforcement	47.2%	42.0%	52.5%
More restrictions on industry	24.0%	25.3%	35.2%
More restrictions on chemicals	16.0%	16.0%	24.7%
Fines for polluters	5.6%	12.3%	17.3%
More laws	2.4%	13.0%	6.8%
More education	12.8%	12.3%	6.8%
Provide more funds	7.2%	11.7%	6.8%
More clean up	1.6%		2.5%
More research	3.2%	3.7%	1.9%
Continue current efforts	1.6%	4.9%	1.9%
Less restrictions, enforcement			.6%
Economic incentives		.6%	.6%
International cooperation		.6%	.6%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
No	12.1%	3.9%	2.5%
Don't know	10.8%	25.5%	15.0%
Better rule enforcement	38.4%	41.2%	47.0%
More restrictions on industry	34.1%	19.6%	28.5%
More restrictions on chemicals	15.1%	7.8%	19.5%
Fines for polluters	10.3%	11.8%	14.5%
More laws	4.7%	9.8%	12.0%
More education	6.5%	2.0%	6.0%
Provide more funds	5.2%	9.8%	6.5%
More clean up	3.8%		4.0%
More research	.4%	2.0%	1.5%
Continue current efforts	1.3%		
Less restrictions, enforcement	.9%		1.0%
Economic incentives			1.5%
International cooperation	.4%		

13b. Have you heard or read anything about an environmental research ship named the Lake Guardian?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Yes			
No			
Log book visitor	100.0%	100.0%	100.0%
Don't know			

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Yes	24.1%	11.8%	4.5%
No	72.4%	82.4%	92.5%
Log book visitor			
Don't know	3.4%	5.9%	3.0%

14b. Can you recall where you heard about the research ship Lake Guardian?

Log Book

	Small	Medium	Large
Base: Heard of Lake Guardian	125	162	162
Local newspaper	40.0%	32.7%	25.9%
Radio	9.6%	1.9%	
Television	4.0%	10.5%	9.9%
Word of mouth	20.8%	11.7%	18.5%
Saw in area	20.0%	40.1%	34.0%
School	2.4%	.6%	6.2%
Sault St. Marie Information Booth	.8%		
Personal Invitation	.8%		.6%
Through Sierra Club	1.6%		.6%
Flyer in grocery store			.6%
Coast Guard			.6%
Mailer			.6%
Ohio Coastal Reserve Advisory Council			.6%
County water district			.6%
Can't recall		2.5%	1.2%

Random Sample

	Small	Medium	Large
Base: Heard of Lake Guardian	56	6	9
Local newspaper	42.9%		33.3%
Radio	1.8%		11.1%
Television	14.3%	66.7%	22.2%
Word of mouth	8.9%	33.3%	22.2%
Saw in area	26.8%		
School	1.8%		
Through Sierra Club	3.6%		
Can't recall			11.1%

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7. Over the past ten years, would you say that the water quality in Lake ___ is it improving, is it getting worse, or is it staying about the same?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Improving	212	47.2%	25	25.3%	14	20.3%	151	62.9%	22	53.7%
About the same	117	26.1%	37	37.4%	20	29.0%	52	21.7%	8	19.5%
Getting worse	66	14.7%	17	17.2%	23	33.3%	20	8.3%	6	14.6%
No opinion	54	12.0%	20	20.2%	12	17.4%	17	7.1%	5	12.2%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Improving	124	25.7%	9	9.0%	16	16.0%	91	36.3%	8	25.0%
About the same	166	34.4%	53	53.0%	36	36.0%	66	26.3%	11	34.4%
Getting worse	130	26.9%	27	27.0%	37	37.0%	57	22.7%	9	28.1%
No opinion	63	13.0%	11	11.0%	11	11.0%	37	14.7%	4	12.5%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

8. What do you think are the biggest problems concerning Lake ___ water quality?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Contaminants pollution	270	60.1%	57	57.6%	48	69.6%	138	57.5%	27	65.9%
Zebra Mussels	44	9.8%	10	10.1%	3	4.3%	26	10.8%	5	12.2%
Paper mills	23	5.1%	6	6.1%	6	8.7%	11	4.6%		
Industrial waste	25	5.6%	4	4.0%	3	4.3%	17	7.1%	1	2.4%
Ship traffic	25	5.6%	13	13.1%	2	2.9%	7	2.9%	3	7.3%
Dirty beaches	13	2.9%	2	2.0%	1	1.4%	10	4.2%		
Pesticides	17	3.8%	1	1.0%			14	5.8%	2	4.9%
People's behavior, attitudes	8	1.8%	1	1.0%			7	2.9%		
Chemical waste	13	2.9%	5	5.1%	1	1.4%	7	2.9%		
Public utility waste	11	2.4%	2	2.0%			9	3.8%		
Oil spills	7	1.6%			2	2.9%	4	1.7%	1	2.4%
Acid rain	7	1.6%	3	3.0%	1	1.4%	2	.8%	1	2.4%
Biological effects	10	2.2%	3	3.0%	1	1.4%	4	1.7%	2	4.9%
Harm to wildlife, fish	6	1.3%			1	1.4%	5	2.1%		
Managing lake quality	5	1.1%	1	1.0%			4	1.7%		
There are no problems	8	1.8%	3	3.0%	3	4.3%	2	.8%		
Don't know	61	13.6%	14	14.1%	8	11.6%	30	12.5%	9	22.0%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

8. What do you think are the biggest problems concerning Lake ___ water quality?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Contaminants pollution	272	56.3%	53	53.0%	60	60.0%	144	57.4%	15	46.9%
Zebra Mussels	24	5.0%	1	1.0%	3	3.0%	15	6.0%	5	15.6%
Paper mills	24	5.0%	5	5.0%	7	7.0%	10	4.0%	2	6.3%
Industrial waste	22	4.6%	4	4.0%	5	5.0%	12	4.8%	1	3.1%
Ship traffic	13	2.7%	4	4.0%	1	1.0%	8	3.2%		
Dirty beaches	22	4.6%	4	4.0%	8	8.0%	9	3.6%	1	3.1%
Pesticides	10	2.1%	2	2.0%			8	3.2%		
People's behavior, attitudes	13	2.7%	4	4.0%	2	2.0%	6	2.4%	1	3.1%
Chemical waste	6	1.2%			2	2.0%	4	1.6%		
Public utility waste	6	1.2%	1	1.0%					5	15.6%
Oil spills	9	1.9%	2	2.0%	1	1.0%	6	2.4%		
Acid rain	7	1.4%	2	2.0%			5	2.0%		
Biological effects	4	.8%	1	1.0%			2	.8%	1	3.1%
Harm to wildlife, fish	2	.4%			1	1.0%	1	.4%		
Managing lake quality	3	.6%					3	1.2%		
There are no problems	24	5.0%	11	11.0%	6	6.0%	6	2.4%	1	3.1%
Don't know	108	22.4%	22	22.0%	19	19.0%	60	23.9%	7	21.9%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

9. Who do you feel is responsible for monitoring the water quality of Lake ___?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
US Environmental Protection Agency	151	33.6%	27	27.3%	18	26.1%	96	40.0%	10	24.4%
State government	60	13.4%	5	5.1%	9	13.0%	39	16.3%	7	17.1%
US Federal Government	68	15.1%	22	22.2%	6	8.7%	31	12.9%	9	22.0%
Department of Natural Resources	30	6.7%	10	10.1%	12	17.4%	6	2.5%	2	4.9%
Local government	36	8.0%	3	3.0%	3	4.3%	26	10.8%	4	9.8%
All of us	44	9.8%	8	8.1%	8	11.6%	21	8.8%	7	17.1%
Industry	24	5.3%	8	8.1%	4	5.8%	11	4.6%	1	2.4%
Environment Canada	16	3.6%	5	5.1%	1	1.4%	10	4.2%		
Other government group	16	3.6%	4	4.0%	1	1.4%	11	4.6%		
Non-government group	4	.9%	2	2.0%	1	1.4%	1	.4%		
Don't know	95	21.2%	24	24.2%	20	29.0%	39	16.3%	12	29.3%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
US Environmental Protection Agency	63	13.0%	10	10.0%	10	10.0%	35	13.9%	8	25.0%
State government	77	15.9%	13	13.0%	8	8.0%	50	19.9%	6	18.8%
US Federal Government	40	8.3%	12	12.0%	1	1.0%	26	10.4%	1	3.1%
Department of Natural Resources	76	15.7%	18	18.0%	33	33.0%	24	9.6%	1	3.1%
Local government	52	10.8%	13	13.0%	10	10.0%	27	10.8%	2	6.3%
All of us	37	7.7%	9	9.0%	9	9.0%	16	6.4%	3	9.4%
Industry	14	2.9%	1	1.0%	5	5.0%	8	3.2%		
Environment Canada	16	3.3%	6	6.0%			9	3.6%	1	3.1%
Other government group	16	3.3%	3	3.0%	2	2.0%	9	3.6%	2	6.3%
Non-government group	1	.2%			1	1.0%				
Don't know	156	32.3%	31	31.0%	32	32.0%	82	32.7%	11	34.4%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10. How much of a problem is each of the following?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Acid Rain										
Major	184	41.0%	46	46.5%	19	27.5%	102	42.5%	17	41.5%
Minor	150	33.4%	30	30.3%	18	26.1%	88	36.7%	14	34.1%
Not at all	53	11.8%	15	15.2%	13	18.8%	23	9.6%	2	4.9%
No opinion	62	13.8%	8	8.1%	19	27.5%	27	11.3%	8	19.5%
Pollution in the bottom mud										
Major	225	50.1%	41	41.4%	26	37.7%	139	57.9%	19	46.3%
Minor	130	29.0%	37	37.4%	24	34.8%	62	25.8%	7	17.1%
Not at all	26	5.8%	11	11.1%	4	5.8%	9	3.8%	2	4.9%
No opinion	68	15.1%	10	10.1%	15	21.7%	30	12.5%	13	31.7%
Chemicals washing into the lake from farms										
Major	232	51.7%	37	37.4%	24	34.8%	154	64.2%	17	41.5%
Minor	147	32.7%	42	42.4%	27	39.1%	62	25.8%	16	39.0%
Not at all	33	7.3%	12	12.1%	11	15.9%	8	3.3%	2	4.9%
No opinion	37	8.2%	8	8.1%	7	10.1%	16	6.7%	6	14.6%
Chemicals washing into the lake from cities										
Major	325	72.4%	62	62.6%	50	72.5%	190	79.2%	23	56.1%
Minor	85	18.9%	28	28.3%	11	15.9%	36	15.0%	10	24.4%
Not at all	15	3.3%	5	5.1%	6	8.7%	2	.8%	2	4.9%
No opinion	24	5.3%	4	4.0%	2	2.9%	12	5.0%	6	14.6%
Industries dumping chemicals in the lake										
Major	335	74.6%	61	61.6%	54	78.3%	194	80.8%	26	63.4%
Minor	79	17.6%	27	27.3%	10	14.5%	34	14.2%	8	19.5%
Not at all	12	2.7%	5	5.1%	3	4.3%	3	1.3%	1	2.4%
No opinion	23	5.1%	6	6.1%	2	2.9%	9	3.8%	6	14.6%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10. How much of a problem is each of the following?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Acid Rain										
Major	145	30.0%	26	26.0%	26	26.0%	84	33.5%	9	28.1%
Minor	162	33.5%	27	27.0%	33	33.0%	92	36.7%	10	31.3%
Not at all	84	17.4%	25	25.0%	23	23.0%	27	10.8%	9	28.1%
No opinion	92	19.0%	22	22.0%	18	18.0%	48	19.1%	4	12.5%
Pollution in the bottom mud										
Major	210	43.5%	30	30.0%	36	36.0%	129	51.4%	15	46.9%
Minor	133	27.5%	25	25.0%	27	27.0%	72	28.7%	9	28.1%
Not at all	44	9.1%	16	16.0%	16	16.0%	9	3.6%	3	9.4%
No opinion	96	19.9%	29	29.0%	21	21.0%	41	16.3%	5	15.6%
Chemicals washing into the lake from farms										
Major	203	42.0%	30	30.0%	35	35.0%	125	49.8%	13	40.6%
Minor	138	28.6%	35	35.0%	30	30.0%	63	25.1%	10	31.3%
Not at all	76	15.7%	23	23.0%	23	23.0%	23	9.2%	7	21.9%
No opinion	66	13.7%	12	12.0%	12	12.0%	40	15.9%	2	6.3%
Chemicals washing into the lake from cities										
Major	310	64.2%	52	52.0%	60	60.0%	175	69.7%	23	71.9%
Minor	101	20.9%	28	28.0%	21	21.0%	46	18.3%	6	18.8%
Not at all	28	5.8%	12	12.0%	12	12.0%	4	1.6%		
No opinion	44	9.1%	8	8.0%	7	7.0%	26	10.4%	3	9.4%
Industries dumping chemicals in the lake										
Major	335	69.4%	63	63.0%	63	63.0%	188	74.9%	21	65.6%
Minor	70	14.5%	12	12.0%	14	14.0%	36	14.3%	8	25.0%
Not at all	27	5.6%	10	10.0%	10	10.0%	5	2.0%	2	6.3%
No opinion	51	10.6%	15	15.0%	13	13.0%	22	8.8%	1	3.1%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10. How much of a problem is each of the following?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
PCBs in the lake										
Major	233	51.9%	46	46.5%	33	47.8%	130	54.2%	24	58.5%
Minor	93	20.7%	20	20.2%	16	23.2%	52	21.7%	5	12.2%
Not at all	24	5.3%	11	11.1%	4	5.8%	7	2.9%	2	4.9%
No opinion	99	22.0%	22	22.2%	16	23.2%	51	21.3%	10	24.4%
DDT in the lake										
Major	164	36.5%	31	31.3%	23	33.3%	97	40.4%	13	31.7%
Minor	124	27.6%	24	24.2%	23	33.3%	66	27.5%	11	26.8%
Not at all	48	10.7%	16	16.2%	8	11.6%	19	7.9%	5	12.2%
No opinion	113	25.2%	28	28.3%	15	21.7%	58	24.2%	12	29.3%
Exotic species like the Zebra Mussels										
Major	219	48.8%	45	45.5%	37	53.6%	117	48.8%	20	48.8%
Minor	148	33.0%	33	33.3%	22	31.9%	83	34.6%	10	24.4%
Not at all	35	7.8%	13	13.1%	4	5.8%	15	6.3%	3	7.3%
No opinion	47	10.5%	8	8.1%	6	8.7%	25	10.4%	8	19.5%
Lake fish unsafe to eat										
Major	210	46.8%	32	32.3%	32	46.4%	125	52.1%	21	51.2%
Minor	149	33.2%	42	42.4%	18	26.1%	77	32.1%	12	29.3%
Not at all	57	12.7%	23	23.2%	14	20.3%	19	7.9%	1	2.4%
No opinion	33	7.3%	2	2.0%	5	7.2%	19	7.9%	7	17.1%
Lake unsafe for swimming										
Major	121	26.9%	12	12.1%	9	13.0%	85	35.4%	15	36.6%
Minor	157	35.0%	26	26.3%	26	37.7%	91	37.9%	14	34.1%
Not at all	143	31.8%	58	58.6%	33	47.8%	47	19.6%	5	12.2%
No opinion	28	6.2%	3	3.0%	1	1.4%	17	7.1%	7	17.1%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

10. How much of a problem is each of the following?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
PCBs in the lake										
Major	212	43.9%	34	34.0%	37	37.0%	123	49.0%	18	56.3%
Minor	94	19.5%	22	22.0%	19	19.0%	46	18.3%	7	21.9%
Not at all	33	6.8%	11	11.0%	11	11.0%	10	4.0%	1	3.1%
No opinion	144	29.8%	33	33.0%	33	33.0%	72	28.7%	6	18.8%
DDT in the lake										
Major	155	32.1%	19	19.0%	30	30.0%	96	38.2%	10	31.3%
Minor	107	22.2%	29	29.0%	12	12.0%	60	23.9%	6	18.8%
Not at all	58	12.0%	16	16.0%	17	17.0%	17	6.8%	8	25.0%
No opinion	163	33.7%	36	36.0%	41	41.0%	78	31.1%	8	25.0%
Exotic species like the Zebra Mussels										
Major	224	46.4%	26	26.0%	40	40.0%	138	55.0%	20	62.5%
Minor	124	25.7%	25	25.0%	35	35.0%	58	23.1%	6	18.8%
Not at all	56	11.6%	25	25.0%	11	11.0%	15	6.0%	5	15.6%
No opinion	79	16.4%	24	24.0%	14	14.0%	40	15.9%	1	3.1%
Lake fish unsafe to eat										
Major	203	42.0%	23	23.0%	33	33.0%	129	51.4%	18	56.3%
Minor	127	26.3%	21	21.0%	36	36.0%	62	24.7%	8	25.0%
Not at all	118	24.4%	45	45.0%	27	27.0%	41	16.3%	5	15.6%
No opinion	35	7.2%	11	11.0%	4	4.0%	19	7.6%	1	3.1%
Lake unsafe for swimming										
Major	109	22.6%	7	7.0%	11	11.0%	87	34.7%	4	12.5%
Minor	153	31.7%	18	18.0%	38	38.0%	80	31.9%	17	53.1%
Not at all	190	39.3%	67	67.0%	50	50.0%	63	25.1%	10	31.3%
No opinion	31	6.4%	8	8.0%	1	1.0%	21	8.4%	1	3.1%

11. Do you feel there is anything you can do to help improve Lake ___ water quality? What is that?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
No	90	20.0%	22	22.2%	22	31.9%	43	17.9%	3	7.3%
Don't Know	80	17.8%	11	11.1%	9	13.0%	44	18.3%	16	39.0%
Proper waste disposal	127	28.3%	37	37.4%	24	34.8%	57	23.8%	9	22.0%
Increase public awareness	74	16.5%	16	16.2%	10	14.5%	39	16.3%	9	22.0%
Recycle	41	9.1%	4	4.0%	1	1.4%	34	14.2%	2	4.9%
Beach clean ups	34	7.6%	9	9.1%	3	4.3%	22	9.2%		
Write to congressman	33	7.3%	6	6.1%	2	2.9%	22	9.2%	3	7.3%
Join environmental group	33	7.3%	8	8.1%	5	7.2%	20	8.3%		
More/better government controls	19	4.2%	2	2.0%	2	2.9%	13	5.4%	2	4.9%
Other personal action	14	3.1%	4	4.0%	3	4.3%	6	2.5%	1	2.4%
More tax funds	2	.4%	1	1.0%			1	.4%		

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
No	153	31.7%	45	45.0%	37	37.0%	63	25.1%	8	25.0%
Don't Know	90	18.6%	7	7.0%	14	14.0%	66	26.3%	3	9.4%
Proper waste disposal	105	21.7%	18	18.0%	24	24.0%	47	18.7%	16	50.0%
Increase public awareness	50	10.4%	11	11.0%	5	5.0%	31	12.4%	3	9.4%
Recycle	31	6.4%	1	1.0%	3	3.0%	25	10.0%	2	6.3%
Beach clean ups	36	7.5%	11	11.0%	7	7.0%	15	6.0%	3	9.4%
Write to congressman	35	7.2%	7	7.0%	6	6.0%	21	8.4%	1	3.1%
Join environmental group	19	3.9%	3	3.0%	10	10.0%	5	2.0%	1	3.1%
More/better government controls	20	4.1%	3	3.0%	2	2.0%	13	5.2%	2	6.3%
Other personal action	19	3.9%	4	4.0%	3	3.0%	11	4.4%	1	3.1%
More tax funds	2	.4%			2	2.0%				

12. Do you feel there is anything the government can do to help improve Lake ___ water quality? What is that?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
No	23	5.1%	7	7.1%	5	7.2%	10	4.2%	1	2.4%
Better rule enforcement	212	47.2%	28	28.3%	34	49.3%	130	54.2%	20	48.8%
More restrictions on industry	128	28.5%	26	26.3%	20	29.0%	76	31.7%	6	14.6%
More restrictions on chemicals	86	19.2%	15	15.2%	11	15.9%	54	22.5%	6	14.6%
Fines for polluters	55	12.2%	13	13.1%	3	4.3%	38	15.8%	1	2.4%
More laws	35	7.8%	12	12.1%	1	1.4%	21	8.8%	1	2.4%
More education	47	10.5%	19	19.2%	5	7.2%	17	7.1%	6	14.6%
Provide more funds	38	8.5%	13	13.1%	4	5.8%	17	7.1%	4	9.8%
More clean up	6	1.3%	1	1.0%	1	1.4%	4	1.7%		
More research	13	2.9%	5	5.1%	3	4.3%	5	2.1%		
Continue current efforts	13	2.9%	8	8.1%	2	2.9%	3	1.3%		
Less restrictions, enforcement	1	.2%					1	.4%		
Economic incentives	2	.4%					2	.8%		
International cooperation	2	.4%	1	1.0%			1	.4%		
Stock it better										
Tax Canadians for pollution	1	.2%					1	.4%		
Don't know	47	10.5%	10	10.1%	4	5.8%	21	8.8%	12	29.3%

12. Do you feel there is anything the government can do to help improve Lake ___ water quality? What is that?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
No	35	7.2%	11	11.0%	12	12.0%	7	2.8%	5	15.6%
Better rule enforcement	204	42.2%	41	41.0%	34	34.0%	115	45.8%	14	43.8%
More restrictions on industry	146	30.2%	35	35.0%	36	36.0%	67	26.7%	8	25.0%
More restrictions on chemicals	78	16.1%	18	18.0%	11	11.0%	43	17.1%	6	18.8%
Fines for polluters	59	12.2%	9	9.0%	12	12.0%	35	13.9%	3	9.4%
More laws	40	8.3%	3	3.0%	5	5.0%	29	11.6%	3	9.4%
More education	28	5.8%	11	11.0%	3	3.0%	13	5.2%	1	3.1%
Provide more funds	30	6.2%	3	3.0%	7	7.0%	18	7.2%	2	6.3%
More clean up	16	3.3%	1	1.0%	4	4.0%	8	3.2%	3	9.4%
More research	5	1.0%					4	1.6%	1	3.1%
Continue current efforts	3	.6%			3	3.0%				
Less restrictions, enforcement	4	.8%	2	2.0%			2	.8%		
Economic incentives	3	.6%					3	1.2%		
International cooperation	1	.2%	1	1.0%						
Stock it better	1	.2%	1	1.0%						
Tax Canadians for pollution										
Don't know	68	14.1%	11	11.0%	11	11.0%	43	17.1%	3	9.4%

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13. Have you heard or read anything about an environmental research ship named the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Log book visitor	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Yes	71	14.7%	23	23.0%	33	33.0%	15	6.0%		
No	395	81.8%	72	72.0%	65	65.0%	227	90.4%	31	96.9%
Don't know	17	3.5%	5	5.0%	2	2.0%	9	3.6%	1	3.1%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

14. Can you recall where you heard about the research ship Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Heard of Lake Guardian	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Local newspaper	145	32.3%	46	46.5%	16	23.2%	56	23.3%	27	65.9%
Radio	15	3.3%	2	2.0%	10	14.5%	1	.4%	2	4.9%
Television	38	8.5%	8	8.1%	4	5.8%	25	10.4%	1	2.4%
Word of mouth	75	16.7%	15	15.2%	16	23.2%	38	15.8%	6	14.6%
Saw in area	145	32.3%	25	25.3%	18	26.1%	97	40.4%	5	12.2%
School	14	3.1%	1	1.0%	3	4.3%	10	4.2%		
Sault St. Marie Information Booth	1	.2%	1	1.0%						
Personal Invitation	2	.4%			1	1.4%	1	.4%		
Through Sierra Club	3	.7%	1	1.0%	1	1.4%	1	.4%		
Flyer in grocery store	1	.2%					1	.4%		
Coast Guard	1	.2%					1	.4%		
Mailer	1	.2%					1	.4%		
Ohio Coastal Reserve Advisory Council	1	.2%					1	.4%		
County water district	1	.2%					1	.4%		
Can't recall	6	1.3%					6	2.5%		

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

14. Can you recall where you heard about the research ship Lake Guardian?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Heard of Lake Guardian	71	100.0%	23	100.0%	33	100.0%	15	100.0%		
Local newspaper	27	38.0%	12	52.2%	12	36.4%	3	20.0%		
Radio	2	2.8%	1	4.3%			1	6.7%		
Television	14	19.7%	3	13.0%	5	15.2%	6	40.0%		
Word of mouth	9	12.7%	2	8.7%	3	9.1%	4	26.7%		
Saw in area	15	21.1%	4	17.4%	11	33.3%				
School	1	1.4%	1	4.3%						
Sault St. Marie Information Booth										
Personal Invitation										
Through Sierra Club	2	2.8%			2	6.1%				
Flyer in grocery store										
Coast Guard										
Mailer										
Ohio Coastal Reserve Advisory Council										
County water district										
Can't recall	1	1.4%					1	6.7%		

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

15. Are you aware that public tours are available on the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Heard of Lake Guardian	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Yes	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Heard of Lake Guardian	71	100.0%	23	100.0%	33	100.0%	15	100.0%		
Yes	39	54.9%	15	65.2%	21	63.6%	3	20.0%		
No	30	42.3%	7	30.4%	12	36.4%	11	73.3%		
Don't know	2	2.8%	1	4.3%			1	6.7%		

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

16. Have you, personally, toured the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Aware of public tours	445	100.0%	99	100.0%	69	100.0%	238	100.0%	39	100.0%
No	1	.2%					1	.4%		
Log book visitor	444	99.8%	99	100.0%	69	100.0%	237	99.6%	39	100.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Aware of public tours	39	100.0%	15	100.0%	21	100.0%	3	100.0%		
Yes	2	5.1%	1	6.7%	1	4.8				
No	37	94.9%	14	93.3%	20	95.2%	3	100.0%		

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17. What was the main reason you toured the ship?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
Interest in the ship itself	251	56.0%	56	56.6%	36	52.2%	146	61.1%	13	31.7%
Interest in conservation, environment	192	42.9%	48	48.5%	28	40.6%	103	43.1%	13	31.7%
Educational experience	65	14.5%	6	6.1%	6	8.7%	33	13.8%	20	48.8%
Curiosity	40	8.9%	12	12.1%	14	20.3%	14	5.9%		
To take children	36	8.0%	9	9.1%	9	13.0%	16	6.7%	2	4.9%
Went with family member	21	4.7%	9	9.1%	3	4.3%	9	3.8%		
Went with a group	11	2.5%			5	7.2%	5	2.1%	1	2.4%
School field trip	7	1.6%	2	2.0%	1	1.4%	2	.8%	2	4.9%
Business related	4	.9%			1	1.4%	2	.8%	1	2.4%
No response	2	.4%					2	.8%		

