

INLAND SEAS EDUCATION ASSOCIATION'S

2011 EVALUATION REPORT

September 2012



INLAND SEAS EDUCATION ASSOCIATION

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ACKNOWLEDGEMENTS

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We thank the many staff, board members, and volunteers who have also provided valuable suggestions for improvements to the evaluation process.

The Inland Seas Education Association (ISEA) was founded in 1989 as a non-profit charitable organization whose mission is to enhance public understanding and stewardship of the Great Lakes through experiential shipboard and onshore education programs for children and adults. To date over 90,000 students have participated in ISEA programs.

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I. EXECUTIVE SUMMARY

Inland Seas Education Association (ISEA) was founded in 1989 as a private, non-profit organization. ISEA helps people of all ages experience the science and spirit of the Great Lakes through shipboard and on-shore education programs. The mission of ISEA is to enhance public understanding and stewardship of the Great Lakes through experiential shipboard and onshore education programs for children and adults.

ISEA's education programs have specific objectives designed to promote the mission of ISEA and reinforce some of the science and social studies objectives of the Michigan Grade Level and High School Content Expectations. The surveys and tests used in ISEA's evaluation process are designed to measure how well the mission and learning objectives are being achieved.

Results of ISEA's evaluation process are used by staff to improve and enhance future education activities. Teaching methods, education materials, and volunteer training programs are refined each year to enrich the learning process for students of all ages participating in ISEA's education programs. Modifications to the evaluation process itself are often made to increase the effectiveness of the process and the usefulness of the results.

The 2011 report includes statistical information about participation in ISEA's education programs, summaries of teacher and students evaluations of the Schoolship Program, and summaries of participant surveys from a variety of ISEA's other education programs. It also includes a summary of evaluations completed by ISEA's volunteer instructors about their volunteer experience.

PARTICIPATION IN ISEA'S EDUCATION PROGRAMS IN 2011

During 2011, ISEA increased its shipboard experiential science learning opportunities by roughly 20%. In total, 4,133 people participated in 160 education programs, raising the total number of shipboard participants in ISEA's Schoolship Program to **90,434**.

In addition to the participants of shipboard education programs, 993 members of the public participated in shore-side educational tours of the schooner *Inland Seas* (in Leland, Charlevoix, Escanaba, Fayette, Suttons Bay, Traverse City, Bay Harbor, Petoskey and the Michigan Schooner Festival), and 104 people attended one of our Great Lakes Seminars in 2011.

The following table is a summary of the participation in ISEA's shipboard education programs in 2011.

Participation in ISEA's Shipboard Education Programs in 2011

Types of ISEA Programs	Number of Programs	Number of Participants
Great Lakes Schoolship Programs		
Great Lakes Schoolship Program – Spring	87	2,539
Great Lakes Schoolship Program – Summer*	5	106
Great Lakes Schoolship Program – Fall	24	528
Family Ecology Sail*†	29	650
Great Lakes Research Programs		
Young Women in Science	2	16
Lake Superior State University – Native Cultures *	1	8
Lake Superior State University – Oceanography*	1	8
Professional Development Workshops		
Invasive Species Field Course	1	19
Great Lakes Specialty Programs		
Gull Island Cruise*	1	27
Lake Superior State University Ed-venture Camp	3	81
Astronomy Under Sail*	2	50
Michigan Schooner Festival Sail*	3	76
Friends of Fayette*	1	25
TOTAL	160	4,133

*Evaluations were not conducted due to the nature of the program.

† Includes Making the Great Lakes Great Programs

SUMMARY OF PROGRAMS EVALUATED IN 2011

GREAT LAKES SCHOOLSHIP PROGRAMS (Spring and Fall)

The Schoolship Program is a half-day education program offered to school groups during spring and fall. Spring Schoolship programs are offered aboard ISEA's schooner *Inland Seas* in Suttons Bay and the chartered schooner *Manitou* in Traverse City. Fall Schoolship Programs are offered aboard *Inland Seas*. A total of 111 Schoolship programs were offered in 2011 (spring and fall), a 21% increase from 2010, and included 54 schools from 35 districts or agencies. There were 28 schools that brought multiple classes. 39 of 48 schools (81%) returned from 2010.

Evaluation forms were distributed to all teachers and students participating in spring and fall Schoolship Programs in 2011. Students were evaluated using three unique tests based on student reading levels and subject matter complexity for elementary (level A; grades 4-5), middle (level B; grades 6-8), and high school (level C; grades 9-12) levels. Of the 111 Schoolship programs offered during spring and fall 2011, there were 59 level A, 20 level B, and six level C programs. The remaining 26 classes had a combination of grade levels and, therefore, were not tested.

Teacher Evaluations

Following each Schoolship Program, teachers or group leaders were given a post-trip packet including a teacher evaluation. Evaluations were provided to 111 classes in spring and fall 2011, from which 40 teachers responded resulting in a 36% return rate. Eight of these teachers were participating for the first time, 15 teachers had participated for 2-5 years, and 16 teachers had participated for more than 6 years. Similar to past years, teachers felt the content level was appropriate for the program. 95% reported an increase in the interest of their students in studying science and 98% reported an increased student concern for the Great Lakes ecosystem after their Schoolship experience.