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
Interest in the ship itself	2	100.0%	1	100.0%	1	100.0%				
Curiosity	1	50.0%	1	100.0%						

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18. Have any other members of your family toured the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
Yes	239	53.3%	73	73.7%	51	73.9%	100	41.8%	15	36.6%
No	208	46.4%	26	26.3%	18	26.1%	139	58.2%	25	61.0%
Not sure	1	.2%							1	2.4%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	39	100.0%	15	100.0%	21	100.0%	3	100.0%		
Yes	10	25.6%	4	26.7%	5	23.8%	1	33.3%		
No	28	71.8%	11	73.3%	15	71.4%	2	66.7%		
Not sure	1	2.6%			1	4.8%				

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

19. What was the main reason your family member toured the ship?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Family member toured Lake Guardian	239	100.0%	73	100.0%	51	100.0%	100	100.0%	15	100.0%
Interest in the ship itself	86	36.0%	22	30.1%	15	29.4%	45	45.0%	4	26.7%
Went with family member	76	31.8%	31	42.5%	19	37.3%	21	21.0%	5	33.3%
Interest in conservation/environment	76	31.8%	30	41.1%	4	7.8%	39	39.0%	3	20.0%
Educational experience	25	10.5%	5	6.8%	5	9.8%	13	13.0%	2	13.3%
Curiosity	19	7.9%	6	8.2%	6	11.8%	7	7.0%		
To take children	15	6.3%	4	5.5%	2	3.9%	7	7.0%	2	13.3%
School field trip	10	4.2%	2	2.7%	5	9.8%	1	1.0%	2	13.3%
Went with a group	9	3.8%			7	13.7%	1	1.0%	1	6.7%
Don't know	3	1.3%	1	1.4%	1	2.0%	1	1.0%		

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Family member toured Lake Guardian	10	100.0%	4	100.0%	5	100.0%	1	100.0%		
School field trip	7	70.0%	3	75.0%	4	80.0%				
Educational experience	2	20.0%	1	25.0%			1	100.0%		
Went with family member	1	10.0%			1	20.0%				

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

20. What impressed you most about the Lake Guardian tour?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
The labs and their equipment	206	46.0%	49	49.5%	32	46.4%	107	44.8%	18	43.9%
The work they are doing	163	36.4%	43	43.4%	23	33.3%	85	35.6%	12	29.3%
The captain and crew	109	24.3%	28	28.3%	14	20.3%	50	20.9%	17	41.5%
Other equipment on deck	62	13.8%	22	22.2%	8	11.6%	28	11.7%	4	9.8%
The scientists on board	38	8.5%	5	5.1%	6	8.7%	24	10.0%	3	7.3%
The size of the ship	22	4.9%	6	6.1%	4	5.8%	12	5.0%		
The Rosette water sampler	18	4.0%	1	1.0%	4	5.8%	11	4.6%	2	4.9%
Lakes coming back	14	3.1%					9	3.8%	5	12.2%
Ship is non-polluting	11	2.5%	3	3.0%	1	1.4%	7	2.9%		
Other	49	10.9%	12	12.1%	7	10.1%	28	11.7%	2	4.9%
Base: Other	49	100.0%	12	100.0%	7	100.0%	28	100.0%	2	100.0%
Living quarters	18	36.7%	2	16.7%	4	57.1%	11	39.3%	1	50.0%
Knowledgeable guide	16	32.7%	5	41.7%	2	28.6%	8	28.6%	1	50.0%
Well organized, informative	9	18.4%	4	33.3%			5	17.9%		
Ship design, features	6	12.2%	1	8.3%	1	14.3%	4	14.3%		

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20. What impressed you most about the Lake Guardian tour?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
The labs and their equipment	1	50.0%			1	100.0%				
Lakes coming back	1	50.0%	1	100.0%						

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21. Please tell me which of these activities you recall being presented during your tour?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
Measuring water pollution	373	83.3%	87	87.9%	61	88.4%	205	85.8%	20	48.8%
Conducting experiments	344	76.8%	80	80.8%	60	87.0%	189	79.1%	15	36.6%
Measuring pollution in sediments	320	71.4%	73	73.7%	51	73.9%	180	75.3%	16	39.0%
Operating as a non-polluting ship	301	67.2%	89	89.9%	52	75.4%	142	59.4%	18	43.9%
Monitoring pollution hot spots	291	65.0%	65	65.7%	45	65.2%	165	69.0%	16	39.0%
Training young scientists	240	53.6%	56	56.6%	48	69.6%	123	51.5%	13	31.7%
Measuring pollution in fish	213	47.5%	48	48.5%	31	44.9%	122	51.0%	12	29.3%
Measuring air pollution	124	27.7%	30	30.3%	12	17.4%	75	31.4%	7	17.1%
Don't know	3	.7%					1	.4%	2	4.9%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
Monitoring pollution hot spots	1	50.0%			1	100.0%				
Measuring water pollution	1	50.0%			1	100.0%				
Measuring pollution in sediments	1	50.0%			1	100.0%				
Measuring pollution in fish	1	50.0%			1	100.0%				
Measuring air pollution	1	50.0%			1	100.0%				
Conducting experiments	1	50.0%			1	100.0%				
Operating as a non-polluting ship	1	50.0%			1	100.0%				
Don't know			1	100.0%						

22. Did you have any questions that were not answered to your satisfaction during the tour? What was your question?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
No unaswered questions	433	96.7%	98	99.0%	64	92.8%	233	97.5%	38	92.7%
How often in area	2	.4%			1	1.4%	1	.4%		
What did you find in the Lake, Bay?	2	.4%			1	1.4%	1	.4%		
What can you do for Thunder Bay?	2	.4%			2	2.9%				
Is ship non-polluting	1	.2%			1	1.4%				
What do you do with the information?	1	.2%	1	1.0%						
How serious IS pollution, contamination?	1	.2%					1	.4%		
More about boom on ship	1	.2%					1	.4%		
Did not release test results	1	.2%							1	2.4%
Is there a mystery corner on lower corner of lake?	1	.2%							1	2.4%
How is the water quality of Lake Ontario?	1	.2%							1	2.4%
Did not answer Data Program	1	.2%					1	.4%		
How cope with long stays on board	1	.2%					1	.4%		

Random Sample

	Total		Lake					
			Superior		Huron		Erie	Ontario
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%		
No unaswered questions	2	100.0%	1	100.0%	1	100.0%		

23. Did you receive a general fact sheet and a self-guided tour brochure when you were aboard the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
Yes	398	88.8%	90	90.9%	58	84.1%	214	89.5%	36	87.8%
No	40	8.9%	8	8.1%	10	14.5%	20	8.4%	2	4.9%
Not sure	10	2.2%	1	1.0%	1	1.4%	5	2.1%	3	7.3%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
Yes	1	50.0%			1	100.0%				
No	1	50.0%	1	100.0%						

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24. Were these helpful to you

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Received materials	399	100.0%	90	100.0%	58	100.0%	215	100.0%	36	100.0%
Yes	375	94.0%	86	95.6%	55	94.8%	202	94.0%	32	88.9%
No	11	2.8%			1	1.7%	8	3.7%	2	5.6%
Not sure	13	3.3%	4	4.4%	2	3.4%	5	2.3%	2	5.6%

Random Sample

	Total		Lake					
			Superior	Huron		Erie	Ontario	
Base: Received materials	1	100.0%		1	100.0%			
Yes	1	100.0%		1	100.0%			

25. What would have improved the fact sheet and self-guided tour brochures?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Materials not helpful	28	100.0%	4	100.0%	3	100.0%	16	100.0%	5	100.0%
Nothing	3	10.7%					1	6.3%	2	40.0%
Don't know	21	75.0%	3	75.0%	2	66.7%	14	87.5%	2	40.0%
Use laymen's terminology	2	7.1%					1	6.3%	1	20.0%
Explaining hot spots	1	3.6%	1	25.0%						
Too juvenile for adults	1	3.6%			1	33.3%				

26. Was there anything you did not like about your tour of the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
No dislikes about tour	386	86.2%	81	81.8%	53	76.8%	219	91.6%	33	80.5%
Wanted more time, information	18	4.0%	5	5.1%	5	7.2%	5	2.1%	3	7.3%
Facilities inadequate for group	9	2.0%	1	1.0%	5	7.2%	3	1.3%		
Didn't see enough of ship	6	1.3%	2	2.0%	2	2.9%	1	.4%	1	2.4%
Ship staff	6	1.3%	1	1.0%	1	1.4%	3	1.3%	1	2.4%
Long lines	6	1.3%	4	4.0%	2	2.9%				
Could not hear	5	1.1%	4	4.0%			1	.4%		
No personal tour	5	1.1%	1	1.0%			2	.8%	2	4.9%
Tour disorganized	4	.9%			1	1.4%	3	1.3%		
Other	3	.7%					2	.8%	1	2.4%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
No dislikes about tour	1	50.0%	1	100.0%						
Wanted more time, information	1	50.0%			1	100.0%				

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27. What day of the week and time were you aboard?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	448	100.0%	99	100.0%	69	100.0%	239	100.0%	41	100.0%
Sunday										
Morning	23	5.1%	20	20.2%	1	1.4%	2	.8%		
Afternoon	56	12.5%	44	44.4%			12	5.0%		
Evening	3	.7%	1	1.0%	1	1.4%	1	.4%		
Monday										
Morning	1	.2%					1	.4%		
Afternoon	22	4.9%	7	7.1%	2	2.9%	12	5.0%	1	2.4%
Evening	11	2.5%			1	1.4%	8	3.3%	2	4.9%
Tuesday										
Morning	2	.4%					2	.8%		
Afternoon	32	7.1%	1	1.0%	22	31.9%	9	3.8%		
Evening	19	4.2%			19	27.5%				
Don't recall	1	.2%					1	.4%		
Wednesday										
Morning	2	.4%					1	.4%	1	2.4%
Afternoon	41	9.2%	3	3.0%	3	4.3%	20	8.4%	15	36.6%
Evening	37	8.3%			3	4.3%	20	8.4%	14	34.1%
Thursday										
Afternoon	17	3.8%	1	1.0%	3	4.3%	12	5.0%	1	2.4%
Evening	12	2.7%			2	2.9%	8	3.3%	2	4.9%
Don't recall	1	.2%					1	.4%		
Friday										
Morning	4	.9%					4	1.7%		
Afternoon	11	2.5%	1	1.0%	2	2.9%	7	2.9%	1	2.4%
Evening	5	1.1%					3	1.3%	2	4.9%
Saturday										
Morning	38	8.5%	8	8.1%			30	12.6%		
Afternoon	72	16.1%	11	11.1%	2	2.9%	59	24.7%		
Evening	2	.4%					2	.8%		
Don't recall	36	8.0%	2	2.0%	8	11.6%	24	10.0%	2	4.9%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

27. What day of the week and time were you aboard?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Toured Lake Guardian	2	100.0%	1	100.0%	1	100.0%				
Tuesday										
Afternoon	1	50.0%			1	100.0%				
Saturday										
Afternoon	1	50.0%	1	100.0%						

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28. Can you recall who owns and operates the Lake Guardian?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Aware of Lake Guardian	448	100.0%	99	100.0%	68	100.0%	240	100.0%	41	100.0%
US EPA	224	50.0%	53	53.5%	26	38.2%	124	51.7%	21	51.2%
Federal Government	42	9.4%	8	8.1%	8	11.8%	22	9.2%	4	9.8%
Other government agencies	10	2.2%	4	4.0%	3	4.4%	3	1.3%		
Private Industry	7	1.6%					7	2.9%		
Other private groups	4	.9%	3	3.0%			1	.4%		
Coast Guard	3	.7%	2	2.0%			1	.4%		
Colleges Universities	1	.2%					1	.4%		
Don't know	157	35.0%	29	29.3%	31	45.6%	81	33.8%	16	39.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: Aware of Lake Guardian	71	100.0%	23	100.0%	33	100.0%	15	100.0%		
US EPA	5	7.0%	3	13.0%	2	6.1%				
Federal Government	2	2.8%			2	6.1%				
Other government agencies	1	1.4%			1	3.0%				
Greenpeace	1	1.4%			1	3.0%				
Colleges Universities	1	1.4%	1	4.3%						
Don't know	61	85.9%	19	82.6%	27	81.8%	15	100.0%		

29. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Too much emphasis	10	2.2%	4	4.0%	1	1.4%	5	2.1%		
About right	240	53.5%	55	55.6%	32	46.4%	130	54.2%	23	56.1%
Too little emphasis	170	37.9%	35	35.4%	27	39.1%	93	38.8%	15	36.6%
No opinion	29	6.5%	5	5.1%	9	13.0%	12	5.0%	3	7.3%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Too much emphasis	22	4.6%	8	8.0%	7	7.0%	7	2.8%		
About right	171	35.4%	32	32.0%	40	40.0%	90	35.9%	9	28.1%
Too little emphasis	224	46.4%	46	46.0%	43	43.0%	116	46.2%	19	59.4%
No opinion	66	13.7%	14	14.0%	10	10.0%	38	15.1%	4	12.5%

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30. Is your age...

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
25 & under	60	13.4%	14	14.1%	15	21.7%	29	12.1%	2	4.9%
26 to 35	116	25.8%	26	26.3%	20	29.0%	57	23.8%	13	31.7%
36 to 45	120	26.7%	27	27.3%	14	20.3%	69	28.8%	10	24.4%
46 to 55	67	14.9%	15	15.2%	10	14.5%	38	15.8%	4	9.8%
56 to 65	43	9.6%	9	9.1%	5	7.2%	22	9.2%	7	17.1%
66 to 75	31	6.9%	7	7.1%	3	4.3%	16	6.7%	5	12.2%
76 & over	5	1.1%	1	1.0%	1	1.4%	3	1.3%		
Refused	7	1.6%			1	1.4%	6	2.5%		

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
25 & under	60	12.4%	7	7.0%	10	10.0%	36	14.3%	7	21.9%
26 to 35	110	22.8%	18	18.0%	18	18.0%	63	25.1%	11	34.4%
36 to 45	105	21.7%	23	23.0%	11	11.0%	62	24.7%	9	28.1%
46 to 55	56	11.6%	10	10.0%	18	18.0%	27	10.8%	1	3.1%
56 to 65	66	13.7%	19	19.0%	18	18.0%	27	10.8%	2	6.3%
66 to 75	55	11.4%	17	17.0%	14	14.0%	23	9.2%	1	3.1%
76 & over	27	5.6%	5	5.0%	11	11.0%	10	4.0%	1	3.1%
Refused	4	.8%	1	1.0%			3	1.2%		

31. Including yourself, how many people currently live in your household?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
One	66	14.7%	13	13.1%	6	8.7%	38	15.8%	9	22.0%
Two	119	26.5%	32	32.3%	18	26.1%	59	24.6%	10	24.4%
Three	87	19.4%	16	16.2%	16	23.2%	47	19.6%	8	19.5%
Four	105	23.4%	23	23.2%	17	24.6%	60	25.0%	5	12.2%
Five	40	8.9%	9	9.1%	8	11.6%	16	6.7%	7	17.1%
Six	18	4.0%	5	5.1%	3	4.3%	9	3.8%	1	2.4%
Seven	1	.2%			1	1.4%				
Eight	5	1.1%	1	1.0%			4	1.7%		
Nine										
Ten or more	2	.4%					2	.8%		
Refused	6	1.3%					5	2.1%	1	2.4%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
One	83	17.2%	13	13.0%	21	21.0%	46	18.3%	3	9.4%
Two	172	35.6%	47	47.0%	47	47.0%	66	26.3%	12	37.5%
Three	68	14.1%	13	13.0%	10	10.0%	42	16.7%	3	9.4%
Four	88	18.2%	15	15.0%	11	11.0%	56	22.3%	6	18.8%
Five	39	8.1%	8	8.0%	7	7.0%	21	8.4%	3	9.4%
Six	22	4.6%	3	3.0%	2	2.0%	13	5.2%	4	12.5%
Seven	5	1.0%	1	1.0%	1	1.0%	2	.8%	1	3.1%
Eight	2	.4%			1	1.0%	1	.4%		
Nine	1	.2%					1	.4%		
Ten or more	1	.2%					1	.4%		
Refused	2	.4%					2	.8%		

32. How many are children under the age of 18?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
None	225	50.1%	54	54.5%	26	37.7%	122	50.8%	23	56.1%
One	80	17.8%	16	16.2%	19	27.5%	41	17.1%	4	9.8%
Two	81	18.0%	19	19.2%	11	15.9%	45	18.8%	6	14.6%
Three	40	8.9%	8	8.1%	12	17.4%	14	5.8%	6	14.6%
Four	12	2.7%	1	1.0%	1	1.4%	9	3.8%	1	2.4%
Five	1	.2%					1	.4%		
Six	2	.4%	1	1.0%			1	.4%		
Seven	1	.2%					1	.4%		
Refused	7	1.6%					6	2.5%	1	2.4%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
None	292	60.5%	64	64.0%	71	71.0%	140	55.8%	17	53.1%
One	61	12.6%	11	11.0%	12	12.0%	36	14.3%	2	6.3%
Two	70	14.5%	13	13.0%	8	8.0%	43	17.1%	6	18.8%
Three	40	8.3%	8	8.0%	6	6.0%	21	8.4%	5	15.6%
Four	13	2.7%	4	4.0%	3	3.0%	5	2.0%	1	3.1%
Five	3	.6%					2	.8%	1	3.1%
Six	1	.2%					1	.4%		
Seven										
Eight	1	.2%					1	.4%		
Refused	2	.4%					2	.8%		

33. Is anyone in your household a member of an environmental organization? Which ones?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
No, Don't know	376	83.7%	88	88.9%	57	82.6%	197	82.1%	34	82.9%
Yes	73	16.3%	11	11.1%	12	17.4%	43	17.9%	7	17.1%
Base: Named a group	70	100.0%	11	100.0%	11	100.0%	41	100.0%	7	100.0%
Sierra Club	14	20.0%	4	36.4%			8	19.5%	2	28.6%
National Wildlife Federation	9	12.9%	1	9.1%	1	9.1%	6	14.6%	1	14.3%
Audubon Society	12	17.1%	2	18.2%	3	27.3%	6	14.6%	1	14.3%
Nature Conservancy	7	10.0%	1	9.1%			4	9.8%	2	28.6%
Greenpeace	8	11.4%	1	9.1%	1	9.1%	4	9.8%	2	28.6%
Huron Environmental Activist League	5	7.1%			5	45.5%				
National Environmental Group	13	18.6%	1	9.1%	1	9.1%	8	19.5%	3	42.9%
Local activist group	16	22.9%	3	27.3%	1	9.1%	12	29.3%		
Other group	6	8.6%	2	18.2%			4	9.8%		

33. Is anyone in your household a member of an environmental organization? Which ones?

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
No, Don't know	447	92.5%	97	97.0%	88	88.0%	233	92.8%	29	90.6%
Yes	36	7.5%	3	3.0%	12	12.0%	18	7.2%	3	9.4%
Base: Named a group	28	100.0%	2	100.0%	11	100.0%	13	100.0%	2	100.0%
Sierra Club	3	10.7%			2	18.2%	1	7.7%		
National Wildlife Federation	4	14.3%			3	27.3%	1	7.7%		
Audubon Society	3	10.7%			1	9.1%	2	15.4%		
Nature Conservancy	2	7.1%					2	15.4%		
Greenpeace	6	21.4%			2	18.2%	3	23.1%	1	50.0%
Huron Environmental Activist League	3	10.7%			3	27.3%				
National Environmental Group	5	17.9%	1	50.0%	2	18.2%	2	15.4%		
Local activist group	4	14.3%	1	50.0%	1	9.1%	1	7.7%	1	50.0%
Other group	1	3.6%					1	7.7%		

34. What is the highest level of school you completed?

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Up to 11th grade	34	7.6%	5	5.1%	7	10.1%	20	8.3%	2	4.9%
High school	114	25.4%	22	22.2%	21	30.4%	59	24.6%	12	29.3%
Trade school	13	2.9%	3	3.0%	2	2.9%	8	3.3%		
Some college	100	22.3%	22	22.2%	18	26.1%	52	21.7%	8	19.5%
Four year degree	117	26.1%	34	34.3%	6	8.7%	67	27.9%	10	24.4%
Graduate school	62	13.8%	13	13.1%	15	21.7%	28	11.7%	6	14.6%
Refused	9	2.0%					6	2.5%	3	7.3%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Up to 11th grade	54	11.2%	9	9.0%	20	20.0%	22	8.8%	3	9.4%
High school	194	40.2%	38	38.0%	43	43.0%	100	39.8%	13	40.6%
Trade school	9	1.9%	2	2.0%			6	2.4%	1	3.1%
Some college	103	21.3%	16	16.0%	20	20.0%	58	23.1%	9	28.1%
Four year degree	85	17.6%	20	20.0%	15	15.0%	46	18.3%	4	12.5%
Graduate school	33	6.8%	14	14.0%	2	2.0%	15	6.0%	2	6.3%
Refused	5	1.0%	1	1.0%			4	1.6%		

35. What is your occupation (Previous occupation if retired)

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Not retired	375	83.5%	87	87.9%	61	88.4%	198	82.5%	29	70.7%
Retired	66	14.7%	12	12.1%	8	11.6%	36	15.0%	10	24.4%
Refused	8	1.8%					6	2.5%	2	4.9%
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Owner Manager	20	4.5%	3	3.0%	3	4.3%	13	5.4%	1	2.4%
Service Hospitality	25	5.6%	6	6.1%	6	8.7%	12	5.0%	1	2.4%
Clerical	27	6.0%	5	5.1%	4	5.8%	17	7.1%	1	2.4%
Skilled trade	47	10.5%	14	14.1%	6	8.7%	21	8.8%	6	14.6%
Unskilled trade	32	7.1%	7	7.1%	5	7.2%	16	6.7%	4	9.8%
Professional sales	6	1.3%	1	1.0%	1	1.4%	4	1.7%		
Military	2	.4%					2	.8%		
Retail sales	18	4.0%	7	7.1%	4	5.8%	5	2.1%	2	4.9%
Middle manager	22	4.9%	5	5.1%	1	1.4%	14	5.8%	2	4.9%
Teacher	35	7.8%	12	12.1%	4	5.8%	13	5.4%	6	14.6%
Farmer	2	.4%			1	1.4%	1	.4%		
Mining										
Civil Service	30	6.7%	6	6.1%	6	8.7%	17	7.1%	1	2.4%
Homemaker	45	10.0%	7	7.1%	9	13.0%	24	10.0%	5	12.2%
Health care	33	7.3%	9	9.1%	8	11.6%	15	6.3%	1	2.4%
Unemployed	9	2.0%	3	3.0%	2	2.9%	4	1.7%		
Transportation	3	.7%	1	1.0%	1	1.4%	1	.4%		
Student	24	5.3%	5	5.1%	2	2.9%	14	5.8%	3	7.3%
Author Journalist Arts Music	12	2.7%	1	1.0%	1	1.4%	10	4.2%		
Environmental job	5	1.1%					4	1.7%	1	2.4%
Engineer	20	4.5%	3	3.0%	2	2.9%	14	5.8%	1	2.4%
Scientist	6	1.3%	3	3.0%			3	1.3%		
Lawyer	2	.4%					2	.8%		
Health Care Professional	4	.9%			3	4.3%			1	2.4%
City employed	2	.4%					1	.4%	1	2.4%
Other Professional	4	.9%	1	1.0%			3	1.3%		
No response	14	3.1%					10	4.2%	4	9.8%

35. What is your occupation (Previous occupation if retired)

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Not retired	375	77.6%	65	65.0%	75	75.0%	205	81.7%	30	93.8%
Retired	104	21.5%	33	33.0%	25	25.0%	44	17.5%	2	6.3%
Refused	4	.8%	2	2.0%			2	.8%		
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Owner Manager	23	4.8%	3	3.0%	7	7.0%	9	3.6%	4	12.5%
Service Hospitality	28	5.8%	4	4.0%	8	8.0%	15	6.0%	1	3.1%
Clerical	47	9.7%	8	8.0%	15	15.0%	21	8.4%	3	9.4%
Skilled trade	53	11.0%	9	9.0%	8	8.0%	36	14.3%		
Unskilled trade	30	6.2%	5	5.0%	6	6.0%	15	6.0%	4	12.5%
Professional sales	8	1.7%	3	3.0%			4	1.6%	1	3.1%
Military	1	.2%							1	3.1%
Retail sales	24	5.0%	6	6.0%	1	1.0%	16	6.4%	1	3.1%
Middle manager	21	4.3%	5	5.0%	6	6.0%	10	4.0%		
Teacher	21	4.3%	5	5.0%			14	5.6%	2	6.3%
Farmer	4	.8%			1	1.0%	3	1.2%		
Mining	1	.2%	1	1.0%						
Civil Service	28	5.8%	16	16.0%	3	3.0%	9	3.6%		
Homemaker	84	17.4%	14	14.0%	27	27.0%	40	15.9%	3	9.4%
Health care	38	7.9%	7	7.0%	9	9.0%	22	8.8%		
Unemployed	10	2.1%	1	1.0%	1	1.0%	5	2.0%	3	9.4%
Transportation	3	.6%	2	2.0%			1	.4%		
Student	20	4.1%	3	3.0%	6	6.0%	7	2.8%	4	12.5%
Author Journalist Arts Music	7	1.4%	2	2.0%			4	1.6%	1	3.1%
Engineer	9	1.9%	2	2.0%	1	1.0%	5	2.0%	1	3.1%
Scientist	1	.2%					1	.4%		
Lawyer	2	.4%			1	1.0%	1	.4%		
Health Care Professional	1	.2%					1	.4%		
Other Professional	2	.4%	1	1.0%			1	.4%		
No response	17	3.5%	3	3.0%			11	4.4%	3	9.4%

36. Gender

Log Book

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	449	100.0%	99	100.0%	69	100.0%	240	100.0%	41	100.0%
Male	227	50.6%	40	40.4%	29	42.0%	133	55.4%	25	61.0%
Female	222	49.4%	59	59.6%	40	58.0%	107	44.6%	16	39.0%

Random Sample

	Total		Lake							
			Superior		Huron		Erie		Ontario	
Base: All respondents	483	100.0%	100	100.0%	100	100.0%	251	100.0%	32	100.0%
Male	171	35.4%	47	47.0%	29	29.0%	79	31.5%	16	50.0%
Female	312	64.6%	53	53.0%	71	71.0%	172	68.5%	16	50.0%

2. Special Table

A -- Perceived Major Problems

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

4a. What activities do you or your family do at the lake?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All Respondents	108	213	439	172
Swimming	29.6%	42.3%	39.6%	39.0%
Fishing	19.4%	32.4%	32.3%	28.5%
Boating	19.4%	38.5%	27.1%	26.7%
Beach activities	13.9%	13.6%	14.6%	15.7%
Family outings	10.2%	14.6%	12.8%	18.0%
Walking jogging	11.1%	10.8%	13.7%	12.2%
Camping	2.8%	7.5%	4.1%	7.0%
Enjoy scenery	5.6%	2.8%	3.6%	2.9%
Skiing	3.7%	1.9%	4.1%	2.9%
Water sports	2.8%	2.3%	3.4%	2.3%
Shore activities	1.9%	.9%	2.1%	1.2%
None, never go there	34.3%	13.1%	15.3%	13.4%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

5a. Where do you spend most of your time when you are at Lake ___?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: Spend time at a lake	70	185	369	148
In deep water-boating, sailing or fishing	20.0%	28.1%	28.7%	23.0%
At the shoreline or on the beaches	70.0%	65.4%	63.7%	64.2%
Away from the shoreline in a park or on jogging trails	10.0%	6.5%	7.6%	12.8%

6a. How would you rate the water quality in Lake ____?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Excellent	20.4%	17.8%	10.0%	5.2%
Good	49.1%	52.1%	39.9%	26.7%
Fair	18.5%	21.1%	31.2%	43.0%
Poor	2.8%	4.7%	13.9%	18.6%
No opinion	9.3%	4.2%	5.0%	6.4%

7a. Over the past 10 years, would you say that the water quality of Lake ____ is improving, is it getting worse, or is it staying about the same?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Improving	25.9%	40.4%	36.2%	36.6%
About the same	44.4%	34.3%	28.0%	22.7%
Getting worse	9.3%	13.1%	23.7%	31.4%
No opinion	20.4%	12.2%	12.1%	9.3%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

8a. What do you think are the biggest problems concerning Lake ___ water quality?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Contaminants pollution	28.7%	54.9%	62.0%	70.9%
Zebra Mussels	.9%	8.9%	8.4%	6.4%
Paper mills	2.8%	4.7%	6.2%	4.1%
Industrial waste	.9%	4.2%	5.9%	6.4%
Ship traffic	3.7%	7.0%	3.2%	2.9%
Dirty beaches	5.6%	4.2%	3.2%	3.5%
Pesticides		1.9%	2.5%	7.0%
People's behavior, attitudes	2.8%	2.8%	1.4%	3.5%
Chemical waste	1.9%	1.4%	2.1%	2.9%
Public utility waste		.9%	2.3%	2.9%
Oil spills	.9%	.5%	2.5%	1.7%
Acid rain		1.9%	1.8%	1.2%
Biological effects	.9%	.9%	1.6%	2.3%
Harm to wildlife, fish		.5%	1.4%	.6%
Managing lake quality		.9%	1.1%	.6%
There are no problems	17.6%	4.2%	.7%	.6%
Don't know	44.4%	20.7%	14.8%	7.0%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

9a. Who do you feel is responsible for monitoring the water quality of Lake __

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
US Environmental Protection Agency	15.7%	17.8%	26.0%	26.2%
State government	7.4%	13.6%	15.7%	18.0%
US Federal Government	9.3%	10.3%	12.3%	12.8%
Department of Natural Resources	7.4%	13.1%	12.1%	9.9%
Local government	11.1%	7.0%	8.9%	12.8%
All of us	7.4%	6.6%	9.6%	[illegible].9%
Industry	1.9%	2.3%	4.8%	[illegible].8%
Environment Canada	4.6%	1.9%	3.6%	4.1%
Other government group	2.8%	3.3%	3.6%	3.5%
Non-government group		.9%	.5%	.6%
Don't know	45.4%	36.2%	21.9%	16.9%

11a. Do you feel there is anything you can do to help improve Lake ___ water quality? What is that?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
No	42.6%	32.4%	23.0%	15.7%
Don't Know	23.1%	17.4%	18.5%	15.7%
Proper waste disposal	17.6%	24.4%	24.4%	31.4%
Increase public awareness	10.2%	12.7%	13.2%	16.3%
Recycle	5.6%	3.3%	8.4%	12.8%
Beach clean ups	2.8%	8.0%	8.4%	7.6%
Write to congressman	1.9%	7.5%	7.3%	10.5%
Join environmental group	1.9%	.9%	8.4%	6.4%
More/better government controls	5.6%	2.3%	4.6%	4.7%
Other personal action		4.2%	3.6%	4.7%
More tax funds		.5%	.7%	

12a. Do you feel there is anything the government can do to help improve Lake ___ water quality? What is that?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
No	16.7%	9.4%	3.6%	2.3%
Don't know	25.9%	14.1%	9.3%	9.3%
Better rule enforcement	26.9%	46.5%	47.4%	46.5%
More restrictions on industry	14.8%	24.4%	32.6%	36.6%
More restrictions on chemicals	2.8%	20.2%	18.5%	21.5%
Fines for polluters	6.5%	8.5%	15.0%	13.4%
More laws	1.9%	7.0%	8.2%	12.8%
More education	7.4%	4.7%	9.1%	9.9%
Provide more funds	4.6%	5.2%	7.9%	10.5%
More clean up	1.9%	3.3%	2.3%	2.3%
More research		3.3%	1.8%	1.7%
Continue current efforts	6.5%	2.3%	.5%	1.2%
Less restrictions, enforcement	2.8%	.9%		
Economic incentives		.5%	.9%	
International cooperation	.9%		.5%	

29a. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Too much emphasis	15.7%	2.8%	1.8%	.6%
About right	48.1%	51.2%	43.5%	34.3%
Too little emphasis	16.7%	33.8%	46.7%	57.6%
No opinion	19.4%	12.2%	8.0%	7.6%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

30a. Is your age...

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
25 & under	11.1%	8.5%	15.9%	11.6%
26 to 35	16.7%	25.4%	24.1%	27.9%
36 to 45	13.0%	23.5%	26.9%	25.0%
46 to 55	17.6%	11.7%	12.8%	13.4%
56 to 65	12.0%	16.9%	9.3%	11.0%
66 to 75	14.8%	8.9%	8.4%	8.1%
76 & over	13.0%	4.2%	1.6%	1.2%
Refused	1.9%	.9%	.9%	1.7%

31a. Including yourself, how many people currently live in your household?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
One	26.9%	13.6%	13.9%	17.4%
Two	34.3%	36.2%	28.7%	29.7%
Three	15.7%	16.0%	17.3%	16.3%
Four	12.0%	17.8%	23.9%	21.5%
Five	3.7%	8.9%	8.9%	9.9%
Six	2.8%	5.2%	4.6%	3.5%
Seven	1.9%	.9%	.5%	
Eight	.9%	.5%	1.1%	
Nine			.2%	
Ten or more			.7%	
Refused	1.9%	.9%	.2%	1.7%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

32a. How many are children under the age of 18?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
None	68.5%	57.7%	52.6%	51.7%
One	12.0%	13.6%	16.4%	15.7%
Two	11.1%	14.1%	18.0%	17.4%
Three	2.8%	9.4%	9.1%	9.9%
Four	2.8%	3.3%	2.5%	2.3%
Five	.9%	.5%	.5%	
Six		.5%	.5%	
Seven			.2%	
Eight				.6%
Refused	1.9%	.9%	.2%	2.3%

33a. Is anyone in your household a member of an environmental organization? Which ones?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
No, Don't know	96.3%	91.5%	87.9%	80.2%
Yes	3.7%	8.5%	12.1%	19.8%
Base: Member	4	18	53	34
Sierra Club			15.1%	26.5%
National Wildlife Federation	50.0%	27.8%	7.5%	5.9%
Audubon Society		22.2%	13.2%	11.8%
Nature Conservancy		5.6%	7.5%	11.8%
Greenpeace		11.1%	13.2%	14.7%
Huron Environmental Activist League		5.6%	9.4%	5.9%
National Environmental Group	25.0%	11.1%	13.2%	23.5%
Local activist group	25.0%	11.1%	20.7%	17.6%
Other group		5.6%	9.4%	2.9%
Can't recall name of group		16.7%	9.4%	8.8%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

34a. What is the highest level of school you completed?

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Up to 11th grade	13.9%	8.0%	9.3%	8.7%
High school	34.3%	34.3%	31.9%	33.7%
Trade school	2.8%	.9%	3.0%	2.3%
Some college	13.0%	23.0%	22.8%	23.3%
Four year degree	20.4%	19.2%	23.7%	20.3%
Graduate school	11.1%	12.7%	8.9%	9.9%
Refused	4.6%	1.9%	.5%	1.7%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

35a. What is your occupation (Previous occupation if retired)

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Not retired	69.4%	77.9%	82.7%	84.9%
Retired	27.8%	20.7%	16.6%	13.4%
Refused	2.8%	1.4%	.7%	1.7%
Base: All respondents	108	213	439	172
Owner Manager	1.9%	3.3%	5.5%	5.8%
Service Hospitality	6.5%	5.2%	4.8%	8.1%
Clerical	4.6%	10.3%	7.1%	9.3%
Skilled trade	6.5%	12.2%	11.8%	8.7%
Unskilled trade	6.5%	3.8%	8.9%	4.7%
Professional sales	.9%	1.9%	1.6%	1.2%
Military		.5%	.5%	
Retail sales	.9%	7.0%	4.6%	3.5%
Middle manager	6.5%	4.7%	4.6%	3.5%
Teacher	4.6%	6.1%	5.5%	8.1%
Farmer		.5%	1.1%	
Mining		.5%		
Civil Service	8.3%	4.7%	6.6%	5.8%
Homemaker	26.9%	16.0%	9.1%	15.1%
Health care	6.5%	8.5%	7.3%	8.1%
Unemployed	2.8%	1.4%	2.7%	.6%
Transportation		.9%	.7%	.6%
Student	3.7%	1.9%	5.9%	5.8%
Author Journalist Arts Music	.9%	.9%	3.2%	1.2%
Environmental job		1.4%	.5%	
Engineer	7.4%	2.3%	2.1%	4.1%
City employed		.5%	.2%	
Scientist	.9%		.9%	1.2%
Lawyer		.9%	.2%	.6%
Health Care Professional		.5%	.2%	1.7%
Other Professional		.9%	.9%	
No response	3.7%	3.3%	3.6%	2.3%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

36a. Gender

	Perceived Major Problems			
	None	1 to 2	4 to 7	8 to 10
Base: All respondents	108	213	439	172
Male	29.6%	45.5%	44.0%	44.2%
Female	70.4%	54.5%	56.0%	55.8%

Question 19. What was the main reason your family member toured the ship? (DO NOT READ LIST)

The ship itself remains the single most important reason that family members toured Lake Guardian, according to log book visitors (36%). Interest in environmental issues (31.8%), and an expectation of educational experience are also high on the list (10.5%). The few random respondents indicate most of their family members went aboard with a school field trip (70%), or for the educational experience (20%).

Interest in the ship itself and interest in conservation/environment is significantly (*) higher for all respondents from medium and large communities; school field trips and other group trips are significantly (*) higher for small community respondents (See table 19b)

Question 20. What impressed you most about the Lake Guardian tour? (DO NOT READ LIST)

Just as in the test results, the labs and their equipment are highest on the list of things that made an impression on visitors to Lake Guardian. For the 1993 survey, based on responses from the test, "the work the scientists are doing" was added to the pre-coded list of possible answers, and that is second most popular as an impressive aspect of the tour. The captain and crew rank third, but the scientists on board and the Rosette water sampler, again in the 1993 survey, were much less impressive to visitors. The Lake Guardian being a non-polluting ship was seldom mentioned.

Of the 10% who answered "other", when prompted to think about what might have been interesting, the responses were highest for the crews' living quarters and a knowledgeable guide; also mentioned favorably was the well organized, informative nature of the tour and the interesting features of the ship design. There were fewer "don't knows" or refusals to answer in the 1993 survey.

Visitors to Lake Guardian express in this question, and in the following one, a clear preference for scientific, experimental information as part of the tour. This is true whether they come from small, medium or large communities. And the size of the community shows no differentiation in the priority of what is most impressive about the Lake Guardian tour: It's the labs and equipment, the

work being done, the captain and crew and other equipment on deck. (See table 20b).

Question 21. Please tell me which of these activities you recall being presented during your tour? (READ LIST)

The excellent impression made on visitors to Lake Guardian can be seen in the very low "don't know" response (.7%) which is 9% lower than in the test results, and involves only 3 persons out of the hundreds questioned.

Visitors' highest recall (83.3%) is the measurement of water pollution; this is slightly higher than in the test results. Conducting experiments is almost as well remembered (76.8%), as is measuring pollution in sediments (71.4%) The next most remembered activities are operating as a non-polluting ship (67.2%), and monitoring pollution hot spots (65%).

Again, in the 1993 survey, as in the test results, there is a very low recall of measuring air pollution (27.7%).

The priority list of activities recalled by all respondents, whether they live in small, medium or large communities, is exactly as stated about visitors generally; however, there are significant (*) differences in appreciation of two activities: 1) small and medium size community residents ranked operating the Lake Guardian as a non-polluting ship significantly higher than persons from large communities; 2) residents of large and medium communities were significantly more impressed with the operation of measuring air pollution. (See table 21b.)

Question 22. Did you have any questions that were not answered to your satisfaction during the tour? What was that question?

An outstanding response again in the 1993 survey, as in the test results, with responses almost completely (97%) positive; the tour hosts and accompanying informative materials are evidently doing the job.

The few questions unanswered were specific pollution or general interest queries about the individual's "home" lake; i.e., "what can you do for Thunder

Bay?" or "how is the water quality of Lake Ontario"?

Question 23. Did you receive a general fact sheet and a self-guided tour brochure when you were aboard the Lake Guardian?

Although almost everyone (89%) says they did receive a fact sheet and tour brochure, there remains in the 1993 survey, as in the test results, a small group, about 10%, of persons who don't recall or say they did not receive these materials.

That the materials were helpful is shown in the next two questions.

Question 24. Were these helpful to you?

Almost identical to the test results, the 1993 survey shows an outstandingly positive (94%) response to the fact sheet and tour brochure.

Question 25. What would have improved the fact sheet and self-guided tour brochure?

For the few persons who thought there could be an improvement, most (85%) did not know how to improve the materials, or thought nothing could be done. The individuals who had a suggestion for improvement, differed from those in the test results (explain testing better; use pictures) by asking for either use of laymen's terminology, or making it less juvenile, and explaining "hot spots".

Question 26. Was there anything you did not like about your tour of Lake Guardian? (IF YES) What was that?

Most responses (86.2%) were positive; they found nothing to dislike about the tour, just as in the test results. For the persons who found something to dislike, it was principally a lack of time and information and these were primarily persons from small and medium sized communities. It may be appropriate to consider some way to offer persons with a desire for detailed information a less crowded time to tour the ship.

Question 27. What day of the week and time were you aboard?

Week-ends are the most popular days; afternoon is the time most persons were aboard. Monday and Wednesday were the only days in which evenings show some attendance.

Question 28. Can you recall who owns and operates the Lake Guardian? (DO NOT READ)

A significantly (*) better job of conveying messages was shown in the 1993 survey. Half (50%) of the visitors to Lake Guardian knew it was owned by the US/EPA, whereas in the test results only 32% could recall this fact. There was also a significantly (*) improved drop in the "don't know" category, (35%), from the test results (54%). That the message was imparted to Lake Guardian visitors can also be seen as a contrast to the responses given by random respondents who for the most part (86%) did not know about ownership.

Question 29. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

There is a significant (*) difference between Lake Guardian visitors and random respondents in almost all answers to this question, with a positive effect on public opinion shown by those who signed the log book. More than half (53.5%) of the Lake Guardian visitors think the emphasis is about right; a surprisingly high (35.4%) response in this regard was obtained from random respondents.

That the US/EPA could increase its Great Lakes environmental activities is shown in the response about too little emphasis: Lake Guardian visitors said it was too little (37.9%) as did random respondents (46.4%). The significantly (*) lower percentage of positive response from Lake Guardian visitors probably indicates their satisfaction with the course of actions heard about during their visit aboard; they may feel a great deal is already being done.

Very few Lake Guardian visitors (6.5%) had no opinion about this subject,

whereas random respondents were significantly (*) higher (13.7%) in not knowing where US/EPA might change its course of actions.

A very strong mandate for EPA to pursue environmental activities can be seen in the significant (***) result when this question is looked at in terms of respondents' perception of major problems (question 10). When the question is asked "is there too much emphasis?" only persons who see no problems with the lakes respond positively, (15.7%). There is a dramatically decreasing positive response (down to .6%) to this question for persons who see from 1 up to 10 major problems with the lakes. There is also a high percentage of respondents who feel that the EPA emphasis on Great Lakes environmental activities is about right. But for respondents who said there is "too little emphasis", there is a dramatic increase in the percentage of those who wish the EPA would to do more, as they perceive more (from 1 to 10) problems with the lakes. (See table 29a)

Lake Guardian visitors in small, medium and large communities, are significantly (*) higher than random respondents in believing that the emphasis is about right on Great Lakes environmental activities. None of the respondents show a significant difference in their beliefs that there is too much emphasis, or too little, or have no opinion. But there are high percentages in both the Lake Guardian and random respondents, in all size communities, for "too little emphasis". (See table 29b)

Question 30. These final questions are for classification purposes only.Is your age.....

Because the test results indicated that the visitors to Lake Guardian were younger than expected, the age groupings were revised to give better detail. As a result, it can be shown that the visitors to Lake Guardian are significantly (**) younger, with a median age of 38, than random respondents, whose median age is 43.

The younger population coming aboard Lake Guardian may be accounted for in the next questions that focus on the size of the family, ages of children, etc.

There is a significant (***) correlation between age range and the perception of respondents about the numbers of problems they see with the lakes (question 10). The younger persons, principally those in the 26 to 45 years of

age range are apparently more concerned about and perceive more environmental problems The over-66 years-of-age group are inclined to think there are no problems or few problems. Respondents in the 46 to 65 years of age group are evenly represented in their perceptions of the numbers of problems in the lakes--that is, they see all the categories from none to 10 at about the same rate. (See table 30a)

The Lake Guardian visitors came from all sized communities in about the same proportions, with no significant differences in ages between small, medium or large towns and cities. (See table 30b) There are few differences between persons called randomly, in terms of the size of community in which they live, from the Lake Guardian visitors; the research was carefully structured to achieve such balance in the calling patterns.

Question 31. Including yourself, how many people currently live in your household?

There is a significant (*) difference between the size of households, with visitors to Lake Guardian having larger families than those called randomly. The mean for Lake Guardian visitors is 3.1 persons per household; the mean for those called randomly is 2.9 persons per household.

A related significant difference shows up in the numbers of persons in the household: In the randomly called families, there are an unusually high (45.7%) percentage of two-person families in small communities, whereas in the medium and large communities and in all the Lake Guardian visitor samples there are just about half that number, approximately 25%. There is a difference in the numbers of four-person families (presumably two adults, two children) in the Lake Guardian visitor statistics, with many more (29%) in large cities than in small communities (20.8%). (See table 31b)

Question 32. How many are children under the age of 18?

There are children under the age of 18 in almost half (49.9%) of the households of Lake Guardian visitors; the mean is 3.1 children per household for households that have children.

The random respondents are less likely to have children under the age of 18 (39.5%); the mean is 2.1 children per household with children.

The presence of young children in their households may account for the preponderance of younger persons visiting the Lake Guardian.

Question 33. Is anyone in your household a member of an environmental organization? (IF YES) Which ones?

There is a significant (*) difference between the Lake Guardian and random respondents when it comes to membership in environmental organizations. The Lake Guardian visitors were twice (16.3%) as likely to indicate membership in an environmental organization than random respondents (7.5%). There is also a significant (*) difference between Lake Guardian visitors (83.7%) and random respondents (92.5%) who said "no, don't know" whether someone in the household belongs to an environmental organization

Another difference to note is that Lake Guardian visitors' memberships indicate more personal involvement in environmental activities: for local activist groups there are about twice the memberships for Lake Guardian visitors (22%) vs. (11.1%) for random respondents. In addition, Lake Guardian visitors indicate more membership in the Sierra Club (19.2%) than in such groups as National Wildlife Federation (12.3%) or Greenpeace (11%).

The results overall are similar to those in the test survey, but there is a highly significant difference in the response to the question of who in the household belongs to an environmental organization, in terms of how respondents see the number of problems in their lake (question 10). The more problems perceived the larger the proportion who were members of an environmental organization.

Only 3.7% of respondents who see no problems indicate membership in an environmental organization, but 19.8% of those who see 8 to 10 major problems indicate membership in an environmental organization. It may be that perceptions of problems in the lake leads to membership in special organizations devoted to some type of environmental subjects; conversely it may be that membership in the organization leads to higher awareness of problems in the lakes; these may be reinforcing activities.

were most likely to perceive problems with the lakes. The responses to this question point to members of national or local environmental groups.as a major public for the EPA's environmental activities with the Great Lakes. (See table 33a)

The Lake Guardian visitor local activists live in medium (31.6%) to large (27.2%) communities; those called randomly principally live in small communities (22.2%) These are not statistically significant numbers, however, and a much larger sample of individuals would have to be queried to make valid comparisons about where activists live. (See table 33b)

Question 34. What is the highest level of school you completed? Is it (READ LIST)

A significant difference appears in the 1993 survey as it did in the test results, with visitors to Lake Guardian much more likely to have some college, to have completed college, or to have been to graduate school (62.2%), vs. random respondents (45.7%). Additionally, more random respondents stopped at high school (40.2%), whereas few Lake Guardian visitors (25.4%) did so.

College graduates among the Lake Guardian visitors are significantly (**) more likely to live in medium (31.5%) to large communities (29.6%) than in small towns (14.4%); but there is a larger group of graduate school respondents (19.2%) in small towns, than in medium to large (11.7%) communities. The random respondents show a significant (**) difference in terms of college graduates and those with some college education living in large cities (46.5%) rather than in small communities (36.2%). (See table 34b)

There are significant differences in education by lake: Lake Guardian visitors and random respondents from Superior are more likely to have a college degree, Erie ranks next. The Lake Guardian visitors from Huron are highest on graduate school; the random respondents from Superior have that ranking.

Question 35. What is your occupation? (IF RETIRED) Retired from doing what?

As might be expected from the difference in ages between the Lake Guardian

visitors and the random respondents, there are significantly (*) fewer persons not retired (83.5%) in the Lake Guardian visitors group, than in the random respondents group (77.6%). There is a significant difference (**) in the random respondents in terms of retirement, with the highest (33%) from Superior, and the lowest (6.3%) from Ontario. There is a significant (*) difference between the two groups in terms of their employment as scientists, engineers or in environmental jobs: Lake Guardian visitors (6.9%) vs. random respondents (2.1%).

That random respondents have a significantly (*) higher rate of "homemaker" response (17.4%) vs. Lake Guardian visitors (10%) can be attributed to either chance and/or the known effect that women are more likely to answer the telephone and be willing to respond to a survey--plus the fact that more males were included in the Lake Guardian survey (see question 36.)

"Homemakers" were the largest group to see "no problems" with their lake (question 10). There is a significant (*) difference between persons who said they are retired and those who are working: Respondents who are working are more likely to see increasing numbers of problems in their lake; retirees are more inclined to see no problems and fewer major problems in all categories. (See table 35a)

The significant (*) difference between the Lake Guardian retired persons who live in small communities (16.8%) and those who live in large cities (9.9%) may be accounted for by the fact that the largest number of persons who refused to answer this question (3.7%) are in large cities. (See table 35b/log book).

Question 36. Gender

More males than females appear on the log book of visitors to Lake Guardian, but slightly less (50.6%) than for the test results (54%). There is a significant difference between the number of male Lake Guardian visitors (50.6%) and the random respondents (35.4%). As noted in question 35, women are more likely to answer the phone and to agree to be interviewed; therefore in future studies, a quota on male/female random respondents can be instituted to correct for this phenomenon.

There is a significant difference by lake for both log book and random respondents for male/female response. The Lake Guardian visitors have the highest female responses from Superior and Huron; the highest male response from Ontario and Erie (*). The random respondents have the highest female response from Huron and Erie; the highest male response from Ontario and Superior (**).

A statistically significant difference (**) occurs between how male and female respondents view the numbers of problems (question 10) in the lakes. Especially striking is the response that says "no problems" are perceived. Females said they saw no problems (70.4%), far more than males (29.6%). However, females are higher in all categories of numbers of problems perceived. There were more women interviewed overall. Therefore, all problem groups are expected to have more women. Women are, however, under-represented in the log book interviews for large cities. (See tables 36a and 36b)

III TEACHER/STUDENT SURVEY

A. Introduction

A major target audience of the EPA's Lake Guardian program are teachers and students. For school children, a 24-page book, "Great Minds? Great Lakes," was developed to supplement a school's curriculum. The activities are purposefully multi-disciplinary so they can be used during various studies -- science, social studies, geography, history. There is a section in the book about Lake Guardian and its relevance to water quality of the Great Lakes. Also, a 15-minute videotape on the scientific activities aboard the Lake Guardian was produced to be used as an introduction to the ship. All of the materials were produced to help educate children as well as their teachers The materials are part of an extensive EPA-produced educational program.

Educators are contacted by the Office of Public Affairs, to alert them to the possibility of a tour of the ship when it is near their location. The Public Affairs officer schedules tours for educators on a first-come, first-served basis, space and time permitting.
The 1993 educator and student survey brought responses from 52 teachers in the United States, and 1089 students from first grade through college.
The 1992 survey included a mailing to 38 educators in Canada and the U.S Eight teachers and 140 students responded.

The packets for both 1992 and 1993 included a letter directed to educators regarding a three-part survey:

1. A Teacher's Evaluation Form-- in which teachers tell EPA whether the materials and tour were appropriate learning experiences;
2. A Student Review--handout quizzes for students who toured the Lake Guardian. The quiz was described to teachers as an opportunity for them to find out whether students learned, what they retained, what more the teacher might be able to impart to students, and whether it was an enjoyable experience;
3 Return materials--consisting of a Student Summary and a postpaid return envelope. The return mailing was designed so that teachers could hand out the student quizzes, grade them and after filling out the summary form,

out the summary, they could place all the student quizzes in the envelope, together with their own evaluation form and the final tally would be done by the research firm.