Student Evaluations

In 2003, new evaluations were designed to more effectively determine what information students gained from the experience, as well as their thoughts on the Schoolship Program and the Great Lakes. This has allowed students of different levels to be evaluated more effectively. These evaluations are widely used by Schoolship teachers and their comprehensive nature allows teachers to reinforce concepts learned aboard the Schoolship back in the classroom.

During the Fall 2011 Schoolship season an online evaluation process was implemented utilizing the same questions as previous years. This served a two-fold purpose by saving the teachers time and the ISEA staff from manually collecting, grading, and evaluating scores. As this system was only implemented for a brief period of time this year, we will use this evaluation process during the entire 2012 season.

The following is a comparison of the average scores students received on their evaluations from 2003-2011.

Average Student Evaluation Scores from 2003-2011

	Average Score									Mean
	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Level A (grades 4-6 '03 – '10; 4-5, '11)	90%	88%	88%	86%	91%	86%	90%	79%	81%	86.5%
Level B (grades 7-9, '03 –'10; 6-8, '11)	87%	83%	85%	86%	81%	84%	86%	84%	79%	83.9%
Level C (grades 10-12, '03-'10; 9-12, '11)	85%	86%	92%	82%	81%	83%	87%	88%	86%	85.5%

Of the responses returned from the 2011 Spring and Fall Schoolship participants, the average scores on each exam level were similar to previous years although it was slightly lower for the Level B (see table above). However, the average Level A test score for 2010 and 2011 (80%) was eight percent lower than the average from 2003-2009 (88%). An analysis of student performance on each question of the Schoolship Student Evaluations was completed to identify areas of difficulty for students in different grade levels (see Figure 1 on page 14, Figure 2 on page 19, and Figure 3 on page 24).

Students who were given the Level A evaluation averaged better than 70% on all ten questions. Similar to 2010, students completing the level B evaluation often incorrectly labeled which organisms represent phytoplankton (54% correct), zooplankton (56% correct), and benthos (53% correct), and had difficulty recognizing that shallow water has enough sunlight for rooted plants to grow (68% correct). Again, similarly to 2010, there were no questions missed by more than 30% of the students who took the Level C evaluation. This analysis describes key areas of difficulty that are addressed in the 2011 Action Plan (see pages 47-48).

GREAT LAKES RESEARCH PROGRAMS

Young Women in Science

Sixteen high school women participated in two Young Women in Science Programs in Grand Traverse Bay and Little Bay de Noc during June and July 2011. These programs were sponsored by Zonta International. Students were evaluated based on the content they learned and how well they thought the program was executed. The program had four content-based objectives: gain content knowledge about invasive species in the Great Lakes, learn and practice sampling techniques, complete and present a research project, and promote a sense of stewardship.

Students were asked to rank each objective (on a scale of 1 to 5) based on their content knowledge before and after the program. Before the program, the average score was 2.96 out of 5 (59% understood the content); after the program the average score was 4.62 (92% understood to content). Ninety-five percent (99%) of the students felt the program was well organized and exciting, the instructor and crew were knowledgeable and helpful, and would recommend the experience to others. The students commented that they really enjoyed the experience and learned a lot about the Great Lakes.

SPECIALTY PROGRAMS

Invasive Species Field Course

Seventeen teachers and environmental professionals and 8 faculty members participated in ISEA's 9th Annual Invasive Species Field Course in July 2011. This was a three-day workshop designed to help prevent the introduction and spread of aquatic invasive species through education and stewardship. The intended outcome of this course was to prepare participants to educate their students, volunteers, and colleagues about invasive species and the means to prevent their spread or introduction.

To determine the program's effectiveness, several evaluation forms were used. One evaluation method was a seven-item pre-/post-program assessment that required participants to answer a series of open-ended questions based on content covered during the field course. An end of the program evaluation was also completed, which asked participants to rate workshop objectives for both their values and whether or not they were accomplished. A scoring rubric was created by external evaluators based on a set of acceptable answers provided by test developers. The statistical difference between the average scores was tested using a paired sample t-test.

The results of these evaluations showed the participant's knowledge of invasive species increased significantly after the field course. The average pre-program score was 59%; the post-program average was 87% (a statistically significant improvement). The largest individual improvement between pre- and post-program evaluations was a difference of 56% (pre-

program score was 34%; post-program score was 90%). The majority of responses (99%) classified the communications prior to the course, the organization and content of classroom and shipboard activities, and the quality of written materials as “good” or “great.” Participants enjoyed the range of speakers and appreciated the opportunity to collect data aboard the schooner. They were enthusiastic about the interactions between teachers and environmental professionals, and left the course well prepared to teach their students, volunteers, and colleagues about invasive species.

ISEA VOLUNTEER INSTRUCTORS

Volunteer Instructor Training

Each year, ISEA volunteers (both new and veteran) participate in a series of training classes from January through April designed to prepare them to become volunteer instructors aboard the Schoolship and in the Education Center. Volunteer instructors evaluated each training session based on the clarity of the presentation, the pace of the presentation, the quality of the visuals used, the clarity of written materials, the effectiveness of the small group station, and the amount of material presented. Ninety-eight percent (98%) of the respondents categorized each as “good” or “great” for all the sessions combined and 94% felt the amount of material presented was “just right.” Most comments pertained to the good quality of the presentations and better visual aids.