Based on findings from the 1992 study, the 1993 survey was designed so that teachers received their research packets personally from the Public Information Officer. Each teacher's name was on the packet; these were distributed to the teachers as they signed in aboard the Lake Guardian. The packets were opened at that time, each item discussed with the teacher, and then the tour began.

RESEARCH METHODOLOGY

Several sets of tables are provided for analysis of teacher and student responses by grade level and by grade groupings. These tables might be needed in future. Throughout the findings and the report on teacher/student responses to the U.S. EPA program, the level of significance will be shown as in the telephone survey responses. These special tables are helpful in perceiving how teachers and students in various grade levels accepted the materials and the tour. Should the EPA decide in future to develop new classroom materials and projects, these tables will be helpful in analyzing grade level needs and wants.

B. KEY FINDINGS

EDUCATORS

1. Who are the educators; what class levels were there?

Most of the teachers were from the elementary grades; principally from fourth to sixth grades. However, there were class grade levels ranging from first grade through college. The size of the classes ranged from 21 to 30 students. A special set of tables is included showing analysis of teacher responses by grade levels. These will be useful in analyzing grade level programs and materials for the future.

2. How did they get to the Lake Guardian?

Teachers credited the EPA as the contact for the tour. Actually, the public

information office contacted the curriculum directors initially to obtain teacher's names.
More than half of the teachers had never before been on an environmental trip.

3. How did they grade the "pre-visit" materials?

Grades were excellent, with an "A "for "Great Minds? Great Lakes" from the majority of teachers. Very few had the videotape pre-visit. The lower grade level teachers were most responsive to "Great Minds"; the higher grade teachers were less likely to give it a high mark. For those who received the materials in time for pre-visit use, class work was done using the materials, and teachers plan to use the materials in future lessons. Low grades were given primarily for not receiving the materials in time, problems viewing the videotape, or a perception that the materials are not age-level appropriate.

4. How educational materials will be used; what else is needed?

Science classes of all types are where the materials will be used. Almost all teachers want more materials from the U.S. EPA: lists of things to do to clean up the Great Lakes, telephone numbers to call for information; materials for parents, and more scientific projects. A great variety of suggestions are included in the tables and write-in comments. There is a need for upper grade level materials; even college level materials.

Teachers are in need of materials about environmental issues; they have many types of classes in which to teach about the Great Lakes and other environmental subjects.

Teachers want more classroom materials, environmental clubs, a summer camp, visits from scientists or persons who can talk knowledgeably to students; charts, maps, etc.

5. What did teachers like or not like about the Lake Guardian tour?

Teachers were very pleased with the tour, the captain and crew, the handout materials, presentation of the deck equipment, explanation of the laboratories and presentation of the living quarters. But the videotape is a problem; it does not arrive pre-visit; it is hard to see at ship-side, it is too mature for young students.

Teachers gave "A" grades for much of the presentation of facts; but there were some lower grades in the 1993 survey. The presentation on surface runoff received the best scores from higher grade teachers--above seventh.

runoff received the best scores from higher grade teachers--above seventh. Importance of proper disposal of trash was also better received at higher grades; and how students and their families can help is scored low by teachers in third grade and below.

Low grades for the tour were very different in the 1993 survey. The teachers want more about the mission of Lake Guardian. They had some complaints about subjects not being covered (how students and their families can help, importance of Great Lakes). But in general they seemed pleased with the materials and visit.

Key findings: STUDENTS

1.Who are the students?

All students were from the U.S. They were from twice the number of school locations as1992. There was a tenfold increase in numbers of students responding--1089 toured the Lake Guardian with a teacher. They were from first grade to college students.

2. What did they like or not like about their Lake Guardian trip?

"Great!" ratings went up to over 50% in the 1993 survey. The "boring" response dropped, as did the "no response". The largest group of students, from first to ninth grade were most enthusiastic. The higher the grade, the less enthusiasm. Students rated the pilot house, the captain and crew and the laboratories highest.

Telling their families about the trip was a major event for elementary grade students; some 80% said they took this information home. Even the higher grade students scored 50% on telling others about the trip, thus extending the public information program significantly.

3. Did they learn and retain information from the trip?

The students again did very well on the true-false questions. Of the 12 questions, they scored 80% or better on seven questions; they gave 60% to 79% correct answers to four questions, and were "stumped" by the question on industry discharging more pollution today--a false answer, which they gave as true.

A set of tables shows how the students did on these questions by grade level.

C. RECOMMENDATIONS

1. Teachers give U.S. EPA credit for contacting them for the trip; they are grateful for the opportunity to tour and use new materials. The tone of comments written by educators to evaluate and offer suggestions for the program's improvement appears to place teachers in a special category of important publics for U.S. EPA and for environmental programs. Teachers are generally very much like the profile of visitors to Lake Guardian, which makes them a special group for public information communications.

2. Special materials can be developed for teachers, to keep them in touch with the Great Lakes program and to give them up-to-date information to use in their classes. Newsletters, scientific bulletins, special programs for teachers in science teaching are particularly likely to be used. But even English classes can be a focus of new materials to be developed for writing contests. There are endless numbers of ideas to be developed for the schools, including bibliographies and computer information for college level students. Advisory panels of educators can be helpful in devising new ideas and programs for the U.S. EPA in whatever future developments they may undertake.

3 Provide special teaching materials for: industry's role in cleaning up the Great Lakes; acid rain; the food chain as a system. These were the questions least likely to be answered correctly on the true/false quiz. But all the questions could use special teaching materials.

4. Contact teachers not only through the curriculum director, but also through their professional journals and newsletters; hold meetings and seminars for teachers at all levels and for their special interests.

5. Provide more field trips, and inservice training programs for teachers. Whatever U.S. EPA can do to bolster the teacher's understanding of environmental issues and facts together with methods for teaching these to students, will have immediate and far-reaching impact as students so trained become the potential enlightened Lake Guardian visitor public for tomorrow.

6. Provide as much take-home material as possible for students. Not only does

this give more activity for teachers and students, but greatly expands the impact of the U.S. EPA information programs.

7. Re-do the videotape. See the general recommendations section, page 14. Recommendation is to use the Captain of the Lake Guardian as host of the video; with cartoon-style educational materials. Verbatim comment from teacher, typical of opinions about the Captain of the Lake Guardian: He was SUPER: Has a great smile and is wonderful with children.

SURVEY FINDINGS -- Educator and Student Test Results

TEACHER'S EVALUATION

School Location

Responses were received from 52 teachers in schools in 16 cities. No Canadian schools were involved in the 1993 survey. The greatest numbers of teachers came from Alpena; Sault St. Marie; Erie, Pa; and Oswego. (See Table I)

Class Grade Level

In the 1993 survey, as in 1992, the grade levels ranged from first grade through college; however in 1993 there were 63.5% teachers reporting from fourth to sixth grades. Two teachers responded that they had multiple class grades. (See Table 2)

Number of Students in Class

Class sizes in 1993 as in 1992, ranged from 15 to more than 30; more than half the classes were in the 21-to-30 students range. (See Table 3) The teachers' responses were tested to determine whether class size caused differences, but apparently, class size, unlike grade levels which were also tested, did not create significant differences in responses from teachers.

How did you hear about the opportunity to visit Lake Guardian?

Responses in 1993 were similar to 1992 Over 40% received a letter from EPA; another 28.8% heard about it from another teacher; and 23.1% read about the Lake Guardian in a newspaper article or some other publication. Other sources of information for teachers were: the school Principal, Science Coordinator, or Elementary Curriculum Facilitator, and EPA representative. (See Table 4)

The *actual* method of contacting teachers was for the US/EPA Public Information Officer to notify curriculum directors of the opportunity to visit Lake Guardian; the curriculum directors in turn notified their teachers who, if interested, could contact the Public Information Officer to set up an appointment for a visit to Lake Guardian.

Was this your first environmental field trip?

The 1993 response showed that over half (51%) of the teachers had never before taken an environmental field trip, unlike the 1992 survey response, in which 75% of the teachers had already participated in some previous experience of a field trip. (See Table 5)

Please grade the pre-visit materials you received from the US/EPA

The pre-visit materials in 1993 were primarily the books, "Great Minds? Great Lakes" and the Atlas/Resource Book; the video was shown principally at the tent where the Lake Guardian was docked

The grades from the teachers in 1993 were excellent, just a bit lower overall than in the previous survey. "Great Minds? Great Lakes" an 'A' (44.2%); a 'B' grade (23.1%). The "Atlas/Resource Book" was graded 'A' (15.4%) and 'B' (11.5%); a very large "no response" (67.3%). The videotape similarly had grades of 'A' (17.3%) and 'B' (13.5%), for the few who had the tape to preview. (See Table 6)

When looked at by grade level, the teacher responses show a significant difference (***), with more than half the lower grade level teachers giving "Great Minds?" an 'A' while teachers at the tenth and upper grade levels rate it an 'A' just 28.6%. A grade of 'B' was given by the fourth through ninth grade teachers. The largest "no response" was given the by the highest grade teachers. (See Table 6-A)

Please tell us the reason for any low grade

The low grades for 1992 were solely because the materials had not been received pre-visit. The 1993 low grade explanations were also from not having seen the materials (17.3%); and low grades for a problem with viewing the videotape (5.8%); not age-level appropriate (5.8%) and a variety of minor problems. (See Table 7)

Concerning the pre-visit materials

The responses to all of the questions were similar in 1993 to those received in the 1992 survey:

- Materials were received in time for the tour, 78.8% yes
- Class work was done using the materials before the tour, 76.9%
- Only 38.5% said they could have used the materials earlier
- The grade level was said to be appropriate, 65.4%
- Teachers do plan to use the materials in future lessons, 75%.

(See Table 8)

In which subject area will you use these materials?

Science classes are the big winner in 1993. Whereas geography had been the principal response in 1992, only one teacher of the 1993 group plans to use the materials in a future geography class, but it, too is linked with science. Other science classes planned using EPA materials: science and social studies (23.1%); science (19.2%); science reading (3.8%); environmental science (9.6%) biology (3.8%) and science and history, chemistry, earth-space science, environmental unit on water, (1.9% each). (See Table 9)

The 1993 response is very similar to 1992:
•Almost all teachers want lists of things to do to help clean up the Great Lakes (87%);
•Information for parents is next highest on teachers' agenda (63%)
•Telephone numbers to call for information is still high (56.5%)
•Government agency program explanation is somewhat lower (23.9%) than in 1992 (42.9%)
•Additional materials suggested by teachers focus on scientific projects such as samples of dead zebra mussels, a chart of the life-cycle of the mayfly, and maps of specific hot spots (1.9% each).
(See Table 10)

Do you have suggestions for additional or improved classroom materials?

The suggestions were quite different in 1993, but the level of "no response" remained high (69.2%). The teachers suggested: grade-level appropriate materials (11.5%); and hands-on activities (5.8%). A variety of other suggestions from teachers are also listed (See Table 11).

Please grade the Lake Guardian tour as a learning experience for your class

There are significant (*) differences between 1993 and the previous survey in the grades teachers gave various of the elements.
•There is a significant difference (*) between the ratings from 1992 and 1993 about the amount of time spent on the Lake Guardian. Shipboard time pleased the 1993 teachers--56.5% gave it an 'A' rating and 21.7% rated it 'B', whereas the 1992 teachers gave the ship tour their biggest 'D' rating (40%).
•The 'A' rating for the presentation by the captain went up to 84.1% in 1993; it had been one of the highest scores in 1992 at 40%, but this jump in 'A' ratings caused a significant difference (**) between the two surveys.
•The handout materials improved dramatically in 1993 with a 45.5% 'A' whereas there had been no 'A' ratings in 1992; this is a significant difference (***) between the two surveys. No "not received" ratings showed up in 1992 only when 25% of the teachers indicated there had been no on-board hand outs.

Many elements of the tour show differences between 1992 and 1993:
•The videotape shown on board is rated 'A' only 31.7% but gets a 'C' rating 34.1% by the 1993 teachers; it had a 50% 'A' rating in 1992;
•The explanation of the mission of the Lake Guardian is almost the same for both years, 'A' rating 67.4% for 1993 and 60% for 1992;
•Presentation of the deck equipment is rated higher in 1993 with an 'A' 56.5% while it was only 20% in 1992.
•Explanation of the laboratories was given a 45.7% 'A' rating in 1993, it had no 'A' rating at all in 1992.
•Presentation of living quarters was much higher on the 'A' rating, 62.2% in 1993 against 25% for 1992.
(See Table 12)

Please grade the presentation of facts about (six items)

Differences show up throughout the responses to these presentations:
•*The sampling program* was a 44.4% 'A' and 33.3% 'B' in 1993; it had only 'B' grades in 1992;
•*Surface runoff* is rated 25% each for 'A' and 'B'; 22.7% 'C' for 1993; it had only a 'B' rating in 1992;*
•*Industrial discharge* is almost identical in ratings to "surface runoff";
•*Importance of proper disposal of trash and waste* went down slightly in 'A' ratings for 1993 (29.5%) from 1992 (33.3%) and down in 'B' ratings as well, from 67.7% in 1992 to 27.3% in 1993.*
•*Importance of the Great Lakes* picked up higher ratings in the 'A' category 46.7% in 1993, from 25% in 1992; but fewer 'B' ratings in 1993 (22.2%) vs. 1992 (75%).
•*How students and their families can help the Great Lakes environment* received an 'A' rating of 26.2% in 1993 and not at all in 1992.*

All of the facts presentations in 1993 received some low scores of 'C', 'D' and even 'F' whereas there had been nothing lower than 'B' in 1992. Lowest scores, 'D' and 'F' ratings, went to *surface runoff, industrial discharge and how students and their families can help the Great Lakes environment.*
(See Table 13)

The three facts presentations marked with an * above all have significant differences (***) when viewed by grade level. The differences are:

•The presentation on *surface runoff* received best scores from the higher grade teachers: Seventh to ninth grade teachers gave it an 'A' 25%, and a 'B' 50%. Tenth grade and above teachers scored it an 'A' 28.6%, 'B' 14.3% and 'C' 57.1%.
First to third grade teachers also gave this presentation an 'A' 28.6%, but they scored it an 'F' 57.l% (See Table 13-A).
•*Importance of proper disposal of trash* was clearly better for the higher grades. Seventh through ninth grades scored it an 'A' 50% and 'B' and 'C' 25% each. Tenth grade and above scored it 'A' and 'B' 42.9%. (See Table 13-B)
•*How students and their families can help* is also more suited to grades from four on up--'A' and 'B' and 'C' ratings predominate in the fourth through sixth, seventh to ninth, and tenth through college. Teachers in first to third grades score it low, even giving it an 'F' of 57.l%.
(See Table 13 -C)

Please tell us the reason for any low grades

The reasons given for low grades in 1993 by the teachers are quite different from the 1992 reasons, which had focused on a poorly organized tour, with too long a wait to get on board, followed by no guided tour and a need for more post-visit materials and more time on content.

The 1993 survey shows a great (76.9%) wish for a tour that tells of the mission rather than the equipment on board. The videotape is still a problem in content and showing times. It is too mature for younger students (19.2%) and it was hard to see and hear (9.6%) and should be shown indoors on cold days (7.7%); and there were several complaints that subjects 10-14 (surface runoff, industrial discharge, proper disposal of waste, importance of Great Lakes, and how students and families can help Great Lakes) were not covered. There were many reasons given (See Table 14), all of which can be seen as good suggestions, rather than criticisms, for future improvements.

Should EPA provide any of the following for your students to learn more about the Great Lakes and pollution control?

Suggestions for science projects heads the wish list (61.5%) for the 1993 survey of teachers, and like the 1992 survey, it is followed by additional classroom materials (48.l%) and then information on how to form environmental clubs (46.2%). The "no response" was only half (25%) the size in 1993 that it was in 1992 (50%); a further indication of the interest of teachers in EPA materials.

A dozen "other" interesting suggestions offered by the teachers, provide further potential for the EPA's educational programs in future. These include: a summer camp dealing with EPA issues for interested students; visits by science staff to individual classrooms; samples of biological pollutants; and maritime charts for social studies enrichment. (See Table 15)

VERBATIM WRITE-IN COMMENTS

Most of the verbatim write-in comments have been coded and appear in the tables. However, some of the verbatim comments are excerpted here as being particularly helpful to educator-consultants who may be expected in future to provide further curricular developments for EPA educational programming.

- Great! Well done! Thank you! Hope the program continues! (From many teachers)
- The National Geographic video coordinates well with the booklet "Great Lakes" (several teachers mentioned this)
- It would be interesting to know where the "hot spot" locations are
- Would like to have flash cards or posters of plants and animals in the Great Lakes food chain
- The lower grades need much more by way of materials designed for them; perhaps you need an elementary grade teacher/consultant
- We did the quiz right after the trip and students did well; for some of them this was the third or fourth time aboard Lake Guardian (4th grade teacher)
- My class really enjoyed the tour. We have talked about our pollution problems. this tour really helped. Most of my class thought it was great!
- Presentation of facts about the program were not dealt with enough on the tour. We need to know more about how we can help. And what waste disposal is happening in industry and elsewhere.
- A biology teacher requested that he be put on an EPA information mailing list; also wishes to receive further notice of Lake Guardian visits, especially a working tour. (The name and address are being given to the Public Information Officer)

•A 9th grade science teacher (whose name and address are being given to the PIO at EPA) requests the video and other booklets and resource materials which they did not receive. Had some difficulty in scheduling the tour; it was "last minute" but interesting and informative.
•Tour directors were pleasant, but apparently not knowledgeable of ongoing research.
•Apparently my students (5/6 grade) missed the point about industry discharging less pollution today than in the past.
•First grade teachers' comments: Make it more simple and understandable for children.
•The Captain was SUPER--had a great smile and was wonderful with the children.
•Be sure to include activities and information about a few things children can do in school and at home to keep water clean. A booklet similar to "Great Minds, Great Lakes" with environmental activities would be SUPER!
•Would help to include actual testing so students could see the reality of what the equipment is in the ship for.
•Forming environmental clubs is a great idea!
•The environmental section of "Great Minds" could be geared to upper grade levels.
•Try not to schedule tours at the beginning of the semester; no time to prepare.
•Workshops for teachers so they are familiar with the materials and how to use them effectively
•Have classroom presentations live; and audio-visual
•Giving the handout materials at the beginning of the tour distracted the students; they made planes and balls out of them.
•It was great to show the students the video first.
•Will the ship tour again? We toured the wastewater treatment plant, the water plant and the ship.
•Needed: A follow-up video with role playing ideas for lower grade students; a follow-up study packet for students and teachers; more activities
•Needed: Access to computer network information for articles and papers about environmental subjects.
•If the boat could be in port longer, perhaps the students could get involved with labs and kitchen
•Students generally liked the visit very much. We were the last school group of the day and only had about ten minutes aboard ship because we had to return to school for bus dismissal. Information was limited for us and therefore the program's effectiveness is not reflected in our summaries.

•A college professor notes: If possible some hands-on work would have been nice. Let students punch a few computer keys, etc. so many of my students did similar work in the lab it would have been a good experience. Too bad it was a short trip since my older students could have helped to do the sampling,etc.
•A fifth grade teacher with three grade-5 classes provided an opportunity for all 71 students to write in on their answer sheets what impressed them most about their ship-board tour. There is a wide range of sophistication in the writing, but essentially the students followed the lists on their answer sheets. (Student comments available to EPA if needed)

STUDENT ANSWER SUMMARY -- VISITING THE LAKE GUARDIAN

School Location

There were more than twice the number of school locations (11) in 1993 than in 1992 (5). But even more important was the tenfold increase in students participating. In 1993, there were over one thousand (1089) students, whereas in the 1992 survey there had been just 140 students. (Table 1-S)

Class Grade Level

First through sixth graders comprised 78.4% of the students; 12.9% were in seventh to ninth grades; and 4% in tenth through college. There is a significant increase(***) in the fourth to sixth grade students in 1993 (65.6%) from 1992 (7.9%) (Table 2-S)

How did you like your visit to the Lake Guardian research ship?

Students gave higher ratings to their visit in 1993: Great! ratings went up

significantly (**) from 37.9% in 1992 to 50.4% in 1993 The mid-level ratings were about the same in both years, but the "boring" response dropped in 1993 to just 2.8% and the "no response" also dropped to .6%. (See Table 3-S)

The largest group of students, in first to ninth grades, (521), were significantly (***) the most enthusiastic about their visit to Lake Guardian, rating it Great! The tenth grade and above students gave the visit a "Good" rating (59.2%), far more than "Great" (18.4%) or "Okay" (16.3%) (See Table 3-Sa)

It was the students in first through fifth grades that gave the tour the highest ratings; a drop-off occurs in fifth grade and above. (See Table 3-Saa)

What parts of the tour did you enjoy?

Students in the 1993 survey enjoyed the tour of Lake Guardian, giving several aspects of the tour higher ratings than did the 1992 students. In 1993, the pilot house received the highest rating (68.4%) closely followed by just being on a ship (64.5%). Talking to the captain and crew (51.7%), seeing the sleeping quarters (40.8%), the equipment on deck (40.1%) and the laboratories (40.1%) were also popular. Meeting the scientists (17.2%) and seeing the videotape (15.2%) were lowest ranked, along with the hand-out materials (19.5%). The 1992 students gave no ratings higher than 56.8%, for the equipment on deck. They ranked lowest seeing the galley, sleeping quarters and the hand-out materials. (See Table 4-S)

Did you tell your family about what you learned on the Lake Guardian?

A higher percentage (80.7%) in 1993 said they told their families about the Lake Guardian trip; it had been 70.7% in 1992. There was a very low "no response" in 1993 (.8%). (See Table 5-S)

It was the students in the elementary grades, 1 through 8, who told their families about their trip and what they learned. There is a big (**) drop-off from the 80% levels down to the 50% levels, which is still very good, for the 9th grades and above. (See Table 5-Saa)

True or False Questions

Of the 12 questions to be answered true or false, eight are true, four are false. In comparing the results from both surveys, it appears that the 1992 students in general did just a bit better at getting correct answers. But with the exception of the question about "Lake Guardian shows that ships do not have to pollute", there are no significant differences.

Looked at by grade level, however, there are differences.
Q.4. The Great Lakes are the largest supply of fresh water on earth, shows the highest scores (85.7%) at tenth grade and above (**) (See Table 6-Sa). While there is a fairly steady high rate of correct answers throughout the grade levels (80%) third, fourth and eighth grades are much lower (See Table 6-Saa).
Q.5. The Lake Guardian shows that ships do not have to pollute the water. Seventh to ninth grades (90.7%) and tenth and above (91.8%) are correct much more often (**) than the lower grade levels. (See Table 6-Sb and 6-Saa)
Q. 6. The Great Lakes can clean themselves up. The fourth to sixth and seventh to ninth graders did best (**) on correct answers, but this seems to have been a "stumper" with more incorrect answers (21.3%) than some other questions. (See Table 6-Sc) There is a significant difference (*) between the two survey groups. The 1993 group had correct answers (81.1%) and incorrect (18.9%) vs. the 1992 group (10.7%) incorrect and (89.3%) correct. (See Table 6-S)
Q.7. Trash thrown into the lakes does not harm the fish. Oddly enough, the higher grade level students didn't get the fact this was a false question and they missed (***) it far more (20.4%) than did the lower grade students, who did quite well scoring upwards of 90%. (See Table 6-Sd and 6-Saa)
Q. 8. The more algae there is in the water, the better it is for the fish. This question, like Q.7, has as its correct answer a "false", and it, too "stumped" the students (***) who gave a high rate of incorrect answers (35.9%). First to third graders were most likely to be incorrect (51.1%). Highest correct answers were at the seventh to ninth (70%) and tenth grade and above (75.5%). (See Table 6-Se) The high score for the lower grades appears to be due to the first grade, where most likely one teacher did a good job of explaining the correct answer; without that first grade the scores are about even throughout (See Table 6-Saa)
Q.9. Acid rain comes from burning fossil fuels. The correct, "true" answer to this question came principally from the higher grades(***): fourth to sixth (71.8%), seventh to ninth (70%) and tenth and above (85.7%).(See Table 6-Sf) As in Q.8, the first and second grade teachers, with small numbers of students,

appear to have done a special job of teaching the correct answers (See Table 6-Saa)

Q.10 Acid rain travels in the air for hundreds of miles. The tenth graders and above answered this correctly (93.9%)(***). The other grade levels fell to the 70% levels in knowing the correct answer. (See Table 6-Sg and 6-Saa).

Q. 11. Toxic chemicals that got into the lakes years ago can be found today when scientists study samples of lake bottom (sediment). This question stumped the older students for some reason. They gave correct answers (67.3%) for tenth grade and above, (65%) for seventh to ninth(***). The first to third graders knew the right answer (93.5%) as did the fourth to sixth graders (84.5%). (See Table 6-Sh and Table 6-Saa)

Q.12. Fish in the Great Lakes do not suffer any ill effects from toxic chemicals This false question did not prove as difficult for the students as the others. There was a lower overall wrong answer score (12.l%). Again, the lower grades were the most likely to have the higher correct scores(***) in the over-80% range, while the tenth grade and above scored much lower (69.4%). (See Table 6-Si and 6-Saa)

Q. 13. It is the job of the Lake Guardian to find out how much pollution is in the waters of the Great Lakes. While all the students scored high on this question, the tenth grade and above again had a lower correct rate (87.8%.) All the other students scored in the 90% range correct.(**) (See Table 6-Sj and 6-Saa)

Q.14. Canada and the United States of America are working together to protect the Great Lakes from pollution. On this question, tenth grade and above had no incorrect answers at all (*), scoring highest in correct answers (95.9%). But all of the students did well on this question. (See Table 6-Sk and 6-Saa)

Q. 15. Today, industry discharges much more pollution into the Great Lakes than it did in the past. The highest (49.4%) wrong answer rating (***) of all the questions was for this false answer "stumper". Correct scores were highest (67.3%) for the tenth grade and above. Lowest scoring (33.8%) were the first to third graders. (See Table 6-Sl and 6-Saa)

IV SURVEY FORMS AND TABLES

A.Telephone Survey Forms

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Chicago, Il. 60601
(312) 263-2500

Telephone Survey - Lake Guardian

- LOG BOOK

TELEPHONE SURVEY - LAKE GUARDIAN

TELEPHONE NUMBER: _____ TIME BEGUN:_____
TIME ENDED:_____

Sample 1[ ] Random 2[X] Log book

Port 3[ ] Detroit 4[ ] Buffalo 5 [ ]Oswego 7[ ]Erie, PA

Hello, my name is _____ from Health Education Research. We are conducting a survey of people who have visited the research ship, Lake Guardian, and would like to include your opinions. It will take only a few minutes. First a few questions about Great Lakes environmental issues.

1. Do you consider one of the Great Lakes to be <u>your</u> lake? [IF YES] Which one?

No/Don't know [SKIP TO #3].....1
Yes:
Lake Superior.....2
Lake Huron.....3
Lake Michigan.....4
Lake Erie.....5
Lake Ontario.....6

2. Why do you feel that Lake <u>[#1]</u> is your lake? [DO NOT READ] [MARK ALL RESPONSES]

Closest to us [SKIP TO #4].....1
Grew up there.....2
Fishing.....3
Swimming.....4
Boating.....5
Family Outings.....6
Beauty.....7
Drinking water.....9
Other_____

3. Which <u>one</u> of the Great Lakes do you live nearest to? [READ LIST]

Lake Superior.....1
Lake Huron.....2
Lake Michigan.....3
Lake Erie.....4
Lake Ontario.....5

4. What activities do you or your family do at the lake [LAKE #1]? [DO NOT READ LIST] [PROBE FOR ALL ACTIVITIES]

Walking/Jogging.....1
Fishing.....2
Swimming.....3
Boating.....4
Camping.....5
Skiing.....6
Beach activities.....7
Family Outings.....8
Other_____
None, never go there [SKIP TO #6B]..9

5. Where do you spend most of your time when you are at Lake <u>[#1]</u>? Would you be... [READ LIST]

In deep water - boating, sailing or fishing.....1
At the shoreline or on the beaches..2
Away from the shoreline in a park or on jogging trails.....3
Other_____

6A. From what you have seen at Lake [#1] when you are [see #5], how would you rate the water quality in Lake [#1]? Would you say it is Excellent, Good, Fair or Poor? [NOW GO TO #7]

6B. From what you have heard about Lake [#1], how would you rate the water quality near the shoreline? Would you say it is Excellent, Good, Fair or Poor?

[Answers for 6A and 6B]
Excellent.....1
Good.....2
Fair.....3
Poor.....4
[No Opinion, Don't Know].....0

7. Over the past ten years, would you say that the water quality of Lake [#1] is improving, is it getting worse, or is it staying about the same?

Improving.....1
About the same.....2
Getting worse.....3
[Don't know]..... 0

8. What do you think are the biggest problems concerning Lake [#1] water quality? [DO NOT READ LIST] [MARK ALL RESPONSES]

Contaminants/pollution.....1
Zebra Mussels.....2
Dirty beaches.....3
Acid Rain.....4
Paper mills.....5
Pesticides.....6
Oil Spills.....7
Ship traffic.....8
There are no problems.....9
Other_____
[Don't know].....0

9. Who do you feel is responsible for monitoring the water quality of Lake [#1]?[DO NOT READ LIST] [MARK ALL RESPONSES]

Local government.....1
State government.....2
US Environmental Protection Agency..3
Department of Natural Resources.....4
US Federal government.....5
Environment Canada.....6
Other_____.7
[Don't know].....0

10. Now I'm going to read you a few things that some people believe are problems. Other people believe these are not problems. As I read each one, please tell me whether you consider it to be a major problem, a minor problem, or not a problem at all. [ROTATE FROM MARKED ITEM]

	MAJOR	MINOR	NOT AT ALL	DON'T KNOW
[ ]A. Acid rain	1	2	3	0
[ ]B. Pollution in the bottom mud below the water	1	2	3	0
[ ]C. Chemicals washing into the lake from farms	1	2	3	0
[ ]D. Chemicals washing into the lake from cities	1	2	3	0
[ ]E. Industries dumping chemicals in Lake [#1]	1	2	3	0
[ ]F. PCBs in Lake [#1]	1	2	3	0
[ ]G. DDT in Lake [#1]	1	2	3	0
[ ]H. Exotic species like the Zebra Mussels	1	2	3	0
[ ]I. Lake [#1] fish unsafe to eat	1	2	3	0
[ ]J. Lake [#1] unsafe for swimming	1	2	3	0

11. Do you feel there is anything you can do to help improve Lake [#1] water quality? [IF YES] What is that? [DO NOT READ LIST]

No.....1
Don't know.....2
Yes:
Proper waste disposal.....3
Join environmental group.....4
Write to congressman.....5
Increase public awareness.....6
Beach clean ups.....7
Recycle.....8
More/better government controls...9
Other_____
Don't know.....0

12. Do you feel there is anything the government can do to help improve Lake [#1] water quality? [IF YES] What is that? [DO NOT READ LIST]

No.....1
Don't know.....2
Yes:
More restrictions on industry.....3
More restrictions on chemicals....4
Better rule enforcement.....5
More laws.....6
Fines for polluters.....7
Provide more funds.....8
More education.....9
Other_____
Don't know.....0

13. [NO QUESTION 13]

[TOURED SHIP].....4

14. Can you recall where you heard about the research ship Lake Guardian? Was it in a local newspaper, on the radio, or TV, or from someone else?

Local newspaper.....1
Radio.....2
Television.....3
Word of mouth.....4
Saw in area.....5
Other_____
[Don't know].....0

15. [NO QUESTION 15]

[TOURED SHIP].....3

16. [NO QUESTION 16]

[TOURED SHIP].....3

17. What was the main reason you toured the ship? [DO NOT READ LIST]

[IF CURIOSITY] About what?

_____

School field trip.....1
Went with a group.....2
Went with family member.....3
To take children.....4
Interest in conservation/environmnt.5
Interest in the ship itself.....6
Educational experience.....7
Curiosity [PROBE].....8
Other_____
Don't know/refused.....0

18. Have any other members of your family toured the Lake Guardian?

Yes.....1
No [SKIP TO #20].....2
Not sure [SKIP TO #20].....3

19. What was the main reason your family member toured the ship? [DO NOT READ LIST]

School field trip.....1
Went with a group.....2
Went with family member.....3
To take children.....4
Interest in conservation/environmnt.5
Interest in the ship itself.....6
Educational experience.....7
Curiosity.....8
Other_____
Don't know/refused.....0

[CHECK #16 - IF RESPONDENT TOURED SHIP, CONTINUE - IF NOT, SKIP TO #28]

20. What impressed you most about the Lake Guardian tour [DO NOT READ LIST]

The size of the ship.....[ ]
The work they are doing.....[ ]
Ship is non-polluting.....[ ]
The Rosette water sampler.....[ ]
Other equipment on deck.....[ ]
The labs and their equipment.....[ ]
The captain and crew.....[ ]
The scientists on board.....[ ]
Other_____
[Refused, don't know].....0

21. I'm going to read a list of activities conducted on the Lake Guardian. Please tell me which of them you recall being presented during your tour. [READ LIST]

Monitoring pollution hot spots.....[ ]
Measuring water pollution.....[ ]
Measuring pollution in sediments...[ ]
Measuring pollution in fish.....[ ]
Measuring air pollution.....[ ]
Conducting experiments.....[ ]
Training young scientists.....[ ]
Operating as a non-polluting ship..[ ]
[Refused, don't know].....0

22. Did you have any questions that were not answered to your satisfaction during the tour? Can you tell me what your question was?

No unanswered questions.....1

---

23. Did you receive a general fact sheet and a self-guided tour brochure when you were aboard the Lake Guardian?

Yes.....1
No [SKIP TO #26].....2
Not sure [SKIP TO #26].....3

24. Were these helpful to you?

Yes [SKIP TO #26].....1
No.....2
Not sure.....3

25. What would have improved the fact sheet and self-guided tour brochures?

Nothing.....1
Don't know.....2

---

26. Was there anything you did <u>not</u> like about your tour of the Lake Guardian? [IF YES] What was that?

No dislikes about tour.....1
Long lines.....2
Could not hear.....3
Video tape too long.....4
No personal tour.....5
Other_____

27. What day of the week and time of day were you aboard?

S M T W T F S
1 2 3 4 5 6 7

1[ ]Morning 2[ ]Afternoon 3[ ]Evening

28. Can you recall who owns and operates the Lake Guardian? [DO NOT READ]

US EPA 1
Environment Canada.....2
Federal government.....3
Coast Guard.....4
Greenpeace.....5
Colleges/Universities.....6
Private Industry.....7
Other_____
Don't know.....0

29. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

Too much emphasis.....1
About right.....2
Too little emphasis.....3
[Don't know/Refused].....0

30. These final questions are for classification purposes only. Is your age [READ CHOICES]

25 and under.....1
26 to 35.....2
36 to 45.....3
46 to 55.....4
56 to 65.....5
66 to 75.....6
76 and over.....7
[Refused].....0

31. Including yourself, how many people currently live in your household?

Number in household is:_____

32. How many are children under the age of 18?

Number of children is:_____

33. Is anyone in your household a member of an environmental organization [IF YES] Which ones?

No/Don't know.....1
Yes.....2
Belong to/support:
Sierra club.....[ ]
National Wildlife Federation....[ ]
Audubon Society.....[ ]
Nature Conservancy.....[ ]
Greenpeace.....[ ]
Cousteau Society.....[ ]
World Wildlife Fund.....[ ]
Other_____
Can't recall.....[ ]

34. What is the highest level of school you completed? Is it [READ LIST]

Up to 11th grade.....1
High school.....2
Trade school.....3
Some college.....4
Four year college degree.....5
Graduate school.....6
[Refused].....0

35. What is your occupation? [IF RETIRED] Retired from doing what?

1[ ]Not retired 2[ ]Retired
Type of work_____

36. Sex of respondent

Male.....1
Female.....2

Thank you for your help with this study. Do you have any other comments you would like to make?

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Telephone Survey - Lake Guardian

- RANDOM

TELEPHONE SURVEY - LAKE GUARDIAN

TELEPHONE NUMBER: _____ TIME BEGUN:_____
TIME ENDED:_____

Sample 1[X] Random 2[ ] Log book

Port 1[ ] Sault St Marie 2[ ] Alpena 3[ ] Detroit 4[ ] Buffalo 5 [ ]Oswego

Hello, my name is _____ from Health Education Research. We are conducting a public opinion survey concerning Great Lakes Environmental Issues, and would like to include the opinions of your household. It will take only a few minutes.

1. Do you consider one of the Great Lakes to be <u>your</u> lake? [IF YES] Which one?

No/Don't know [SKIP TO #3].....1
Yes:
Lake Superior.....2
Lake Huron.....3
Lake Michigan.....4
Lake Erie.....5
Lake Ontario.....6

2. Why do you feel that Lake <u>[#1]</u> is your lake? [DO NOT READ] [MARK ALL RESPONSES]

Closest to us [SKIP TO #4].....1
Grew up there.....2
Fishing.....3
Swimming.....4
Boating.....5
Family Outings.....6
Beauty.....7
Drinking water.....9
Other_____

3. Which <u>one</u> of the Great Lakes do you live nearest to? [READ LIST]

Lake Superior.....1
Lake Huron.....2
Lake Michigan.....3
Lake Erie.....4
Lake Ontario.....5

4. What activities do you or your family do at the lake [LAKE #1]? [DO NOT READ LIST] [PROBE FOR ALL ACTIVITIES]

Walking/Jogging.....1
Fishing.....2
Swimming.....3
Boating.....4
Camping.....5
Skiing.....6
Beach activities.....7
Family Outings.....8
Other_____
None, never go there [SKIP TO #6B]..9

5. Where do you spend most of your time when you are at Lake <u>[#1]</u>? Would you be... [READ LIST]

In deep water - boating, sailing or fishing.....1
At the shoreline or on the beaches..2
Away from the shoreline in a park or on jogging trails.....3
Other_____

6A. From what you have seen at Lake [#1 when you are [see #5], how would you rate the water quality in Lake [#1]? Would you say it is Excellent, Good, Fair or Poor? [NOW GO TO #7]

6B. From what you have heard about Lake [#1], how would you rate the water quality near the shoreline? Would you say it is Excellent, Good, Fair or Poor?

[Answers for 6A and 6B]
Excellent.....1
Good.....2
Fair.....3
Poor.....4
[No Opinion, Don't Know].....0

7. Over the past ten years, would you say that the water quality of Lake [#1] is improving, is it getting worse, or is it staying about the same?

Improving.....1
About the same.....2
Getting worse.....3
[Don't know]..... 0

8. What do you think are the biggest problems concerning Lake [#1] water quality? [DO NOT READ LIST] [MARK ALL RESPONSES]

Contaminants/pollution.....1
Zebra Mussels.....2
Dirty beaches.....3
Acid Rain.....4
Paper mills.....5
Pesticides.....6
Oil Spills.....7
Ship traffic.....8
There are no problems.....9
Other_____
[Don't know].....0

9. Who do you feel is responsible for monitoring the water quality of Lake [#1]?[DO NOT READ LIST]
[MARK ALL RESPONSES]

Local government.....1
State government.....2
US Environmental Protection Agency..3
Department of Natural Resources.....4
US Federal government.....5
Environment Canada.....6
Other_____.7
[Don't know].....0

10. Now I'm going to read you a few things that some people believe are problems. Other people believe these are not problems. As I read each one, please tell me whether you consider it to be a major problem, a minor problem, or not a problem at all. [ROTATE FROM MARKED ITEM]

	MAJOR	MINOR	NOT AT ALL	DON'T KNOW
[ ]A. Acid rain	1	2	3	0
[ ]B. Pollution in the bottom mud below the water	1	2	3	0
[ ]C. Chemicals washing into the lake from farms	1	2	3	0
[ ]D. Chemicals washing into the lake from cities	1	2	3	0
[ ]E. Industries dumping chemicals in Lake [#1]	1	2	3	0
[ ]F. PCBs in Lake [#1]	1	2	3	0
[ ]G. DDT in Lake [#1]	1	2	3	0
[ ]H. Exotic species like the Zebra Mussels	1	2	3	0
[ ]I. Lake [#1] fish unsafe to eat	1	2	3	0
[ ]J. Lake [#1] unsafe for swimming	1	2	3	0

11. Do you feel there is anything you can do to help improve Lake [#1] water quality? [IF YES] What is that? [DO NOT READ LIST]

No.....1
Don't know.....2
Yes:
Proper waste disposal.....3
Join environmental group.....4
Write to congressman.....5
Increase public awareness.....6
Beach clean ups.....7
Recycle.....8
More/better government controls...9
Other_____
Don't know.....0

12. Do you feel there is anything the government can do to help improve Lake [#1] water quality? [IF YES] What is that? [DO NOT READ LIST]

No.....1
Don't know.....2
Yes:
More restrictions on industry.....3
More restrictions on chemicals....4
Better rule enforcement.....5
More laws.....6
Fines for polluters.....7
Provide more funds.....8
More education.....9
Other_____
Don't know.....0

13. Have you heard or read anything about an environmental research ship named the Lake Guardian?

Yes.....1
Yes, I toured it [ASK #14 THEN SKIP TO #17].....2
No [SKIP TO #29].....3
Don't know [SKIP TO #29].....0

14. Can you recall where you heard about the research ship Lake Guardian? Was it in a local newspaper, on the radio, or TV, or from someone else?

Local newspaper.....1
Radio.....2
Television.....3
Word of mouth.....4
Saw in area.....5
Other_____
[Don't know].....0

15. Are you aware that public tours are available on the Lake Guardian?

Yes.....1
No [SKIP TO #28].....2
Don't know [SKIP TO #28].....0

16. Have you, personally, toured the Lake Guardian?

Yes.....1
No [SKIP TO #18].....2
Don't know [SKIP TO #18].....0

17. What was the main reason you toured the ship? [DO NOT READ LIST]

[IF CURIOSITY] About what?

_____

School field trip.....1
Went with a group.....2
Went with family member.....3
To take children.....4
Interest in conservation/environmnt.5
Interest in the ship itself.....6
Educational experience.....7
Curiosity [PROBE].....8
Other_____
Don't know/refused.....0

18. Have any other members of your family toured the Lake Guardian?

Yes.....1
No [SKIP TO #20].....2
Not sure [SKIP TO #20].....3

19. What was the main reason your family member toured the ship? [DO NOT READ LIST]

School field trip.....1
Went with a group.....2
Went with family member.....3
To take children.....4
Interest in conservation/environmnt.5
Interest in the ship itself.....6
Educational experience.....7
Curiosity.....8
Other_____
Don't know/refused.....0

[CHECK #16 - IF RESPONDENT TOURED SHIP, CONTINUE - IF NOT, SKIP TO #28]

20. What impressed you most about the Lake Guardian tour [DO NOT READ LIST]

The size of the ship.....[ ]
The work they are doing.....[ ]
Ship is non-polluting.....[ ]
The Rosette water sampler.....[ ]
Other equipment on deck.....[ ]
The labs and their equipment.....[ ]
The captain and crew.....[ ]
The scientists on board.....[ ]
Other_____
[Refused, don't know].....0

21. I'm going to read a list of activities conducted on the Lake Guardian. Please tell me which of them you recall being presented during your tour. [READ LIST]

Monitoring pollution hot spots.....[ ]
Measuring water pollution.....[ ]
Measuring pollution in sediments...[ ]
Measuring pollution in fish.....[ ]
Measuring air pollution.....[ ]
Conducting experiments.....[ ]
Training young scientists.....[ ]
Operating as a non-polluting ship..[ ]
[Refused, don't know].....0

22. Did you have any questions that were not answered to your satisfaction during the tour? Can you tell me what your question was?

No unanswered questions.....1

---

23. Did you receive a general fact sheet and a self-guided tour brochure when you were aboard the Lake Guardian?

Yes.....1
No [SKIP TO #26].....2
Not sure [SKIP TO #26].....3

24. Were those helpful to you?

Yes [SKIP TO #26].....1
No.....2
Not sure.....3

25. What would have improved the fact sheet and self-guided tour brochures?

Nothing.....1
Don't know.....2

---

26. Was there anything you did not like about your tour of the Lake Guardian? [IF YES] What was that?

No dislikes about tour.....1
Long lines.....2
Could not hear.....3
Video tape too long.....4
No personal tour.....5
Other_____

27. What day of the week and time of day were you aboard?

S M T W T F S
1 2 3 4 5 6 7

1[ ]Morning 2[ ]Afternoon 3[ ]Evening

28. Can you recall who owns and operates the Lake Guardian? [DO NOT READ]

US EPA 1
Environment Canada.....2
Federal government.....3
Coast Guard.....4
Greenpeace.....5
Colleges/Universities.....6
Private Industry.....7
Other_____
Don't know.....0

29. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

Too much emphasis.....1
About right.....2
Too little emphasis.....3
[Don't know/Refused].....0

30. These final questions are for classification purposes only. Is your age [READ CHOICES]

25 and under.....1
26 to 35.....2
36 to 45.....3
46 to 55.....4
56 to 65.....5
66 to 75.....6
76 and over.....7
[Refused].....0

31. Including yourself, how many people currently live in your household?

Number in household is:_____

32. How many are children under the age of 18?

Number of children is:_____

33. Is anyone in your household a member of an environmental organization [IF YES] Which ones?

No/Don't know.....1
Yes.....2
Belong to/support:
Sierra club.....[ ]
National Wildlife Federation....[ ]
Audubon Society.....[ ]
Nature Conservancy.....[ ]
Greenpeace.....[ ]
Cousteau Society.....[ ]
World Wildlife Fund.....[ ]
Other_____
Can't recall.....[ ]

34. What is the highest level of school you completed? Is it [READ LIST]

Up to 11th grade.....1
High school.....2
Trade school.....3
Some college.....4
Four year college degree.....5
Graduate school.....6
[Refused].....0

35. What is your occupation? [IF RETIRED] Retired from doing what?

1[ ]Not retired 2[ ]Retired
Type of work_____

36. Sex of respondent

Male.....1
Female.....2

Thank you for your help with this study. Do you have any other comments you would like to make?

B. Teacher/Student Survey Forms

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Dear Educator:

You and your class recently toured the Lake Guardian, the U.S. Environmental Protection Agency's (EPA) largest research vessel. EPA is glad you came aboard. EPA wants to be sure the materials you received, and the tour of the Lake Guardian were appropriately educational and useful.

That is why we are conducting a survey on behalf of the EPA. This is a confidential survey. That is, all responses will be tabulated as a group, and no individual responses will be shown at any time.

If there are things that need to be fixed or added to the teacher and student materials, or on the tour, we will find out through this survey. Your own future class tours will benefit from your help, as will other teachers and their students.

This survey has three parts:

1. Teacher's Evaluation Form -- This is where you tell us how and whether the materials and the tour were useful, and if it was an appropriate learning experience for your class.

2. Student Review -- These are hand-out quizzes for the students who toured the Lake Guardian with you. It's actually a chance for you to see whether students retain what they learned; what more you might be able to teach them about Great Lakes and water quality; and whether it was an enjoyable experience for them.

3. Return Materials -- Consisting of a Student Summary and postpaid return envelope. Here's how the return mailing works:

    * You may keep the student quizzes, grade them if you wish, and hand them back to the students. If that's what you decide to do, please total the student's responses, fill out the Student Summary form and mail the Summary together with your Teacher's Evaluation form in the postpaid return envelope.

    * You may place all of the student quizzes, the Student Summary form and your Teacher's Evaluation form in the postpaid envelope. The tally of student responses will be done by us.

We all appreciate your help and look forward to hearing from you soon.

Elaine Falk Katz, Ed.D.
Director, Health Education Research, Inc.

Expires on 07/31/95

TEACHER'S EVALUATION — VISITING THE LAKE GUARDIAN

School location (City): _____

Class grade level: _____ Number of students in the class: _____

How did you hear about the opportunity to visit the Lake Guardian?

1 ❑ Received a letter from the Environmental Protection Agency
2 ❑ Saw a newspaper article or other publication
3 ❑ Heard about it from another teacher
4 ❑ Other:

_____

Was this your first environmental field trip? 1 ❑ Yes 2 ❑ No

Please grade the pre-visit materials you received from the US/EPA:

	A	B	C	D	E
1. Great Minds? Great Lakes	4	3	2	1	0
2. Great Lakes Atlas/Resource Book	4	3	2	1	0
3. Videotape	4	3	2	1	0

Please tell us the reasons for any low grades:

_____

_____

Did you receive these materials in time for your tour? 1 ❑ Yes 2 ❑ No
Did you do any class work with them before your tour? 1 ❑ Yes 2 ❑ No
Could you have used the materials earlier? 1 ❑ Yes 2 ❑ No
Are they appropriate for your grade level students? 1 ❑ Yes 2 ❑ No
Will you use the materials in future lessons? 1 ❑ Yes 2 ❑ No

In which subject area will you use these materials? _____

Should EPA provide any additional take-home materials for your students? (PLEASE CHECK ALL THAT APPLY)

1 ❑ Information for parents on environmental problems
2 ❑ Lists of things to do to help clean up the Great Lakes
3 ❑ Lists of telephone numbers to call for information
4 ❑ Government agency program explanations
5 ❑ Other

_____

Do you have any suggestions for additional or improved classroom materials?

_____

_____

_____

(OVER)

STUDENT REVIEW — VISITING THE LAKE GUARDIAN

1. How did you like your visit to the Lake Guardian research ship?

1	❑	It was great!	3	❑	It was okay
2	❑	It was good	4	❑	It was boring

2. What parts of the tour did you enjoy?

1	❑	Being on a ship	6	❑	The sleeping quarters
2	❑	The equipment on deck	7	❑	The Pilot House
3	❑	The laboratories	8	❑	Talking to the captain and crew
4	❑	The videotape	9	❑	Meeting the scientists
5	❑	The galley and eating area	10	❑	The hand-out materials

3. Did you tell your family about what you learned on the Lake Guardian?

1 ❑ Yes 2 ❑ No

Please circle **T** for True or **F** for False:

4.	The Great Lakes are the largest supply of fresh water on earth.	T	F
5.	The Lake Guardian shows that ships do not have to pollute the water.	T	F
6.	The Great Lakes can clean themselves up, especially if people stop adding new pollution to the water.	T	F
7.	Trash thrown into the lakes does not harm the fish because it quickly breaks down into atoms.	T	F
8.	The more algae there is in the water, the better it is for the fish.	T	F
9.	Acid Rain comes from burning fossil fuels.	T	F
10.	Acid Rain travels in the air for hundreds of miles before falling as rain or snow.	T	F
11.	Toxic chemicals that got into the lakes years ago can be found today when scientists study samples of lake bottom (sediment).	T	F
12.	Fish in the Great Lakes do not suffer any ill effects from toxic chemicals because they are at the bottom of the food chain.	T	F
13.	It is the job of the Lake Guardian to find out how much pollution is in the waters of the Great Lakes.	T	F
14.	Canada and the United States of America are working together to protect the Great Lakes from pollution.	T	F
15.	Today, industry discharges much more pollution into the Great Lakes than it did in the past.	T	F

STUDENT ANSWER SUMMARY — VISITING THE LAKE GUARDIAN

1. How did you like your visit to the Lake Guardian research ship?

1 __	It was great!	3 __	It was okay
2 __	It was good	4 __	It was boring

2. What parts of the tour did you enjoy?

1 __	Being on a ship	6 __	The sleeping quarters
2 __	The equipment on deck	7 __	The Pilot House
3 __	The laboratories	8 __	Talking to the captain and crew
4 __	The videotape	9 __	Meeting the scientists
5 __	The galley and eating area	10 __	The hand-out materials

3. Did you tell your family about what you learned on the Lake Guardian?

1 __ Yes 2 __ No

Please circle **T** for True or **F** for False:	T	F
4. The Great Lakes are the largest supply of fresh water on earth.	__	__
5. The Lake Guardian shows that ships do not have to pollute the water.	__	__
6. The Great Lakes can clean themselves up, especially if people stop adding new pollution to the water.	__	__
7. Trash thrown into the lakes does not harm the fish because it quickly breaks down into atoms.	__	__
8. The more algae there is in the water, the better it is for the fish.	__	__
9. Acid Rain comes from burning fossil fuels.	__	__
10. Acid Rain travels in the air for hundreds of miles before falling as rain or snow.	__	__
11. Toxic chemicals that got into the lakes years ago can be found today when scientists study samples of lake bottom (sediment).	__	__
12. Fish in the Great Lakes do not suffer any ill effects from toxic chemicals because they are at the bottom of the food chain.	__	__
13. It is the job of the Lake Guardian to find out how much pollution is in the waters of the Great Lakes.	__	__
14. Canada and the United States of America are working together to protect the Great Lakes from pollution.	__	__
15. Today, industry discharges much more pollution into the Great Lakes than it did in the past.	__	__

15b. Are you aware that public tours are available on the Lake Guardian?