Volunteer Instructor Year-End Survey

A Volunteer Instructor Year-End Survey was sent to 205 volunteers that taught aboard the Schoolship or in the Education Center during 2011. Of the 36 volunteers that responded (17% response rate), 98% rated the organization’s performance “good” or “great,” in terms of volunteer information, practical training, organizational support, and interaction with the Education Director/Education and Volunteer Coordinator, sailing crew, lead instructors, and other volunteers. Ninety-five percent (95%) of the responding volunteers agreed that their experience was enjoyable and worthwhile, and that ISEA had provided opportunities for their feedback.

In 2011, 205 volunteers contributed a total of 11,743.75 hours to the operation of ISEA. A total of 128 volunteer instructors taught aboard *Inland Seas* and *Manitou* donating 6,265.25 of the total volunteer hours. In addition to hours donated by volunteers aboard the Schoolships, 318.75 hours were committed to Education Center programs, 1,947 hours to the Boat Shop, and 3109.75 hours to other projects (office work, events, curriculum development, training etc.). The highest number of hours donated by a single volunteer in 2011 was 1,087.5. The average number of hours per volunteer was 57. Based on the 2011 average hourly value (\$21.79) for volunteer time in the U.S. from Independent Sector (http://www.independentsector.org/volunteer_time), volunteers provided ISEA with time and services worth approximately \$253,652. A total of 103 professional service hours were donated to ISEA totaling approximately \$22,812. The total value of volunteer time and services ISEA received in 2011 was \$276,464. ISEA is extremely fortunate to have such a strong group of supportive volunteers. We simply could not do what we do at ISEA without this incredible group of people. The diverse backgrounds and enthusiasm volunteers bring to ISEA’s education programs each year is priceless.

2012 ACTION PLAN

In 2011, the Stewardship Station incorporated a memory game that included stewardship options. This approach was unsuccessful as most volunteers stated that they rarely utilized this game. The memory game will therefore be deleted from the 2012 Stewardship Station materials. We will incorporate a new rope demonstration, designed to teach students about water resources and the percent of total water on Earth that is available as freshwater. Furthermore, we will re-incorporate the foam-core food web tool into this station. This activity will give students an opportunity to draw the food web of the Great Lakes. This will help them visualize the different Great Lakes food web levels and the ecological importance of each level.

During the Fall 2011 Schoolship Programs, we switched to an internet based survey instrument run by Survey Monkey. In 2012, evaluation materials will again be distributed to all teachers and students participating in the Schoolship Program and will continue to be done electronically. In 2011 the three levels of student evaluations (Levels A, B, and C) were updated to better reflect the comprehension levels of students in each grade, and to better align with Michigan Grade Level and High School Content Expectations. These same categories will be used again in 2012. Finally, as the Michigan state curriculum Science standards will be changing, the Education Director and the Education and Volunteer Coordinator will host a 'Teacher Roundtable' where teachers who have been with ISEA for multiple years will be invited to discuss how ISEA can update its programs to better reflect the needs of the new state curriculum.

Of particular concern are questions that less than 70% of the students answered correctly. Similarly to 2010, students had difficulty identifying benthos as organisms that live on or near the bottom of the lake, labeling phytoplankton/zooplankton/ benthos on a food web, and recognizing that shallow water has enough sunlight for rooted plants to grow. These topics were addressed when updating the student evaluations, and will be emphasized to all volunteers during the 2012 volunteer instructor training. ISEA staff and volunteers will work to clarify these concepts through their teaching aboard the Schoolship in 2012.

ISEA's evaluation studies give staff and volunteer instructors important information used to improve instruction and to provide the most educational and memorable experience possible. ISEA is dedicated to this process of evaluation and improvement in years to come.

II. GREAT LAKES SCHOOLSHIP PROGRAMS

A. TEACHER EVALUATIONS

40 Teacher Responses

1. Was this your first trip with ISEA? Yes (20%) No (80%)

If not, how many times have you sailed with us?

Once (9%)	Four Times (13%)	Ten Times (3%)
Twice (6%)	Five Times (3%)	More than Ten (31%)
Three Times (19%)	Eight Times (3%)	

2. How did you hear about the Schoolship Program?

Another School (3%)	Previous Trip (10%)
Colleague (18%)	Tradition (15%)
ISEA staff/member/volunteer (3%)	ISEA directly (5%)
Media (5%)	Another school (3%)
Parent (5%)	ISEA brochure (3%)

3. Was the content level appropriate for this program? Please rate the amount of new information and experience your students gained at each station.

	Much	Some	Little
Fish	80%	20%	0
Plankton	87%	10%	3%
Sediment/Benthos	80%	20%	0
Seamanship	80%	17%	3%
Stewardship	77%	18%	5%
Water Chemistry	81%	14%	5%
Weather	59%	37%	5%

4. Do you have any suggestions on how we could improve our stations?

Example Comments:

- It was an excellent program and the students loved it. The only reason they didn't learn "much" for each category was because there was a lot of info to take in.
- The stations were great! I have only one suggestion, have the volunteers slow down a little when the students need to put information in their books. Even I got behind at times since they were going so fast.
- You've improved them all these years. The units are very well developed. Many things on internet to support your lessons. Instructors in Traverse City need to record one temperature from a reading on the thermometer.
- Possibly make seamanship and stewardship more hands on to get the kids more interested in the topics.