Log Book

	Small	Medium	Large
Base: Heard of Lake Guardian	125	162	162
Yes	100.0%	100.0%	100.0%
No			
Don't know			

Random Sample

	Small	Medium	Large
Base: Heard of Lake Guardian	56	6	9
Yes	64.3%	33.3%	11.1%
No	33.9%	50.0%	88.9%
Don't know	1.8%	16.7%	

16b. Have you, personally, toured the Lake Guardian?

Log Book

	Small	Medium	Large
Base: Aware of public tours	123	160	162
Yes			
No			.6%
Log book visitor	100.0%	100.0%	99.4%

Random Sample

	Small	Medium	Large
Base: Aware of public tours	36	2	1
Yes	2.8%		
No	94.4%	100.0%	100.0%
Log book visitor	2.8%		

17b. What was the main reason you toured the ship?

	Small	Medium	Large
Base: Toured Lake Guardian	127	162	161
Interest in the ship itself	44.9%	64.2%	57.1%
Interest in conservation, environment	39.4%	44.4%	43.5%
Educational experience	22.0%	4.9%	18.0%
Curiosity	12.6%	9.3%	6.2%
To take children	8.7%	10.5%	5.0%
Went with family member	3.9%	6.8%	3.1%
Went with a group	4.7%		3.1%
School field trip	3.1%	1.2%	.6%
Business related	1.6%	1.2%	
No response			1.2%

18b. Have any other members of your family toured the Lake Guardian?

	Small	Medium	Large
Base: Toured Lake Guardian	161	164	162
Yes	53.4%	55.5%	44.4%
No	45.3%	44.5%	55.6%
Not sure	1.2%		

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

19b. What was the main reason your family member toured the ship?

	Small	Medium	Large
Base: Family member toured Lake Guardian	86	91	72
Interest in the ship itself	25.6%	37.4%	41.7%
Went with family member	31.4%	36.3%	23.6%
Interest in conservation/environment	16.3%	40.7%	34.7%
Educational experience	10.5%	8.8%	13.9%
Curiosity	7.0%	6.6%	9.7%
School field trip	17.4%	1.1%	1.4%
To take children	4.7%	7.7%	5.6%
Went with a group	9.3%	1.1%	
Don't know	1.2%	1.1%	1.4%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

20b. What impressed you most about the Lake Guardian tour?

	Small	Medium	Large
Base: Toured Lake Guardian	127	162	161
The size of the ship	3.9%	5.6%	5.0%
The work they are doing	34.6%	37.0%	36.6%
Ship is non-polluting	.8%	3.7%	2.5%
The Rosette water sampler	5.5%	2.5%	4.3%
Other equipment on deck	10.2%	17.9%	12.4%
The labs and their equipment	42.5%	48.1%	46.6%
The captain and crew	26.8%	28.4%	18.0%
The scientists on board	8.7%	4.3%	12.4%
Don't know, refused	4.7%	4.3%	1.2%
Other	7.9%	12.3%	11.8%
Base: Other	10	20	19
Well organized, informative		30.0%	15.8%
Knowledgeable guide	30.0%	35.0%	31.6%
Living quarters	60.0%	30.0%	31.6%
Ship design, features	10.0%	5.0%	21.1%

21b. Please tell me which of these activities you recall being presented during your tour?

	Small	Medium	Large
Base: Toured Lake Guardian	126	162	161
Monitoring pollution hot spots	58.7%	65.4%	69.6%
Measuring water pollution	77.0%	84.6%	87.0%
Measuring pollution in sediments	65.9%	72.8%	74.5%
Measuring pollution in fish	38.9%	56.2%	46.0%
Measuring air pollution	18.3%	32.1%	31.1%
Conducting experiments	71.4%	75.3%	82.6%
Training young scientists	54.0%	52.5%	54.0%
Operating as a non-polluting ship	66.7%	79.0%	55.9%
Don't know	1.6%		.6%

22b. Did you have any questions that were not answered to your satisfaction during the tour? What was your question?

	Small	Medium	Large
Base: Toured Lake Guardian	127	162	161
No unanswered questions	93.7%	98.1%	97.5%
How often in area	.8%		.6%
Is ship non-polluting	.8%		
What did you find in the Lake, Bay?	.8%	.6%	
What can you do for Thunder Bay?	1.6%		
What do you do with the information?		.6%	
How serious IS pollution, contamination?			.6%
More about boom on ship			.6%
Did not release test results	.8%		
Is there a mystery corner on lower corner of lake?	.8%		
How is the water quality of Lake Ontario?	.8%		
Did not answer Data Program		.6%	
How cope with long stays on board			.6%

23b. Did you receive a general fact sheet and a self-guided tour brochure when you were aboard the Lake Guardian?

	Small	Medium	Large
Base: Toured Lake Guardian	127	162	161
Yes	86.6%	90.7%	88.2%
No	10.2%	8.6%	8.7%
Not sure	3.1%	.6%	3.1%

24b. Were these helpful to you

	Small	Medium	Large
Base: Received materials	110	148	142
Yes	92.7%	95.9%	93.0%
No	2.7%	1.4%	4.2%
Not sure	4.5%	2.7%	2.8%

25b. What would have improved the fact sheet and self-guided tour brochures?

	Small	Medium	Large
Base: Materials not helpful	9	8	11
Nothing	22.2%		9.1%
Don't know	44.4%	100.0%	81.8%
Explaining hot spots	11.1%		
Too juvenile for adults	11.1%		
Use laymen's terminology	11.1%		9.1%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

26b. Was there anything you did not like about your tour of the Lake Guardian?

	Small	Medium	Large
Base: Toured Lake Guardian	127	162	161
No dislikes about tour	80.3%	86.4%	90.1%
Long lines	1.6%	2.5%	
Could not hear		2.5%	.6%
No personal tour	1.6%	1.2%	.6%
Tour disorganized	.8%		1.9%
Facilities inadequate for group	3.9%	.6%	1.9%
Wanted more time, information	7.1%	4.3%	1.9%
Didn't see enough of ship	2.4%	1.2%	.6%
Ship staff	1.6%	.6%	1.9%
Other	.8%	.6%	.6%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

28b. Can you recall who owns and operates the Lake Guardian?

Log Book

	Small	Medium	Large
Base: Aware of Lake Guardian	124	162	162
US EPA	43.5%	50.0%	54.9%
Federal Government	9.7%	9.3%	9.3%
Coast Guard	.8%	1.2%	
Greenpeace			
Colleges Universities		.6%	
Private Industry		.6%	3.7%
Other government agencies	2.4%	3.1%	1.2%
Other private groups	.8%	1.2%	.6%
Don't know	42.7%	34.0%	30.2%

Random Sample

	Small	Medium	Large
Base: Aware of Lake Guardian	56	6	9
US EPA	8.9%		
Federal Government	3.6%		
Coast Guard			
Greenpeace	1.8%		
Colleges Universities	1.8%		
Private Industry			
Other government agencies	1.8%		
Other private groups			
Don't know	82.1%	100.0%	100.0%

29b. Is it your impression that the Environmental Protection Agency is putting too much emphasis on Great Lakes environmental activities, too little, or about the right amount?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Too much emphasis	.8%	2.5%	3.1%
About right	51.2%	58.6%	50.0%
Too little emphasis	38.4%	35.2%	40.1%
No opinion	9.6%	3.7%	6.8%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Too much emphasis	6.5%	3.9%	2.5%
About right	34.9%	31.4%	37.0%
Too little emphasis	46.6%	43.1%	47.0%
No opinion	12.1%	21.6%	13.5%

30b. Is your age...

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
25 & under	14.4%	11.7%	14.2%
26 to 35	28.0%	29.6%	20.4%
36 to 45	24.0%	24.7%	30.9%
46 to 55	13.6%	14.2%	16.7%
56 to 65	10.4%	10.5%	8.0%
66 to 75	8.0%	7.4%	5.6%
76 & over	.8%	1.9%	.6%
Refused	.8%		3.7%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
25 & under	10.3%	13.7%	14.5%
26 to 35	20.3%	17.6%	27.0%
36 to 45	18.5%	33.3%	22.5%
46 to 55	12.5%	13.7%	10.0%
56 to 65	16.8%	9.8%	11.0%
66 to 75	13.8%	7.8%	9.5%
76 & over	7.3%	3.9%	4.0%
Refused	.4%		1.5%

31b. Including yourself, how many people currently live in your household?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
One	12.8%	17.3%	13.6%
Two	27.2%	29.6%	22.8%
Three	20.0%	21.0%	17.3%
Four	20.8%	19.8%	29.0%
Five	12.8%	8.0%	6.8%
Six	4.8%	2.5%	4.9%
Seven	.8%		
Eight		1.2%	1.9%
Nine			
Ten or more		.6%	.6%
Refused	.8%		3.1%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
One	15.9%	21.6%	17.5%
Two	45.7%	25.5%	26.5%
Three	11.2%	15.7%	17.0%
Four	13.8%	21.6%	22.5%
Five	7.8%	7.8%	8.5%
Six	3.9%	5.9%	5.0%
Seven	1.3%		1.0%
Eight	.4%		.5%
Nine		2.0%	
Ten or more			.5%
Refused			1.0%

32b. How many are children under the age of 18?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
None	45.6%	54.9%	48.8%
One	20.0%	18.5%	15.4%
Two	17.6%	16.7%	19.8%
Three	14.4%	7.4%	6.2%
Four	1.6%	.6%	5.6%
Five		.6%	
Six		.6%	.6%
Seven		.6%	
Eight			
Refused	.8%		3.7%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
None	65.5%	54.9%	56.0%
One	10.8%	17.6%	13.5%
Two	11.6%	13.7%	18.0%
Three	8.2%	7.8%	8.5%
Four	3.4%	3.9%	1.5%
Five	.4%		1.0%
Six		2.0%	
Seven			
Eight			.5%
Refused			1.0%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

33b. Is anyone in your household a member of an environmental organization? Which ones?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
No, Don't know	83.2%	88.3%	79.6%
Yes	16.8%	11.7%	20.4%
Base: Member	21	19	33
Sierra Club	9.5%	31.6%	18.2%
National Wildlife Federation	9.5%	5.3%	18.2%
Audubon Society	19.0%	21.1%	12.1%
Nature Conservancy	14.3%	5.3%	9.1%
Greenpeace	14.3%	10.5%	9.1%
Huron Environmental Activist League	23.8%		
National Environmental Group	19.0%	15.8%	18.2%
Local activist group	4.8%	31.6%	27.2%
Other group	9.5%	5.3%	9.1%
Can't recall name of group	4.8%	5.3%	3.0%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
No, Don't know	92.2%	96.1%	92.0%
Yes	7.8%	3.9%	8.0%
Base: All respondents	18	2	16
Sierra Club	11.1%		6.2%
National Wildlife Federation	22.2%		6.2%
Audubon Society	5.6%	50.0%	6.2%
Nature Conservancy			12.5%
Greenpeace	22.2%		18.8%
Huron Environmental Activist League	22.2%		
National Environmental Group	22.2%	50.0%	6.2%
Local activist group	22.2%		6.2%
Other group			6.2%
Can't recall name of group	16.7%	5.3%	31.2%

34b. What is the highest level of school you completed?

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Up to 11th grade	8.0%	4.3%	10.5%
High school	30.4%	29.0%	17.9%
Trade school	1.6%	3.7%	3.1%
Some college	24.0%	19.1%	24.1%
Four year degree	14.4%	31.5%	29.6%
Graduate school	19.2%	11.7%	11.7%
Refused	2.4%	.6%	3.1%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Up to 11th grade	13.8%	13.7%	7.5%
High school	40.5%	60.8%	34.5%
Trade school	1.3%	2.0%	2.5%
Some college	19.4%	7.8%	27.0%
Four year degree	16.8%	13.7%	19.5%
Graduate school	7.8%	2.0%	7.0%
Refused	.4%		2.0%

35b. What is your occupation (Previous occupation if retired)

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Not retired	81.6%	82.1%	86.4%
Retired	16.8%	17.9%	9.9%
Refused	1.6%		3.7%
Base: All respondents	125	162	162
Owner Manager	3.2%	3.7%	6.2%
Service Hospitality	5.6%	7.4%	3.7%
Clerical	4.8%	4.3%	8.6%
Skilled trade	12.8%	11.7%	7.4%
Unskilled trade	7.2%	9.3%	4.9%
Professional sales	1.6%	.6%	1.9%
Military		.6%	.6%
Retail sales	7.2%	3.1%	2.5%
Middle manager	2.4%	5.6%	6.2%
Teacher	8.8%	10.5%	4.3%
Farmer	.8%	.6%	
Mining			
Civil Service	6.4%	4.9%	8.6%
Homemaker	12.0%	8.0%	10.5%
Health care	8.0%	9.3%	4.9%
Unemployed	1.6%	3.1%	1.2%
Transportation	.8%	.6%	.6%
Student	4.8%	3.1%	8.0%
Author Journalist Arts Music	.8%	2.5%	4.3%
Environmental job	.8%	2.5%	
Engineer	3.2%	3.1%	6.8%
City employed	.8%	.6%	
Scientist		2.5%	1.2%
Lawyer			1.2%
Health Care Professional	3.2%		
Other Professional		1.2%	1.2%
No response	3.2%	1.2%	4.9%

35b. What is your occupation (Previous occupation if retired)

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Not retired	73.3%	86.3%	80.5%
Retired	25.9%	13.7%	18.5%
Refused	.9%		1.0%
Base: All respondents	232	51	200
Owner Manager	6.0%	2.0%	4.0%
Service Hospitality	5.6%	3.9%	6.5%
Clerical	11.2%	2.0%	10.0%
Skilled trade	7.3%	9.8%	15.5%
Unskilled trade	6.5%	11.8%	4.5%
Professional sales	1.7%	2.0%	1.5%
Military	.4%		
Retail sales	3.4%	2.0%	7.5%
Middle manager	4.7%	2.0%	4.5%
Teacher	3.0%	3.9%	6.0%
Farmer	.4%	3.9%	.5%
Mining	.4%		
Civil Service	8.2%		4.5%
Homemaker	19.0%	25.5%	13.5%
Health care	6.9%	7.8%	9.0%
Unemployed	2.2%	2.0%	2.0%
Transportation	.9%	2.0%	
Student	5.6%	3.9%	2.5%
Author Journalist Arts Music	1.3%	3.9%	1.0%
Environmental job			
Engineer	1.7%	2.0%	2.0%
City employed			
Scientist			.5%
Lawyer	.4%		.5%
Health Care Professional			.5%
Other Professional	.4%		.5%
No response	2.6%	9.8%	3.0%

36b. Gender

Log Book

	Small	Medium	Large
Base: All respondents	125	162	162
Male	48.0%	43.2%	59.9%
Female	52.0%	56.8%	40.1%

Random Sample

	Small	Medium	Large
Base: All respondents	232	51	200
Male	39.7%	33.3%	31.0%
Female	60.3%	66.7%	69.0%

2. Special Table

C -- "Owned Lake" Differences

PERCEPTION OF ENVIRONMENTAL ISSUES FOR NEAREST/"OWNED" LAKE

Table 6c
Current Water Quality

Log Book

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	3.2	2.5	2.6	2.6	2.4
n	98	86	8	196	42

Random Sample

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	3.0	2.5	2.7	2.3	2.2
n	83	95	28	212	32

Excellent=4, Good=3, Fair=2, Poor=1

Table 7c
Direction of Change in Water Quality

Log Book

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	.1	-.1	.5	.6	.5
n	81	73	8	194	39

Random Sample

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	-.2	-.2	-.1	.1	.0
n	77	86	23	203	31

Improving=+1, Staying the Same=0, Worsening=-1

PERCEPTION OF ENVIRONMENTAL ISSUES FOR NEAREST/"OWNED" LAKE

Table 10c
Number of Environmental 'Major Problems'

Log Book

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	4.2	4.7	6.0	5.5	4.9
Sample	102	86	8	208	45

Random Sample

	Lake Superior	Lake Huron	Lake Michigan	Lake Erie	Lake Ontario
Index	3.3	3.5	5.1	5.0	4.7
Sample	87	101	33	226	36

Base= 10 issues rated 'major', 'minor', or 'not a problem'

PERCEPTION OF ENVIRONMENTAL ISSUES

Table 6cc
Current Water Quality

Log Book

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	2.7	3.2	2.5	2.6	2.4
n	430	94	69	229	38

Random Sample

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	2.5	3.0	2.4	2.3	2.3
n	450	93	96	232	29

Excellent=4, Good=3, Fair=2, Poor=1

Table 7cc
Direction of Change in Water Quality

Log Book

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	.4	.1	-.2	.6	.4
n	395	79	57	223	36

Random Sample

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	-.0	-.2	-.2	.2	-.0
n	420	89	89	214	28

Improving=+1, Staying the Same=0, Worsening=-1

PERCEPTION OF ENVIRONMENTAL ISSUES

Table 10cc
Number of Environmental 'Major Problems'

Log Book

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	5.0	4.2	4.4	5.6	4.8
Sample	449	99	69	240	41

Random Sample

	Total	Lake			
		Superior	Huron	Erie	Ontario
Index	4.4	3.1	3.7	5.1	4.7
Sample	483	100	100	251	32

Base= 10 issues rated 'major', 'minor', or 'not a problem'

2. Special Table

D -- "Owned" by "Nearest" Lake

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

1d. Do you consider one of the Great Lakes to be your lake?

	Total		Nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base	932	100.0%	189	100.0%	187	100.0%	41	100.0%	434	100.0%	81	100.0%
No Don't know	160	17.2%	26	13.8%	34	18.2%	13	31.7%	70	16.1%	17	21.0%
Lake Superior	171	18.3%	159	84.1%	4	2.1%	1	2.4%	5	1.2%	2	2.5%
Lake Huron	148	15.9%	1	.5%	140	74.9%			7	1.6%		
Lake Michigan	49	5.3%	2	1.1%	7	3.7%	25	61.0%	15	3.5%		
Lake Erie	342	36.7%	1	.5%	2	1.1%	2	4.9%	336	77.4%	1	1.2%
Lake Ontario	62	6.7%							1	.2%	61	75.3%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

2d. Why do you feel that Lake ___ is your lake?

	Total		Name of "your lake"									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: Consider one lake their lake	772	100.0%	171	100.0%	148	100.0%	49	100.0%	342	100.0%	62	100.0%
Closest to us	602	78.0%	120	70.2%	119	80.4%	22	44.9%	288	84.2%	53	85.5%
Grew up there	71	9.2%	21	12.3%	13	8.8%	10	20.4%	22	6.4%	5	8.1%
Beauty	34	4.4%	11	6.4%	5	3.4%	8	16.3%	10	2.9%		
Fishing	25	3.2%	11	6.4%	5	3.4%	1	2.0%	6	1.8%	2	3.2%
Family outings	23	3.0%	5	2.9%	3	2.0%	5	10.2%	9	2.6%	1	1.6%
Boating	20	2.6%	1	.6%	2	1.4%	5	10.2%	10	2.9%	2	3.2%
Recreation	14	1.8%	3	1.8%	6	4.1%			4	1.2%	1	1.6%
Quality of water, shore areas	12	1.6%	6	3.5%	1	.7%	2	4.1%	2	.6%	1	1.6%
Swimming	11	1.4%	3	1.8%	2	1.4%			5	1.5%	1	1.6%
Drinking water	11	1.4%	5	2.9%					5	1.5%	1	1.6%
Economic factor	2	.3%			2	1.4%						
No response	1	.1%	1	.6%								

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

4d. What activities do you or your family do at the lake?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: All respondents	932	100.0%	197	100.0%	182	100.0%	62	100.0%	412	100.0%	79	100.0%
Swimming	363	38.9%	80	40.6%	97	53.3%	22	35.5%	139	33.7%	25	31.6%
Fishing	281	30.2%	64	32.5%	68	37.4%	16	25.8%	114	27.7%	19	24.1%
Boating	268	28.8%	66	33.5%	52	28.6%	12	19.4%	115	27.9%	23	29.1%
None, never go there	155	16.6%	20	10.2%	28	15.4%	15	24.2%	74	18.0%	18	22.8%
Beach activities	135	14.5%	18	9.1%	22	12.1%	11	17.7%	75	18.2%	9	11.4%
Family outings	129	13.8%	28	14.2%	20	11.0%	5	8.1%	61	14.8%	15	19.0%
Walking jogging	116	12.4%	52	26.4%	20	11.0%	5	8.1%	34	8.3%	5	6.3%
Camping	49	5.3%	15	7.6%	10	5.5%	7	11.3%	12	2.9%	5	6.3%
Enjoy scenery	33	3.5%	14	7.1%	1	.5%	1	1.6%	13	3.2%	4	5.1%
Skiing	31	3.3%	9	4.6%	4	2.2%	2	3.2%	16	3.9%		
Water sports	27	2.9%	4	2.0%	3	1.6%	2	3.2%	14	3.4%	4	5.1%
Shore activities	15	1.6%	5	2.5%			1	1.6%	8	1.9%	1	1.3%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

5d. Where do you spend most of your time when you are at Lake ___?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: Spend time at a lake	772	100.0%	177	100.0%	154	100.0%	47	100.0%	333	100.0%	61	100.0%
In deep water-boating, sailing or fishing	206	26.7%	33	18.6%	35	22.7%	9	19.1%	109	32.7%	20	32.8%
At the shoreline or on the beaches	500	64.8%	130	73.4%	111	72.1%	34	72.3%	189	56.8%	36	59.0%
Away from the shoreline in a park or on jogging trails	66	8.5%	14	7.9%	8	5.2%	4	8.5%	35	10.5%	5	8.2%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

6d. How would you rate the water quality in Lake ___?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base	932	100.0%	197	100.0%	182	100.0%	62	100.0%	412	100.0%	79	100.0%
Excellent	113	12.1%	59	29.9%	18	9.9%	9	14.5%	22	5.3%	5	6.3%
Good	385	41.3%	95	48.2%	71	39.0%	31	50.0%	162	39.3%	26	32.9%
Fair	276	29.6%	30	15.2%	62	34.1%	10	16.1%	143	34.7%	31	39.2%
Poor	106	11.4%	6	3.0%	24	13.2%	4	6.5%	61	14.8%	11	13.9%
No opinion	52	5.6%	7	3.6%	7	3.8%	8	12.9%	24	5.8%	6	7.6%

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

7d. Over the past ten years, would you say that the water quality in Lake ___ is improving, is it getting worse, or is it staying about the same?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: All respondents	932	100.0%	197	100.0%	182	100.0%	62	100.0%	412	100.0%	79	100.0%
Improving	336	36.1%	35	17.8%	38	20.9%	12	19.4%	218	52.9%	33	41.8%
About the same	283	30.4%	89	45.2%	65	35.7%	21	33.9%	88	21.4%	20	25.3%
Getting worse	196	21.0%	42	21.3%	53	29.1%	12	19.4%	74	18.0%	15	19.0%
No opinion	117	12.6%	31	15.7%	26	14.3%	17	27.4%	32	7.8%	11	13.9%

8d. What do you think are the biggest problems concerning Lake ___ water quality?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: All respondents	932	100.0%	197	100.0%	182	100.0%	62	100.0%	412	100.0%	79	100.0%
Contaminants pollution	542	58.2%	112	56.9%	105	57.7%	32	51.6%	247	60.0%	46	58.2%
Don't know	169	18.1%	30	15.2%	30	16.5%	16	25.8%	75	18.2%	18	22.8%
Zebra Mussels	68	7.3%	11	5.6%	8	4.4%	4	6.5%	35	8.5%	10	12.7%
Paper mills	47	5.0%	14	7.1%	11	6.0%	1	1.6%	19	4.6%	2	2.5%
Industrial waste	47	5.0%	9	4.6%	11	6.0%	4	6.5%	18	4.4%	5	6.3%
Ship traffic	38	4.1%	17	8.6%	7	3.8%	2	3.2%	9	2.2%	3	3.8%
Dirty beaches	35	3.8%	5	2.5%	7	3.8%	3	4.8%	19	4.6%	1	1.3%
There are no problems	32	3.4%	14	7.1%	10	5.5%	2	3.2%	6	1.5%		
Pesticides	27	2.9%	3	1.5%	2	1.1%	7	11.3%	13	3.2%	2	2.5%
People's behavior, attitudes	21	2.3%	6	3.0%	4	2.2%			10	2.4%	1	1.3%
Chemical waste	19	2.0%	5	2.5%	5	2.7%	2	3.2%	7	1.7%		
Public utility waste	17	1.8%	3	1.5%					9	2.2%	5	6.3%
Oil spills	16	1.7%	3	1.5%	5	2.7%	1	1.6%	6	1.5%	1	1.3%
Acid rain	14	1.5%	5	2.5%	2	1.1%			6	1.5%	1	1.3%
Biological effects	14	1.5%	4	2.0%	1	.5%			6	1.5%	3	3.8%
Harm to wildlife, fish	8	.9%			3	1.6%	1	1.6%	3	.7%	1	1.3%
Managing lake quality	8	.9%	1	.5%	1	.5%			6	1.5%		

1993 LAKE GUARDIAN/GREAT LAKES SURVEY RESULTS

9d. Who do you feel is responsible for monitoring the water quality of Lake ___?

	Total		Name of 'your lake'/nearest lake									
	Number	Percent	Lake Superior		Lake Huron		Lake Michigan		Lake Erie		Lake Ontario	
			Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Base: All respondents	932	100.0%	197	100.0%	182	100.0%	62	100.0%	412	100.0%	79	100.0%
US EPA	214	23.0%	45	22.8%	29	15.9%	11	17.7%	107	26.0%	22	27.8%
State government	137	14.7%	24	12.2%	21	11.5%	15	24.2%	64	15.5%	13	16.5%
US Federal Government	108	11.6%	35	17.8%	10	5.5%	7	11.3%	45	10.9%	11	13.9%
Department of Natural Resources	106	11.4%	23	11.7%	52	28.6%	5	8.1%	23	5.6%	3	3.8%
Local government	88	9.4%	16	8.1%	14	7.7%	8	12.9%	44	10.7%	6	7.6%
All of us	81	8.7%	17	8.6%	17	9.3%	6	9.7%	30	7.3%	11	13.9%
Industry	38	4.1%	9	4.6%	8	4.4%	1	1.6%	18	4.4%	2	2.5%
Environment Canada	32	3.4%	11	5.6%	4	2.2%	1	1.6%	13	3.2%	3	3.8%
Other government group	32	3.4%	7	3.6%	3	1.6%	3	4.8%	16	3.9%	3	3.8%
Non-government group	5	.5%	2	1.0%	2	1.1%			1	.2%		
Don't know	251	26.9%	47	23.9%	53	29.1%	19	30.6%	111	26.9%	21	26.6%

PERCEPTION OF ENVIRONMENTAL ISSUES

Table 10d
Proportion That Rate each Environmental Issue a Major Problem

Log Book

	Total	Lake			
		Superior	Huron	Erie	Ontario
Acid Rain	41.0%	46.5%	27.5%	42.5%	41.5%
Polluted Sediments	50.1%	41.4%	37.7%	57.9%	46.3%
Farm Run-off	51.7%	37.4%	34.8%	64.2%	41.5%
Urban Run-off	72.4%	62.6%	72.5%	79.2%	56.1%
Industry Dumping	74.6%	61.6%	78.3%	80.8%	63.4%
PCBs	51.9%	46.5%	47.8%	54.2%	58.5%
DDT	36.5%	31.3%	33.3%	40.4%	31.7%
Exotic Species	48.8%	45.5%	53.6%	48.8%	48.8%
Contaminated Fish	46.8%	32.3%	46.4%	52.1%	51.2%
Unsafe for Swimming	26.9%	12.1%	13.0%	35.4%	36.6%

Random Sample

	Total	Lake			
		Superior	Huron	Erie	Ontario
Acid Rain	30.0%	26.0%	26.0%	33.5%	28.1%
Polluted Sediments	43.5%	30.0%	36.0%	51.4%	46.9%
Farm Run-off	42.0%	30.0%	35.0%	49.8%	40.6%
Urban Run-off	64.2%	52.0%	60.0%	69.7%	71.9%
Industry Dumping	69.4%	63.0%	63.0%	74.9%	65.6%
PCBs	43.9%	34.0%	37.0%	49.0%	56.3%
DDT	32.1%	19.0%	30.0%	38.2%	31.3%
Exotic Species	46.4%	26.0%	40.0%	55.0%	62.5%
Contaminated Fish	42.0%	23.0%	33.0%	51.4%	56.3%
Unsafe for Swimming	22.6%	7.0%	11.0%	34.7%	12.5%

D. Teacher/Student Survey Tables

1. Teacher Basic Tables: Totals 1992 and 1993
   Teacher Special Tables:
   1a-Teacher responses by grade groups
   1aa-Teacher responses by grades

2. Student Basic Tables: Totals 1992 and 1993
   1sa-Students by grade groups
   1saa-Students bygrade level

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1. Teacher Basic Tables: Totals 1992 and 1993

Table 1
School Location

	1992	1993
BASE	8	52
Alpena, MI		25.0%
Buffalo, NY	12.5%	1.9%
Duluth, MN		9.6%
East Amherst, NY		1.9%
East Aurora, NY		1.9%
Erie, PA		15.4%
Grosse Point, MI		7.7%
Oswego, NY		7.7%
Port Huron, MI	25.0%	1.9%
Ransenville, NY		3.8%
Redcreek, NY		1.9%
Rochester, NY	37.5%	3.8%
Sault Ste. Marie, MI		13.5%
Scarborough, Ontario	12.5%	3.8%
Toledo, OH	12.5%	
Not stated		3.8%

Table 2
Class Grade Level

	1992	1993
BASE	8	52
First Grade		3.8%
Second Grade		1.9%
Third Grade	25.0%	9.6%
Fourth Grade		19.2%
Fifth Grade		23.1%
Sixth Grade	25.0%	19.2%
Eighth Grade	12.5%	5.8%
Ninth Grade		1.9%
Eleventh Grade		1.9%
Twelfth Grade		7.7%
High School	25.0%	
Adult Education	12.5%	
College		1.9%
Eleventh & Twelfth Grades		1.9%
Grades Three to Eight		1.9%

Table 3
Number of Students in the Class

	1992	1993
BASE	8	52
1 to 15	25.0%	11.5%
16 to 20	12.5%	15.4%
21 to 25	37.5%	32.7%
26 to 30		23.1%
More than 30	25.0%	17.3%

Table 4
How did you hear about the opportunity
To visit the Lake Guardian?

	1992	1993
BASE	8	52
Letter from the Environmental Protection Agency	37.5%	40.4%
Newspaper article or other publication	25.0%	23.1%
Heard about it from another teacher	37.5%	28.8%
No response	12.5%	15.4%
OTHER RESPONSE:		
BASE	4	14
From Principal		6
From Science Coordinator		5
Friend		1
Letter from Elementary Curriculum Facilitator		1
From EPA representative		1
Genesee River Valley Proj Coordinator	2	
Bulletin through mail system	1	
Meeting with Michael Raab	1	

Table 5
Was this your first environmental field trip?

	1992	1993
BASE	8	51
Yes	25.0%	51.0%
No	75.0%	49.0%

Table 6
Please grade the pre-visit materials
You received from the US/EPA:

	1992	1993
BASE	8	52
Great Minds?Great Lakes		
A	50.0%	44.2%
B	25.0%	23.1%
C		1.9%
D		3.8%
No response	25.0%	26.9%
Great Lakes Atlas/Resource Book		
A	25.0%	15.4%
B	25.0%	11.5%
F		5.8%
No response	50.0%	67.3%
Videotape		
A	37.5%	17.3%
B	12.5%	13.5%
C	12.5%	5.8%
D		5.8%
F	12.5%	1.9%
No response	25.0%	55.8%

Table 7
Please tell us the reasons for any low grades

	1992	1993
BASE	8	52
Videotape hard to see in sunlight		5.8%
Reading level too high		1.9%
Took test with class as a learning tool-No valid results		1.9%
Activities too lengthy		1.9%
So-so video tape a downer		1.9%
Not age-level appropriate		5.8%
Have not viewed any yet		17.3%
Some of my students are not in tune with school		1.9%
No response	100.0%	61.5%

Table 8
Pre-visit materials:

	1992	1993
BASE	8	52
Received in time for your tour?		
Yes	75.0%	78.8%
No	12.5%	19.2%
No response	12.5%	1.9%
Any class work with them before tour?		
Yes	75.0%	76.9%
No		17.3%
No response	25.0%	5.8%
Could you have used the materials earlier?		
Yes	50.0%	38.5%
No	25.0%	53.8%
No response	25.0%	7.7%
Appropriate for your grade level students?		
Yes	62.5%	65.4%
No	12.5%	13.5%
Not received		3.8%
No response	25.0%	17.3%
Will you use the materials in future lessons?		
Yes	87.5%	75.0%
No		9.6%
Not received		1.9%
No response	12.5%	13.5%

Table 9
In which subject area will you use these materials?

	1992	1993
BASE	8	52
Geography	37.5%	
Science & Social Studies	25.0%	23.1%
Science	12.5%	19.2%
Science/Reading		3.8%
Environmental Science		9.6%
Science & Michigan History		1.9%
Biology/Advanced Biology		3.8%
Science/Social Studies/Reading		3.8%
Social Studies		5.8%
Geography/Science		3.8%
Reading		1.9%
Chemistry		1.9%
Earth-Space Science		1.9%
Environmental unit on water		1.9%
No response	25.0%	17.3%

Table 10
Should EPA provide any additional take-home materials
For your students?

	1992	1993
BASE	7	46
Information for parents on environmental problems	57.1%	63.0%
Lists of things to do to help clean up the Great Lakes	100.0%	87.0%
Lists of telephone numbers to call for information	85.7%	56.5%
Government agency program explanations	42.9%	23.9%
OTHER RESPONSE:		
BASE	8	52
Maps of specific hot spots		1.9%
Samples of dead zebra mussels		1.9%
Chart of life-cycle of mayfly		1.9%
No response	100.0%	94.2%

Table 11
Do you have any suggestions for additional
Or improved classroom materials?

	1992	1993
BASE	8	52
Materials grade-level appropriate		11.5%
National Geographic film on Great Lakes an enhancement		3.8%
Chart/flash cards Plants/animals of Great Lakes food chain		1.9%
More hands-on activities		5.8%
Workshops for teachers	12.5%	1.9%
Skip ancient history-Focus on application of Ships functions		1.9%
Environmental section not geared to upper grade levels		1.9%
Reports how lakes are improving	12.5%	1.9%
Explain charts, provide handouts of them	75.0%	69.2%

Table 12
Please grade the Lake Guardian tour
As a learning experience for your class

	1992	1993
BASE	5	46
The amount of time on the ship		
A	20.0%	56.5%
B	20.0%	21.7%
C	20.0%	17.4%
D	40.0%	4.3%
The videotape shown on board		
A	50.0%	31.7%
B	25.0%	19.5%
C		34.1%
D	25.0%	7.3%
F		7.3%
Explanation of the mission of the Lake Guardian		
A	60.0%	67.4%
B	20.0%	26.1%
C		4.3%
D	20.0%	2.2%
Presentation of the deck equipment		
A	20.0%	56.5%
B	40.0%	26.1%
C	20.0%	10.9%
D	20.0%	6.5%

Table 12 (Continued)
Please grade the Lake Guardian tour
As a learning experience for your class

	1992	1993
BASE	5	46
Explanation of the laboratories		
A		45.7%
B	60.0%	34.8%
C	20.0%	15.2%
D	20.0%	4.3%
Presentation of living quarters		
A	25.0%	62.2%
B	75.0%	17.8%
C		15.6%
D		4.4%
Presentation by the captain		
A	40.0%	84.1%
B	40.0%	11.4%
C		4.5%
F	20.0%	
The handout materials		
A		45.5%
B	25.0%	34.1%
C		13.6%
D	50.0%	6.8%
Not received	25.0%	

Table 13
Please grade the Presentation of facts about:

	1992	1993
BASE	4	45
The sampling program		
A		44.4%
B	100.0%	33.3%
C		17.8%
D		2.2%
F		2.2%
Surface runoff from urban and agricultural areas		
A		25.0%
B	100.0%	25.0%
C		22.7%
D		15.9%
F		11.4%
Industrial discharge		
A		25.6%
B	100.0%	25.6%
C		20.9%
D		16.3%
F		11.6%
Importance of proper disposal of trash and wastes		
A	33.3%	29.5%
B	66.7%	27.3%
C		22.7%
D		11.4%
F		9.1%
Importance of the Great Lakes		
A	25.0%	46.7%
B	75.0%	22.2%
C		17.8%
D		4.4%
F		8.9%
How students and their families can help the G L environment		
A		26.2%
B	100.0%	28.6%
C		21.4%
D		11.9%
F		11.9%

Table 14
Please tell us the reason for any low grades:

	1992	1993
BASE	8	52
Tell of mission rather than equipment	75.0%	76.9%
Technician could demonstrate sampling		13.5%
Videotape too mature for younger students	25.0%	19.2%
Glare on videotape hard to see/hear		9.6%
Video indoors on cold days		7.7%
Less scientific talk--more demonstration		3.8%
Did not emphasize points 10-14		15.4%
Long wait		1.9%
A clean empty lab is boring	25.0%	5.8%
Pilot House good with working equipment		1.9%
Too many "technical" words		3.8%
Unloading sewage during visit unpleasant distraction		5.8%
Some areas not presented or viewed		5.8%
Too rushed-need more explanation		5.8%
Would like longer visit		1.9%
Students missed point re less industrial discharge currently		1.9%
Give us specifics for keeping waters clean		1.9%
Too early in school year/student focus on living quarters		3.8%
Hand out materials at end of tour		3.8%
Too many distractions		1.9%
Did not discuss #s 10 & 11		5.8%
Hands-on tour for older (college) students		3.8%
Hard to situate students to see & hear topic of discussion		3.8%
Poorly organized	37.5%	
Questionnaire 3 months late	25.0%	
No guided tour offered	12.5%	
No response	50.0%	34.6%

Table 15
Should EPA provide any of the following
For your students to learn more
About the Great Lakes and pollution control?

	1992	1993
BASE	8	52
Information on how to form environmental clubs	25.0%	46.2%
Suggestions for science projects	37.5%	61.5%
Directions for scouting projects	12.5%	25.0%
Additional classroom materials	37.5%	48.1%
No response	50.0%	25.0%
OTHER SUGGESTIONS		
Hands-on samples of biological pollutants		1
Maritime charts for Social Studies enrichment		1
Location/cause of hot spots		1
Would like longer (45 Minute?) visit		2
Wants EPA info and a working tour of Lake Guardian		1
Classroom visit by science staff		2
Activities for home & school to keep water clean		1
Would have liked video tape to show at school before trip		1
Please send pre-visit Resource books & tapes mentioned		1
Good hands-on stuff		2
More take-home materials		2
Summer camp dealing with EPA issues for interested students		1
Monroe Co Envir Health Lab trip highlight	2	
No response	6	36

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Teacher Special Tables:

1a-Teacher responses by grade groups

Table 1a
School Location

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Alpena, MI	50%	28%		
Buffalo, NY				14%
Duluth, MN		16%		
East Amherst, NY				14%
East Aurora, NY		3%		
Erie, PA		3%	75%	43%
Grosse Point, MI		13%		
Oswego, NY		13%		
Port Huron, MI		3%		
Ransenville, NY		6%		
Redcreek, NY				14%
Rochester, NY		3%	25%	
Sault Ste. Marie, MI	38%	9%		14%
Not stated	13%	3%		

Table 3a
Number of Students in the Class

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
1 to 15	13%	3%	25%	43%
16 to 20	13%	13%		43%
21 to 25	75%	25%	25%	14%
26 to 30		38%		
More than 30		22%	50%	

Table 4a
How did you hear about the opportunity to visit the Lake Guardian?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
[illegible]	8	32	4	7
Letter from the EPA	83%	50%	50%	14%
Newspaper article or other publication	17%	12%	75%	57%
Heard about it from another teacher		46%	25%	29%
OTHER RESPONSE:				
BASE	3	11		
From Principal	67%	36%		
From Science Coordinator		45%		
Friend	33%			
Letter from Elementary Curriculum Facilitator		9%		
From EPA representative		9%		

Table 5a
Was this your first environmental field trip?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	7	32	4	7
Yes	86%	44%	50%	43%
No	14%	56%	50%	57%

Table 6a
Please grade the pre-visit materials you received from the US/EPA:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Great Minds?Great Lakes				
A	50%	53%		29%
B		31%	50%	
C	13%			
D	25%			
No response	13%	16%	50%	71%
Great Lakes Atlas/ Resource Book				
A	13%	16%		14%
B		19%		
F		6%	25%	
No response	88%	59%	75%	86%
Videotape				
A		22%	25%	14%
B	13%	19%		
C	13%	6%		
D		9%		
F			25%	
No response	75%	44%	50%	86%

Table 7a
Please tell us the reasons for any low grades

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Videotape hard to see in sunlight	13%	6%		
Reading level too high	13%			
Took test with class as a learning tool-No valid results	13%			
Activities too lengthy		3%		
So-so video tape a downer				14%
Not age-level appropriate	13%	3%	25%	
Have not viewed any yet		13%	50%	43%
Some of my students are not in tune with school				14%
No response	50%	75%	25%	29%

Table 8a
Pre-visit materials:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	100%	100%	100%	100%
Received in time for your tour?				
Yes	88%	91%	25%	43%
No	13%	6%	75%	57%
No response		3%		
Any class work with them before tour?				
Yes	75%	84%	50%	57%
No	25%	9%	50%	29%
No response		6%		14%
Could you have used the materials earlier?				
Yes	25%	34%	75%	57%
No	75%	59%	25%	14%
No response		6%		29%
Appropriate for your grade level students?				
Yes	25%	84%	25%	43%
No	50%	9%		
Not received			25%	14%
No response	25%	6%	50%	43%
Will you use the materials in future lessons?				
Yes	63%	81%	100%	43%
No	25%	9%		
Not received				14%
No response	13%	9%		43%

Table 9a
In which subject area will you use these materials?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Science & Social Studies	13%	31%	25%	
Science	25%	19%	50%	
Science/Reading	13%	3%		
Environmental Science	25%	9%		
Science & Michigan History		3%		
Biology/Advanced Biology				29%
Science/Social Studies/Reading		6%		
Social Studies	13%	3%		
Geography/Science		6%		
Reading		3%		
Chemistry				14%
Earth-Space Science			25%	
Environmental unit on water				14%
No response	13%	16%		43%

Table 10a
Should EPA provide any additional take-home materials
For your students?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	6	28	4	7
Information for parents on environmental problems	50%	61%	75%	71%
Lists of things to do to help clean up the Great Lakes	83%	86%	100%	86%
Lists of telephone numbers to call for information	50%	54%	50%	71%
Government agency program explanations	17%	11%	50%	57%
Other		4%		

Table 11a
Do you have any suggestions for additional or improved classroom materials?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Materials grade-level appropriate	63%	3%		
National Geographic film on Great Lakes an enhancement		6%		
Chart/flash cards Plants/animals of Great Lakes food chain		3%		
More hands-on activities		6%		14%
Workshops for teachers		3%		
Skip ancient history-Focus on application of Ships functions		3%		
Environmental section not geared to upper grade levels			25%	
Reports how lakes are improving				14%
Explain charts, provide handouts of them	38%	75%	75%	71%

Table 12a
Please grade the Lake Guardian tour as a learning experience for your class:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	100%	100%	100%	100%
The amount of time on the ship				
A	50%	63%	50%	43%
B	25%	15%	50%	29%
C	13%	19%		29%
D	13%	4%		
The videotape shown on board				
A		35%	50%	50%
B	43%	15%		17%
C	14%	42%	50%	17%
D	29%	4%		
F	14%	4%		17%
Explanation of the mission of the Lake Guardian				
A	38%	70%	75%	86%
B	50%	22%	25%	14%
C		7%		
D	13%			
Presentation of the deck equipment				
A	25%	59%	100%	57%
B	50%	22%		29%
C		15%		14%
D	25%	4%		

Table 12a (Continued)
Please grade the Lake Guardian tour as a learning experience for your class:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	100%	100%	100%	100%
Explanation of the laboratories				
A	25%	48%	50%	57%
B	50%	26%	50%	43%
C	13%	22%		
D	13%	4%		
Presentation of living quarters				
A	57%	63%	50%	71%
B	14%	15%	50%	14%
C		22%		14%
D	29%			
Presentation by the captain				
A	88%	84%	75%	86%
B	13%	16%		
C			25%	14%
The handout materials				
A	38%	52%	33%	33%
B	38%	33%		50%
C	13%	7%	67%	17%
D	13%	7%		

Table 13a
Please grade the presentation of facts about:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	100%	100%	100%	100%
The sampling program				
A	29%	44%	50%	57%
B	29%	33%	50%	29%
C	29%	19%		14%
D	14%			
F		4%		
Surface runoff from urban and agricultural areas				
A	29%	23%	25%	29%
B	14%	27%	50%	14%
C		23%		57%
D		23%	25%	
F	57%	4%		
Industrial discharge				
A	29%	24%	25%	29%
B	14%	24%	50%	29%
C		24%	25%	29%
D		24%		14%
F	57%	4%		
Importance of proper disposal of trash and wastes				
A	29%	23%	50%	43%
B	14%	27%	25%	43%
C		31%	25%	14%
D		19%		
F	57%			
Importance of Great Lakes				
A	29%	44%	75%	57%
B	14%	22%	25%	29%
C	14%	26%		
D		4%		14%
F	43%	4%		
How students and their families can help the G L environment				
A	14%	28%		50%
B	29%	20%	50%	50%
C		28%	50%	
D		20%		
F	57%	4%		

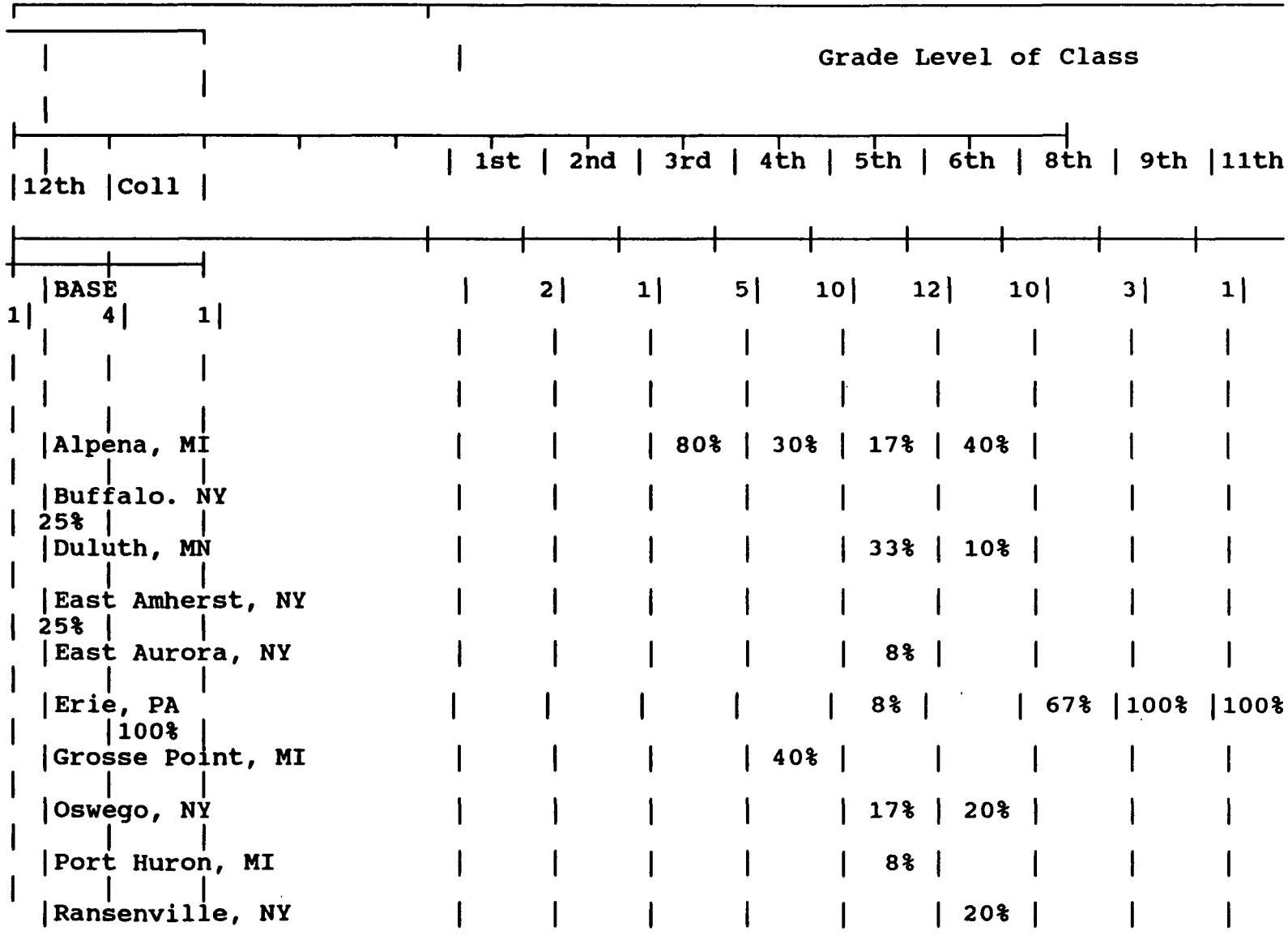
Table 14a
Please tell us the reason for any low grades:

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
Tell of mission rather than equipment	88%	69%	100%	86%
Technician could demonstrate sampling	25%	13%		14%
Videotape too mature for younger students	38%	22%		
Glare on videotape hard to see/hear		16%		
Video indoors on cold days		13%		
Less scientific talk--more demonstration		6%		
Did not emphasize points 10-14	25%	16%	25%	
Long wait		3%		
A clean empty lab is boring		9%		
Pilot House good with working equipment		3%		
Too many technical words	13%	3%		
Unloading sewage during visit unpleasant distraction		9%		
Some areas not presented or viewed		6%		14%
Too rushed-need more explanation		3%	25%	14%
Would like longer visit	13%			
Students missed point re less industrial discharge currently		3%		
Give us specifics for keeping waters clean	13%			
Too early in school year/ student focus on living quarters		6%		
Hand out materials at end of tour		6%		
Too many distractions		3%		
Did not discuss #10 & 11		3%	25%	14%
Hands-on tour for older (college) students				29%
Hard to situate students to see & hear topic of discussion		3%		14%
No response	25%	38%	25%	29%

Table 15a
Should EPA provide any of the following for your students to learn more about the Great Lakes and pollution control?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	8	32	4	7
	100%	100%	100%	100%
Information on how to form environmental clubs	25%	44%	75%	71%
Suggestions for science projects	50%	53%	100%	100%
Directions for scouting projects		19%	50%	71%
Additional classroom materials	50%	38%	50%	100%
No response	38%	28%		
OTHER SUGGESTIONS:				
BASE	8	32	4	7
Hands-on samples of biological pollutants		3%		
Maritime charts for Social Studies enrichment		3%		
Location/cause of hot spots		3%		
Would like longer (45 Minute?) visit		6%		
Wants EPA info and a working tour of Lake Guardian				14%
Classroom visit by science staff		6%		
Activities for home & school to keep water clean	13%			
Would have liked video tape to show at school before trip		3%		
Please send pre-visit Resource books & tapes mentioned			25%	
Good hands-on stuff			25%	14%
More take-home materials		6%		
Summer camp dealing with EPA issues for interested students				14%
No response	88%	69%	50%	57%

Table 1aa
School Location



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Teacher Special Tables:

1aa-Teacher responses by grades

Table 1aa
School Location

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Alpena, MI			80%	30%	17%	40%					
Buffalo. NY										25%	
Duluth, MN					33%	10%					
East Amherst, NY										25%	
East Aurora, NY					8%						
Erie, PA					8%		67%	100%	100%		100%
Grosse Point, MI				40%							
Oswego, NY					17%	20%					
Port Huron, MI					8%						
Ransenville, NY						20%					
Redcreek, NY										25%	
Rochester, N.Y.						10%	33%				
Sault Ste. Marie, MI	100%		20%	20%	8%					25%	
Not Stated		100%		10%							