5. Please rate your perception of your students' attitudes following their Schoolship experience:

a. Did you notice an increased interest in science?

No Change (5%) Some Positive Change (55%) Great Positive Change (40%)

b. Did you notice an increased concern for the Great Lakes ecosystem?

No Change (3%) Some Positive Change (45%) Great Positive Change (52%)

Example Comments:

- Many students were saying that they never knew how valuable the Great Lakes were and that there was so much life in the water and cycles working together.
- They already had a great interest in science. Yes, there is a definite increased awareness of the Great Lakes ecosystem and the need to take care of it.
- Anytime we reinforce the need to protect our environment, the students will remember for the future.

6. Can you relate any specific examples of how the Schoolship experience affected one or more of your students?

Example Comments:

- One student said, “It was the best field trip I have ever been on!” The students have been busy talking about ways to conserve water and to protect the great lakes. Many said that they were glad they got a chance to look at the plankton under the microscope.
- Students created a website beverlybarrels.com to encourage the use of rain barrels, how to make them, or where they could purchase them
- Reinforcement of HOMES acronym. Many said that they would tell their friends about it as they knew that they would like it too. They loved the fish identification and looking for invasive species.
- Many were thrilled to have sailed for the first time and stated they did not know there was so many factors affecting the quality of water.

7. Please check any of the following activities from the Schoolship Teacher’s Guide that you have used or plan to use:

A Watershed View of the Bay (38%)	Invader Species of the Great Lakes (63%)
Acids & Bases (33%)	Journey to the Sea (20%)
Building Your Own Watershed (10%)	Lake Stratification (20%)
Calculating Cloud Cover (15%)	Sea Shanties & the Schoolship (13%)
Fathoms Below the Schoolship (3%)	Shoe Key (18%)
Great Lakes Food Web (58%)	Teaching Vocabulary (48%)
Great Lakes Stewardship Challenge (33%)	Understanding Global Water
Great Lakes Stewardship: Post-Schoolship	Distribution (28%)
Community Involvement (10%)	Understanding Water in Your Region (33%)
Gyotaku (Japanese Fish Painting) (3%)	Why Do Boats Float? (18%)

8. If you used one or more of the activities from the Schoolship Teacher’s Guide, how successful were the activities? Did you modify the activities for your students? Can you suggest improvements?

Example Comments:

- The kids loved the activities. It also got them ready for the trip. They had a better understanding of what they would see. Many didn't know what plankton was or what invader species were.
- Students knew a lot of the information needed once on the schooner. I think activities were successful. I did modify the activities. Have activities in all areas modified to grade level might help.
- Unfortunately since 5th grade science standards are no longer related to these science concepts, I won't use them as part of my lessons. I still value the experience though so I bring my students.
- I used these activities in conjunction with their social studies unit on the Great Lakes and activities from the Alliance for the Great Lakes curriculum. It correlated great!

9. ISEA uses Schoolship Student Evaluations with unique evaluation forms for students of different grade levels. We would appreciate your feedback on these evaluations.

a. Did your students complete the Schoolship Student Evaluations (34 responses)?

Yes (88%) No (12%)

b. Did you correct the evaluations and discuss the results (32 responses)?

Yes (75%) No (25%)

c. Did your students encounter any problems with the evaluations (25 responses)?

Yes (24%) No (76%)

If your students encountered problems, what were their concerns?

Example Comments:

- Stewardship was difficult. Benthos vs. Plankton definitions confused some.
- We didn't take time to do the letter part, unfortunately. Busy testing season for my district.
- I read some of the questions to the students and some of the material was above their reading levels.
- Confused benthos and dissolved oxygen on test.
- Diagram labeling was confusing for students.

Additional comments regarding the Schoolship Student Evaluations?

Example Comments:

- I like having the students complete the evaluation. We spend about 3 weeks preparing for the trip—it is a nice culmination activity.
- Nice job having them apply vocabulary and their experience.
- A very clever way to educate students.
- Great tool for assessing the program.

10. Many of our prospective clients wonder how schools finance their trip(s). Would you share how your trip was funded?

School Fundraiser (25%)	Rotary Scholarship (1%)
Grant (30%)	Donations (8%)
ISEA Scholarship (1%)	Students (13%)