Table 3aa
Number of Students in the Class

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
1 to 15		100%				10%	33%			50%	100%
16 to 20			20%	20%	8%	10%			100%	25%	
21 to 25	100%		80%	20%	25%	30%		100%		25%	
26 to 30				50%	33%	30%					
More than 30				10%	33%	20%	67%				

Table 4aa
How did you hear about the opportunity to visit the Lake Guardian?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Letter from the EPA	100%		80%	44%	44%	63%	33%	100%		25%	
Newspaper article or other publication			20%		11%	25%	100%			50%	100%
Heard about it from another teacher				56%	56%	25%	33%		100%	25%	
BASE	100%	100%	100%	100%	100%	100%					
Other											
From Principal	100%		100%	50%	50%						
From Science Coordinator				50%	33%	67%					
Friend		100%									
Letter from Elementary Curriculum Facilitator					17%						
From EPA representative						33%					

Table 5aa
Was this your first environmental field trip?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	4	10	12	10	3	1	1	4	1
Yes	50%	100%	100%	70%	42%	20%	33%	100%	100%	50%	
No	50%			30%	58%	80%	67%			50%	100%

Table 6aa
Please grade the pre-visit materials you received from the US/EPA:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Great Minds?Great Lakes											
A		100%	60%	60%	50%	50%				25%	
B				10%	33%	50%	67%				
C			20%								
D	50%		20%								
No response	50%			30%	17%		33%	100%	100%	75%	100%
Great Lakes Atlas/Resource Book											
A			20%	20%	8%	20%				25%	
B				40%	8%	10%					
F						20%	33%				
No response	100%	100%	80%	40%	83%	50%	67%	100%	100%	75%	100%
Videotape											
A				10%	33%	20%	33%			25%	
B			20%	10%	8%	40%					
C			20%		17%						
D				20%		10%					
F							33%				
No response	100%	100%	60%	60%	42%	30%	33%	100%	100%	75%	100%

Table 7aa
Please tell us the reasons for any low grades

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Videotape hard to see in sunlight			20%	20%							
Reading level a little high			20%								
Took test with class as a learning tool-No valid results	50%										
Activities too lengthy						10%					
So-so video tape watched on ship-a downer										25%	
Not age-level appropriate	50%			10%			33%				
Have not viewed any yet					8%	30%	33%	100%	100%	25%	100%
No response		100%	60%	70%	92%	60%	33%			50%	

Table 8aa
Pre-visit materials:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Received in time for your tour?											
Yes	50%	100%	100%	90%	83%	100%	33%		100%	25%	
No	50%			10%	8%		67%	100%		75%	100%
No response					8%						
Any class work with them before tour?											
Yes	50%	100%	80%	70%	83%	100%	67%			75%	
No	50%		20%	20%	8%		33%	100%	100%		100%
No response				10%	8%					25%	
Could you have used the materials earlier?											
Yes	100%			50%	33%	20%	67%	100%	100%	25%	100%
No		100%	100%	40%	58%	80%	33%			25%	
No response				10%	8%					50%	
Appropriate for your grade level students?											
Yes			40%	70%	83%	100%	33%		100%	25%	
No	50%	100%	40%	30%							
Not received								100%			100%
No response	50%		20%		17%		67%			75%	
Will you use the materials in future lessons?											
Yes	50%	100%	60%	80%	75%	90%	100%	100%	100%	25%	
No	50%		20%	10%	8%	10%					
Not received											100%
No response			20%	10%	17%					75%	

Table 9aa
In which subject area will you use these materials?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Science & Social Studies			20%	10%	50%	30%	33%				
Science		100%	20%	10%	17%	30%	67%				
Science/Reading			20%	10%							
Environmental Science	100%				8%	20%					
Science & Michigan History				10%							
Biology/Advanced Biology										50%	
Science/Social Studies/Reading					8%	10%					
Social Studies			20%	10%							
Geography/Science				20%							
Reading				10%							
Chemistry									100%		
Earth-Space Science								100%			
No response			20%	20%	17%	10%				50%	100%

Table 10aa
Should EPA provide any additional take-home materials for your students?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	3	9	11	8	3	1	1	4	1
Information for parents on environmental problems	100%		33%	44%	73%	63%	67%	100%	100%	75%	100%
Lists of things to do to help clean up the Great Lakes	100%	100%	67%	89%	82%	88%	100%	100%	100%	100%	100%
Lists of telephone numbers to call for information	100%		33%	56%	45%	63%	33%	100%	100%	50%	100%
Government agency program explanations	50%			11%	18%		33%	100%	100%	50%	
Other					9%						

Table 11aa
Do you have any suggestions for additional or improved classroom materials?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Materials grade-level appropriate	100%	100%	40%	10%							
National Geographic film on Great Lakes an enhancement					17%						
Chart/flash cards Plants/animals of Great Lakes food chain						10%					
More hands-on activities						20%				25%	
Workshops for teachers						10%					
Skip ancient history-Focus on application of Ships functions				10%							
Environmental section not geared to upper grade levels							33%				
Reports how lakes are improving										25%	
Explain charts, provide handouts of them			60%	80%	83%	60%	67%	100%	100%	50%	100%

Table 12aa
Please grade the Lake Guardian tour as a learning experience for your class:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
The amount of time on the ship											
A		100%	60%	63%	73%	50%	67%			50%	100%
B	50%		20%	25%		25%	33%	100%		25%	
C	50%			13%	18%	25%			100%	25%	
D			20%		9%						
The videotape shown on board											
A				14%	45%	38%	50%			25%	100%
B		100%	50%	29%	9%	13%				25%	
C			25%	43%	36%	50%	50%			25%	
D	50%		25%		9%						
F	50%			14%						25%	
Explanation of the mission of the Lake Guardian											
A		100%	40%	75%	73%	63%	100%		100%	75%	100%
B	50%		60%	25%	27%	13%		100%		25%	
C						25%					
D	50%										
Presentation of the deck equipment											
A		100%	20%	88%	45%	50%	100%	100%	100%	75%	
B			80%		36%	25%					100%
C					18%	25%				25%	
D	100%			13%							

Table 12aa (Continued)
Please grade the Lake Guardian tour as a learning experience for your class:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Explanation of the laboratories											
A		100%	20%	63%	36%	50%	67%		100%	50%	100%
B			80%	38%	27%	13%	33%	100%		50%	
C	50%				27%	38%					
D	50%				9%						
Presentation of living quarters											
A		100%	75%	75%	55%	63%	67%		100%	75%	100%
B			25%	13%	27%		33%	100%			
C				13%	18%	38%				25%	
D	100%										
Presentation by the captain											
A	100%	100%	80%	88%	78%	88%	100%		100%	75%	100%
B			20%	13%	22%	13%					
C								100%		25%	
The handout materials											
A		100%	40%	50%	55%	50%	50%			50%	
B			60%	25%	36%	38%				50%	
C	50%			13%		13%	50%	100%	100%		
D	50%			13%	9%						

Table 13aa
Please grade the presentation of facts about:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
The sampling program											
A		100%	25%	50%	45%	38%	67%		100%	50%	100%
B			50%	38%	27%	38%	33%	100%		25%	
C	50%		25%	13%	27%	13%				25%	
D	50%										
F						13%					
Surface runoff from urban and agricultural areas											
A		100%	25%		36%	25%	33%			50%	
B			25%	57%	18%	13%	67%				
C				43%	9%	25%			100%	50%	100%
D					36%	25%		100%			
F	100%		50%			13%					
Industrial discharge											
A		100%	25%		36%	29%	33%			50%	
B			25%	57%	9%	14%	67%				100%
C				29%	18%	29%		100%	100%	25%	
D				14%	36%	14%				25%	
F	100%		50%			14%					
Importance of proper disposal of trash and wastes											
A		100%	25%		36%	25%	67%			50%	100%
B			25%	43%	18%	25%	33%		100%	25%	
C				29%	27%	38%		100%		25%	
D				29%	18%	13%					
F	100%		50%								

Table 13aa
Please grade the presentation of facts about:
(Continued)

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Importance of the Great Lakes											
A		100%	25%	25%	55%	50%	100%			75%	100%
B			25%	50%		25%		100%	100%		
C	50%			25%	36%	13%					
D					9%					25%	
F	50%		50%			13%					
How students and their families can help the G L environment											
A			25%		45%	29%				67%	100%
B		100%	25%	43%		29%	67%		100%	33%	
C				43%	27%	14%	33%	100%			
D				14%	27%	14%					
F	100%		50%			14%					

Table 14aa
Please tell us the reason for any low grades:

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Tell of mission rather than equipment	100%		100%	90%	50%	70%	100%	100%	100%	100%	100%
Technician could demonstrate sampling		100%	20%	10%	25%						
Videotape too mature for younger students		100%	40%		33%	30%					
Glare on videotape hard to see/hear					17%	30%					
Video indoors on cold days					17%	20%					
Less scientific talk--more demonstration					17%						
Did not emphasize points 10-14	50%		20%	30%	8%	10%	33%				
Long wait					8%						
A clean empty lab is boring					17%	10%					
Pilot House good with working equipment					8%						
Too many "technical" words	50%			10%							
Unloading sewage during visit unpleasant distraction					17%	10%					
Some areas not presented or viewed						20%				25%	
Too rushed-need more explanation						10%	33%				
Would like longer visit			20%								
Students missed point re less industrial discharge currently					8%						

Table 14aa
Please tell us the reason for any low grades:
(Continued)

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Give us specifics for keeping waters clean		100%									
Too early in school year/student focus on living quarters				10%	8%						
Hand out materials at end of tour				20%							
Too many distractions				10%							
Did not discuss #s 10 & 11					8%			100%	100%		
Hands-on tour for older (college) students										25%	100%
Hard to situate students to see & hear topic of discussion					8%						
No response			40%	30%	33%	50%	33%			50%	

Table 15aa
Should EPA provide any of the following for your students to learn more about the Great Lakes and pollution control?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Information on how to form environmental clubs	50%		20%	50%	50%	30%	67%	100%	100%	75%	100%
Suggestions for science projects	100%	100%	20%	40%	67%	50%	100%	100%	100%	100%	100%
Directions for scouting projects				10%	33%	10%	67%		100%	75%	100%
Additional classroom materials	100%	100%	20%	50%	25%	40%	33%	100%	100%	100%	100%
No response			60%	30%	25%	30%					

Table 15aa
Should EPA provide any of the following for your students to learn More about the Great Lakes and pollution control? Other Suggestions.

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	8th	9th	11th	12th	Coll
BASE	2	1	5	10	12	10	3	1	1	4	1
Hands-on samples of biological pollutants					8%						
Maritime charts for Social Studies enrichment					8%						
Location/cause of hot spots						10%					
Would like longer (45 Minute?) visit				10%		10%					
Wants EPA info and a working tour of Lake Guardian										25%	
Classroom visit by science staff						20%					
Activities for home & school to keep water clean		100%									
Would have liked video tape to show at school before trip				10%							
Please send pre-visit Resource books & tapes mentioned								100%			
Good hands-on stuff							33%				100%
More take-home materials					17%						
Summer camp dealing with EPA issues for interested students										25%	
No response	100%		100%	80%	67%	60%	67%		100%	50%	

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2. Student Basic Tables: Totals 1992 and 1993

Table 1-S
School Location

	Survey Year	
	1992	1993
BASE	140	1089
Alpena, MI		27.6%
Buffalo, NY	26.4%	3.5%
Duluth, MN		11.5%
Erie, PA		18.5%
Grosse Point, MI		3.7%
Oswego, NY		9.2%
Port Huron, MI	20.0%	
Rochester,NY	20.0%	
Sault Ste. Marie, MI		8.4%
Scarborough, Ontario	15.7%	
Toledo, OH	17.9%	
Not Stated		17.7%

Table 2-S
Class Grade Level

	Survey Year	
	1992	1993
BASE	140	1089
First grade		1.8%
Second grade		.9%
Third grade	30.0%	10.0%
Fourth grade		14.1%
Fifth grade		29.9%
Sixth grade	7.9%	21.5%
Seventh grade		.3%
Eighth grade	26.4%	3.8%
Ninth grade		2.3%
Twelfth grade		1.9%
High School	25.0%	
Adult Education	10.7%	
College		1.1%
Eleventh & Twelfth grades		1.5%
Seventh & Eighth grades		6.5%
Not stated		4.3%

Table 3-S
How did you like your visit
To the Lake Guardian research ship?

	Survey Year	
	1992	1993
BASE	140	1089
Great	37.9%	50.4%
Good	31.4%	29.2%
Okay	23.6%	16.9%
Boring	4.3%	2.8%
No response	2.9%	.6%

Table 4-S
What parts of the tour did you enjoy?

	Survey Year	
	1992	1993
BASE	118	983
Being on a ship	55.9%	72.0%
The equipment on deck	56.8%	44.4%
The laboratories	43.2%	44.8%
The videotape	31.4%	16.8%
The galley and eating area	30.5%	39.7%
The sleeping quarters	28.0%	45.2%
The Pilot House	46.6%	75.4%
Talking to the captain & crew	45.8%	57.3%
Meeting the scientists	37.3%	19.1%
The hand-out materials	16.9%	21.6%

Table 5-S
Did you tell your family
About what you learned on the Lake Guardian?

	Survey Year	
	1992	1993
BASE	140	1089
Yes	70.7%	80.7%
No	22.1%	18.5%
No response	7.1%	.8%

Table 6-S
Please circle T for True or F for False:
Percent of students who gave correct response

	Survey Year	
	1992	1993
The Great Lakes are the largest supply of fresh water on earth.		
Correct	81.4%	77.0%
Incorrect	18.6%	23.0%
The Lake Guardian shows that ships do not have to pollute the water.		
Correct	89.3%	81.1%
Incorrect	10.7%	18.9%
The Great Lakes can clean themselves up, especially if people stop adding new pollution to the water.		
Correct	76.4%	79.2%
Incorrect	23.6%	20.8%
Trash thrown into the lakes does not harm the fish because it quickly breaks down into atoms.		
Incorrect	8.6%	7.7%
Correct	91.4%	92.3%
The more algae there is in the water, the better it is for the fish.		
Incorrect	37.9%	38.8%
Correct	62.1%	61.2%
Acid Rain comes from burning fossil fuels.		
Incorrect	24.3%	30.1%
Correct	75.7%	69.9%

Table 6-S (Continued)
Please circle T for True or F for False:
Percent of students who gave correct response

	Survey Year	
	1992	1993
Acid Rain travels in the air for hundreds of miles before falling as rain or snow.		
Incorrect	27.9%	27.0%
Correct	72.1%	73.0%
Toxic chemicals that got into the lakes years ago can be found today when scientists study samples of lake bottom.		
Incorrect	13.6%	17.3%
Correct	86.4%	82.7%
Fish in the Great Lakes do not suffer any ill effects from toxic chemicals because they are at the bottom of the food chain.		
Incorrect	8.6%	15.1%
Correct	91.4%	84.9%
It is the job of the Lake Guardian to find out how much pollution is in the waters of the Great Lakes.		
Incorrect	6.4%	9.8%
Correct	93.6%	90.2%
Canada and the Unites States of America are working together to protect the Great Lakes from pollution.		
Incorrect	12.9%	9.9%
Correct	87.1%	90.1%
Today, industry discharges much more pollution into the Great Lakes than it did in the past.		
Incorrect	50.7%	52.2%
Correct	49.3%	47.8%

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Student Special Tables:

1sa - Students by grade groups

Table 1-Sa
School Location

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	139	714	69	49
Alpena, MI	60%	30%		
Buffalo, NY		3%		31%
Duluth, MN		18%		
Erie, PA	2%	13%	100%	57%
Grosse Point, MI		6%		
Oswego, NY		14%		
Sault Ste. Marie, MI	30%	6%		12%
Not stated	7%	11%		

Table 2-Sa
Class Grade Level

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	139	714	69	49
Grade Level Groups				
1st-3rd	100.0%			
4th-6th		100.0%		
7th-9th			100.0%	
10th +				100.0%

Table 3-Sa
How did you like your visit
To the Lake Guardian research ship?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	139	714	69	49
Great	74.8%	49.0%	34.8%	18.4%
Good	15.1%	28.4%	47.8%	59.2%
Okay	7.9%	19.0%	17.4%	16.3%
Boring	.7%	2.9%		6.1%
No response	1.4%	.6%		

Table 4-Sa
What parts of the tour did you enjoy?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	121	646	63	44
Being on a ship	70.2%	69.7%	85.7%	75.0%
The equipment on deck	54.5%	43.2%	63.5%	59.1%
The laboratories	69.4%	40.6%	55.6%	56.8%
The videotape	17.4%	17.0%	15.9%	4.5%
The galley and eating area	54.5%	37.3%	36.5%	43.2%
The sleeping quarters	33.1%	48.9%	52.4%	43.2%
The Pilot House	90.9%	72.3%	65.1%	59.1%
Talking to the captain and crew	72.7%	50.8%	63.5%	59.1%
Meeting the scientists	7.4%	20.7%	38.1%	29.5%
The hand-out materials	47.1%	20.9%	14.3%	13.6%

Table 5-Sa
Did you tell your family
About what you learned on the Lake Guardian?

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
BASE	139	714	69	49
Yes	77.7%	81.2%	73.9%	65.3%
No	21.6%	17.9%	24.6%	32.7%
No response	.7%	.8%	1.4%	2.0%

Table 6-Sa
Please circle T for True or F for False:
Percent of students who gave correct response

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
Fresh water supply				
Incorrect	25.2%	21.1%	36.2%	14.3%
Correct	74.8%	78.9%	63.8%	85.7%
Ships need not pollute				
Incorrect	18.0%	21.6%	18.8%	8.2%
Correct	82.0%	78.4%	81.2%	91.8%
Lakes clean themselves				
Incorrect	25.2%	19.3%	40.6%	26.5%
Correct	74.8%	80.7%	59.4%	73.5%
Trash not harmful				
Incorrect	7.9%	7.1%	1.4%	20.4%
Correct	92.1%	92.9%	98.6%	79.6%
Algae not harmful				
Incorrect	51.1%	39.2%	47.8%	24.5%
Correct	48.9%	60.8%	52.2%	75.5%
Acid Rain source				
Incorrect	44.6%	28.2%	26.1%	14.3%
Correct	55.4%	71.8%	73.9%	85.7%

Table 6-Sa (Continued)
Please circle T for True or F for False:
Percent of students who gave correct response

	Grade Level Groups			
	1st-3rd	4th-6th	7th-9th	10th +
Acid Rain travels far				
Incorrect	21.6%	28.7%	27.5%	6.1%
Correct	78.4%	71.3%	72.5%	93.9%
Toxic chemicals				
Incorrect	6.5%	15.5%	8.7%	32.7%
Correct	93.5%	84.5%	91.3%	67.3%
Fish and toxic chemicals				
Incorrect	14.4%	15.5%	4.3%	30.6%
Correct	85.6%	84.5%	95.7%	69.4%
Lake Guardian's job				
Incorrect	8.6%	10.5%	8.7%	12.2%
Correct	91.4%	89.5%	91.3%	87.8%
Canada USA cooperation				
Incorrect	6.5%	11.1%	11.6%	4.1%
Correct	93.5%	88.9%	88.4%	95.9%
Industry pollution				
Incorrect	66.2%	48.5%	75.4%	32.7%
Correct	33.8%	51.5%	24.6%	67.3%

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Student Special Tables:

1saa - Students by grade level

Table 1-Saa
School Location

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
BASE	20	10	109	154	326	234	3	41	25	21	12
Alpena, MI			77%	50%	17%	36%					
Buffalo, NY						10%				71%	
Duluth, MN					27%	15%					
Erie, PA			3%	10%	23%	2%	100%	100%	100%		100%
Grosse Point, MI				26%							
Oswego, NY					12%	26%					
Sault Ste. Marie, MI	100%		20%	14%	6%					29%	
Not stated		100%			15%	11%					

Table 2-Saa
Class Grade Level

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
BASE	20	10	109	154	326	234	3	41	25	21	12
Grade Level of Class											
1st	100%										
2nd		100%									
3rd			100%								
4th				100%							
5th					100%						
6th						100%					
7th							100%				
8th								100%			
9th									100%		
12th										100%	
Coll											100%

Table 3-Saa
How did you like your visit to the Lake Guardian research ship?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
BASE	20	10	109	154	326	234	3	41	25	21	12
Great	80.0%	60.0%	75.2%	64.3%	55.2%	30.3%	33.3%	48.8%	12.0%	14.3%	8.3%
Good	15.0%	20.0%	14.7%	18.2%	27.0%	37.2%	66.7%	46.3%	48.0%	47.6%	91.7%
Okay		20.0%	8.3%	16.2%	14.4%	27.4%		4.9%	40.0%	23.8%	
Boring	5.0%			.6%	2.5%	5.1%				14.3%	
No response			1.8%	.6%	.9%						

Table 4-Saa
What parts of the tour did you enjoy?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
BASE	20	7	94	139	307	200	3	41	19	19	12
Being on a ship	85.0%	42.9%	69.1%	77.0%	67.1%	68.5%	100%	78.0%	100%	68.4%	58.3%
The equipment on deck	60.0%	42.9%	54.3%	36.7%	48.5%	39.5%	66.7%	73.2%	42.1%	57.9%	58.3%
The laboratories	90.0%	42.9%	67.0%	33.1%	43.3%	41.5%	66.7%	63.4%	36.8%	73.7%	50.0%
The videotape	25.0%	28.6%	14.9%	12.2%	23.1%	11.0%	33.3%	22.0%		5.3%	8.3%
The galley and eating area	80.0%	28.6%	51.1%	29.5%	38.4%	41.0%	100%	36.6%	26.3%	31.6%	16.7%
The sleeping quarters	10.0%	14.3%	39.4%	47.5%	45.3%	55.5%	100%	48.8%	52.6%	26.3%	41.7%
The Pilot House	95.0%	71.4%	91.5%	80.6%	71.3%	68.0%	100%	75.6%	36.8%	42.1%	50.0%
Talking to the captain and crew	75.0%	100%	70.2%	41.7%	52.8%	54.0%	100%	73.2%	36.8%	57.9%	41.7%
Meeting the scientists	5.0%	28.6%	6.4%	10.8%	28.0%	16.5%	66.7%	41.5%	26.3%	42.1%	41.7%
The hand-out materials	40.0%	42.9%	48.9%	18.0%	26.7%	14.0%	33.3%	17.1%	5.3%	5.3%	

Table 5-Saa
Did you tell your family about what you learned on the Lake Guardian?

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
BASE	20	10	109	154	326	234	3	41	25	21	12
Yes	70.0%	80.0%	78.9%	86.4%	84.7%	73.1%	100%	82.9%	56.0%	52.4%	58.3%
No	30.0%	20.0%	20.2%	12.3%	14.4%	26.5%		14.6%	44.0%	47.6%	33.3%
No response			.9%	1.3%	.9%	.4%		2.4%			8.3%

Table 6-Saa
Please circle T for True or F for False:
Percent of students who gave correct response

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
Fresh water supply											
Correct	80.0%	80.0%	73.4%	64.3%	82.8%	82.9%	100%	51.2%	80.0%	90.5%	75.0%
Incorrect	20.0%	20.0%	26.6%	35.7%	17.2%	17.1%		48.8%	20.0%	9.5%	25.0%
Ships need not pollute											
Correct	75.0%	70.0%	84.4%	74.7%	85.9%	70.5%	100%	78.0%	84.0%	85.7%	91.7%
Incorrect	25.0%	30.0%	15.6%	25.3%	14.1%	29.5%		22.0%	16.0%	14.3%	8.3%
Lake clean themselves											
Correct	65.0%	80.0%	76.1%	73.4%	85.0%	79.5%	100%	61.0%	52.0%	71.4%	75.0%
Incorrect	35.0%	20.0%	23.9%	26.6%	15.0%	20.5%		39.0%	48.0%	28.6%	25.0%
Trash not harmful											
Correct	90.0%	80.0%	93.6%	81.2%	95.7%	96.6%	100%	97.6%	100%	100%	100%
Incorrect	10.0%	20.0%	6.4%	18.8%	4.3%	3.4%		2.4%			
Algae not harmful											
Correct	15.0%	70.0%	53.2%	43.5%	66.6%	64.1%		48.8%	64.0%	95.2%	100%
Incorrect	85.0%	30.0%	46.8%	56.5%	33.4%	35.9%	100%	51.2%	36.0%	4.8%	
Acid Rain source											
Correct	90.0%	90.0%	45.9%	53.2%	78.2%	75.2%	66.7%	73.2%	76.0%	95.2%	83.3%
Incorrect	10.0%	10.0%	54.1%	46.8%	21.8%	24.8%	33.3%	26.8%	24.0%	4.8%	16.7%

Table 6-Saa (Continued)
Please circle T for True or F for False:
Percent of students who gave correct response

	Grade Level of Class										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	12th	Coll
Acid Rain travels											
Correct	75.0%	90.0%	78.0%	64.9%	69.6%	77.8%	66.7%	75.6%	68.0%	85.7%	100%
Incorrect	25.0%	10.0%	22.0%	35.1%	30.4%	22.2%	33.3%	24.4%	32.0%	14.3%	
Toxic chemicals											
Correct	95.0%	90.0%	93.6%	59.7%	93.3%	88.5%	100%	87.8%	96.0%	100%	100%
Incorrect	5.0%	10.0%	6.4%	40.3%	6.7%	11.5%		12.2%	4.0%		
Fish and toxic chemicals											
Correct	65.0%	80.0%	89.9%	58.4%	90.8%	92.7%	100%	95.1%	96.0%	100%	100%
Incorrect	35.0%	20.0%	10.1%	41.6%	9.2%	7.3%		4.9%	4.0%		
Lake Guardian's job											
Correct	100%	90.0%	89.9%	77.9%	96.0%	88.0%	66.7%	92.7%	92.0%	76.2%	91.7%
Incorrect		10.0%	10.1%	22.1%	4.0%	12.0%	33.3%	7.3%	8.0%	23.8%	8.3%
Canada USA cooperation											
Correct	90.0%	90.0%	94.5%	78.6%	91.7%	91.9%	100%	87.8%	88.0%	100%	83.3%
Incorrect	10.0%	10.0%	5.5%	21.4%	8.3%	8.1%		12.2%	12.0%		16.7%
Industry pollution											
Correct	25.0%	80.0%	31.2%	44.8%	53.1%	53.8%	33.3%	31.7%	12.0%	76.2%	75.0%
Incorrect	75.0%	20.0%	68.8%	55.2%	46.9%	46.2%	66.7%	68.3%	88.0%	23.8%	25.0%