B. STUDENT EVALUATIONS – LEVEL A (grades 5-6)

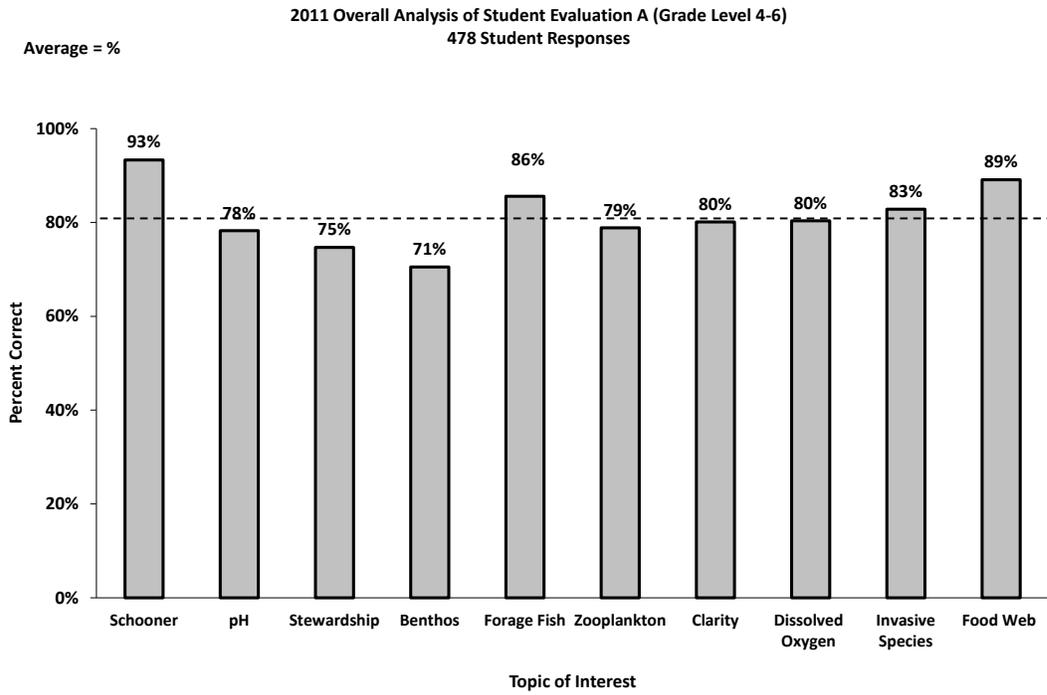
478 Student Responses

Instructions: Now that you have sailed with us on the Schoolship, please help us see what you have learned! Choose the best word from the box below to complete each sentence.

food web	clarity	forage fish	benthos
exotic species	plankton	pH	schooner
stewardship	dissolved oxygen		

1. The Schoolship is a special type of sailing ship called a schooner, which has at least two masts. (93%)
2. The pH of the water should be in the healthy range of 6-9 and can be affected by acid rain and other types of pollution. (78%)
3. The responsibility to protect and preserve the Great Lakes is called stewardship, something that can be practiced everyday at your house or school. (75%)
4. Benthos are organisms that live on or near the bottom of the lake. (71%)
5. A special net called an otter trawl can be used to catch forage fish, organisms that feed on benthos or zooplankton and are eaten by larger predator fish. (86%)
6. Plankton are microscopic plants and animals that float freely in the water and are very important since they help form the base of the food web. (79%)
7. The black and white Secchi disk is used to measure the clarity of the water. (80%)
8. Dissolved oxygen is essential for organisms to survive in the lake and comes from phytoplankton, plants that live in the water, and the atmosphere. (80%)
9. Some exotic species such as round gobies and zebra mussels have come into the Great Lakes in the ballast water of ships traveling from the Caspian Sea. (83%)
10. The feeding relationships between organisms is best described as a food web, which uses arrows to show what each organism eats. (89%)

Figure 1: Summary of the Student Evaluation – Level A results. The dashed line represents the average score (81%).



C. STUDENT EVALUATIONS – LEVEL B (grades 6-8)

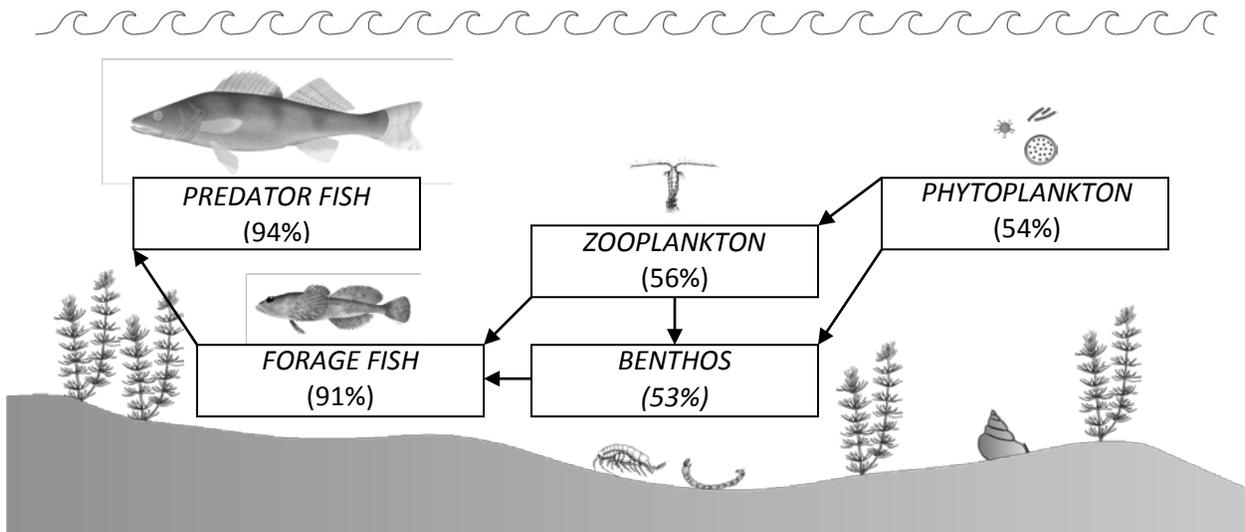
445 Student Responses

Instructions: Now that you have sailed with us on the Schoolship, please help us see what you have learned!

DIAGRAM LABELING

1. On the food web diagram below, label the groups of organisms by entering the following names in the boxes provided.

PHYTOPLANKTON	BENTHOS	ZOOPLANKTON
PREDATOR FISH <i>(feed on smaller fish)</i>	FORAGE FISH <i>(feed on benthos or zooplankton)</i>	



MULTIPLE CHOICE

Circle the correct answer for each question below.

1. The Schoolship is a special type of sailing ship called a:
(a) sloop.
(b) skiff.
(c) schooner. (97%)
2. Even though the Schoolship is made of heavy steel, it floats. This is because of:
(a) sail lift.
(b) wave action.
(c) buoyancy. (90%)

3. Weather information is used on the ship to:
 - (a) describe the conditions that existed when samples were collected.
 - (b) determine the conditions to help the Captain decide where to sail.
 - (c) both of the above. (80%)
4. Phytoplankton and zooplankton are an important part of the aquatic ecosystem of a lake because they:
 - (a) feed on forage fish.
 - (b) help form the base of the food web. (77%)
 - (c) buffer the pH of the water.
5. Twenty percent of the world's available fresh water is found in:
 - (a) the Great Lakes. (91%)
 - (b) the Atlantic Ocean.
 - (c) Lake Michigan.
6. The _____ of the water should be in the healthy range of 6-9 and can be affected by acid rain and other types of pollution.
 - (a) dissolved oxygen
 - (b) pH (75%)
 - (c) clarity
7. Dissolved oxygen in the water comes from:
 - (a) phytoplankton, aquatic plants, and the atmosphere. (70%)
 - (b) benthos and bacteria.
 - (c) forage and predator fish.
8. One important difference between the deep water habitat (Ponar dredge sample) and the shallow water habitat (otter trawl sample) is that the shallow water has:
 - (a) too much pollution for benthos to survive.
 - (b) not enough dissolved oxygen for forage fish.
 - (c) enough sunlight for rooted plants to grow. (62%)
9. Benthos are an important part of the food web because they:
 - (a) are food for forage fish and recyclers of organic material. (84%)
 - (b) obtain their energy directly from the sun.
 - (c) only eat exotic species.
10. The wheel of the ship turns the _____, which turns the ship.
 - (a) sail
 - (b) rudder (89%)
 - (c) mast

MATCHING

Match the term(s) in the right column with the definition/explanation in the left column. Place the letter of the best answer in the blank provided. Each letter can only be used once.

- | | | |
|----------------|---|---|
| <u>b</u> (87%) | 1. Term that best describes the feeding relationships between organisms. | a. Secchi disk |
| <u>f</u> (84%) | 2. Equipment used by scientists to collect samples of benthos, plankton, forage fish, and water. | b. Food web |
| <u>d</u> (79%) | 2. Plant plankton. | c. Benthos |
| <u>i</u> (82%) | 3. Threats to the fish population. | d. Phytoplankton |
| <u>c</u> (71%) | 4. Organisms that live on or near the bottom of the lake. | e. Exotic species |
| <u>i</u> (79%) | 5. Diagrams and descriptions used by scientists to identify benthos and fish. | f. Ponar dredge, plankton net, otter trawl, and Van Dorn bottle |
| <u>a</u> (80%) | 6. Animal plankton. | g. Zooplankton |
| <u>e</u> (77%) | 7. Organisms that have come into the Great Lakes in the ballast water of ships travelling from the Caspian Sea. | h. Stewardship |
| <u>a</u> (83%) | 8. Equipment used to measure the clarity of the water. | i. Dichotomous keys |
| <u>h</u> (82%) | 10. The responsibility to protect and preserve the Great Lakes for future generations. | j. Pollution, overfishing, exotic species, and destruction of habitat |

YOUR EXPERIENCE

Answer the following questions in complete sentences.

1. What could YOU do to become a better steward and help protect the Great Lakes?

Example Comments:

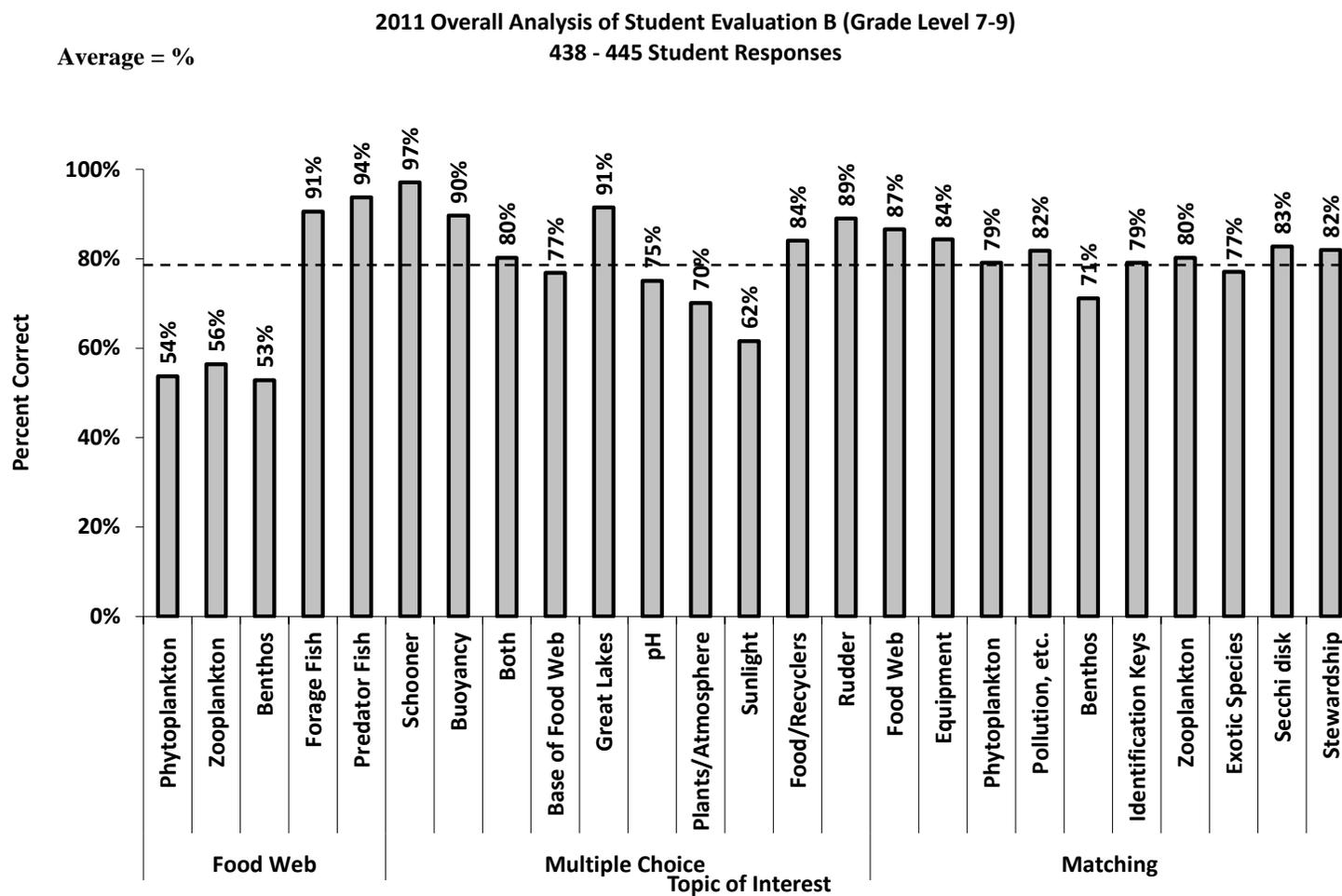
- By being mindful of how much water I use when I brush my teeth, using the shower, and washing my hands.
- There are many things I could do to be a steward of the Great Lakes. I can clean up beaches and water and not pollute the lakes. I can learn more about the Great Lakes and try to get people to see what they are doing to the Great Lakes.
- I could spread awareness of problems in the Great Lakes, I will start to recycle, and I will treat the world like it is meant to be, because people don't know what they are doing... they are causing us to lose what is part of the world's history and if we pollute and let more things into the Great Lakes to the point of destruction then we are destroying part of the world.

2. What did your trip on the Schoolship help you appreciate?

Example Comments:

- How complex and fragile the ecosystem in the Great Lakes. All the water we have will not be there forever.
- My time on the Schoolship helped me appreciate how precious the Great Lakes are, and how we can help
- The trip on the Schoolship helped me appreciate the beauty of our wonderful Great Lakes and had me wanting to protect them so future generations can enjoy them too.
- The trip helped me appreciate stewardship, and made me want to help take care of the Great Lakes. There's lots of little things we can do to be better stewards of the Great Lakes. Another thing
- How much
- It helped me appreciate plankton a bit more. Before I just thought they were little evil things that show up on Spongebob Squarepants, but now I know they create most of our oxygen. I also appreciate our drinking water more too, since only 1% of our water is drinkable.

Figure 2: Summary of the Student Evaluation – Level B results. The dashed line represents the average score (79%).



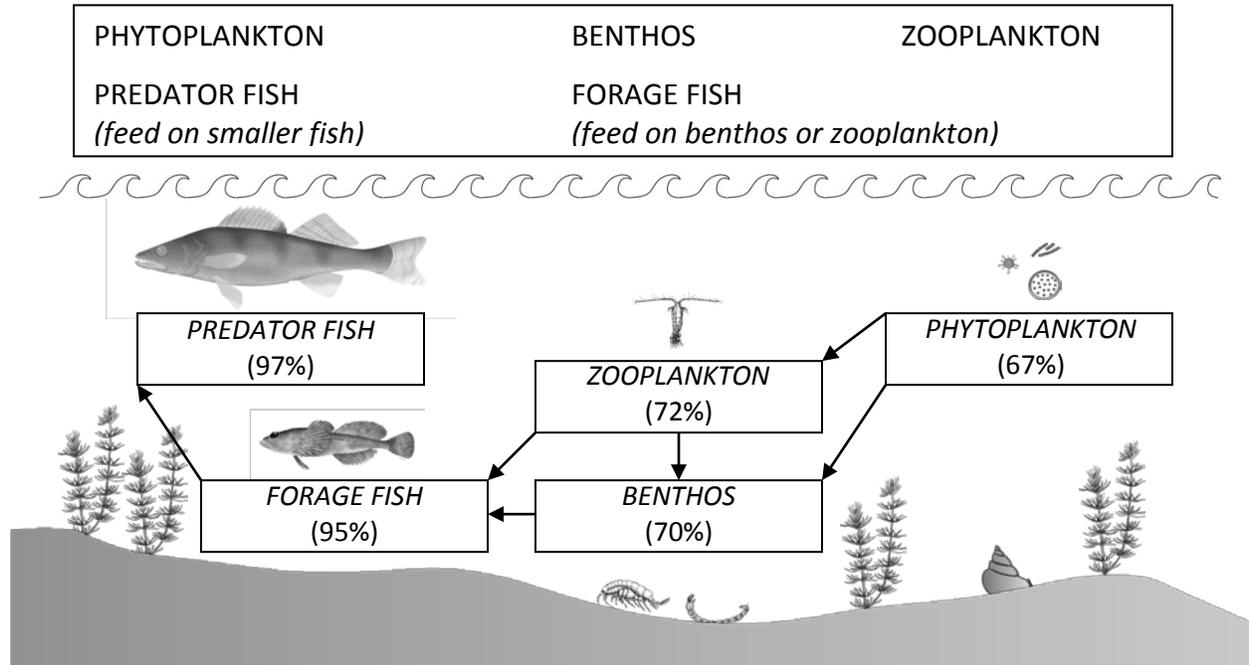
D. STUDENT EVALUATIONS – LEVEL C (grades 9-12)

60 Student Responses

Instructions: Now that you have sailed with us on the Schoolship, please help us see what you have learned!

DIAGRAM LABELING

On the food web diagram below, label the groups of organisms by entering the following names in the boxes provided:



MULTIPLE CHOICE

Circle the correct answer for each question below.

- Twenty percent of the world's available fresh water is contained in:
 - the Great Lakes. (92%)
 - the Atlantic Ocean.
 - Lake Michigan.
 - glaciers.
- The pH of the water should be in the healthy range of _____ and can be affected by acid rain and other types of pollution.
 - 1-4
 - 3-5
 - 6-9 (98%)
 - 10-12

3. What geological condition in the Great Lakes keeps our water within the healthy pH range?
 - (a) sandy beaches
 - (b) high moraines
 - (c) limestone bedrock (97%)
 - (d) ancient mountains
4. Plankton are:
 - (a) organisms that live on or near the bottom.
 - (b) rooted plants that grow near the shore.
 - (c) small fish that are eaten by trout and salmon.
 - (d) microscopic plants and animals that float freely in the water. (97%)
5. One important difference between the deep water habitat (Ponar dredge sample) and the shallow water habitat (otter trawl sample) is that the shallow water has:
 - (a) too much pollution for benthos to survive.
 - (b) not enough dissolved oxygen for fish.
 - (c) enough sunlight for rooted plants to grow. (72%)
 - (d) not enough sunlight for phytoplankton to survive.
6. In the middle of summer, the surface water temperature is generally _____ the bottom water temperature.
 - (a) warmer than (92%)
 - (b) colder than
 - (c) the same temperature as
 - (d) none of the above
7. Dissolved oxygen in the water comes from:
 - (a) phytoplankton, aquatic plants, and the atmosphere. (77%)
 - (b) benthos and bacteria.
 - (c) fish and other aquatic animals.
 - (d) limestone bedrock.
8. How do exotic zebra and quagga mussels affect the Great Lakes ecosystem?
 - (a) they attach to native freshwater mussels
 - (b) they increase water clarity
 - (c) they compete for food with organisms like amphipods and native freshwater mussels
 - (d) all of the above (77%)
9. Which of the following is NOT an exotic species in the Great Lakes Region?
 - (a) round goby
 - (b) walleye (85%)
 - (c) zebra mussel
 - (d) sea lamprey

10. The feeding relationships among aquatic organisms are best described as a:
- (a) food group.
 - (b) chain gang.
 - (c) food pyramid.
 - (d) food web. (93%)
11. Which of the following is a threat to the fish population in the Great Lakes?
- (a) pollution
 - (b) loss of habitat
 - (c) exotic species
 - (d) all of the above (97%)
12. On the schooner, the wheel turns the _____, which turns the ship.
- (a) sail
 - (b) spar
 - (c) rudder (78%)
 - (d) mast
13. Benthos are an important part of the food web because they:
- (a) obtain their energy directly from the sun.
 - (b) are food for fish and recyclers of organic material. (90%)
 - (c) only eat exotic species.
 - (d) all of the above.
14. The responsibility to protect and preserve the Great Lakes for future generations is called:
- (a) preparedness.
 - (b) stewardship. (83%)
 - (c) friendship.
 - (d) responsiveness.
15. The ability of a boat to float is called:
- (a) buoyancy. (88%)
 - (b) mass.
 - (c) dislocation.
 - (d) drifting.

MATCHING

Match the definition in the left column with the sampling equipment in the right column. Place the letter of the best answer in the blank provided. Each letter can only be used once.

- | | | |
|----------------|---|-----------------|
| <u>b</u> (93%) | 1. Measures water clarity. | a. Ponar dredge |
| <u>d</u> (85%) | 2. Collects a water sample from deep in the lake. | b. Secchi disk |
| <u>e</u> (90%) | 3. Filters microscopic plants and animals out of the water. | c. Otter trawl |

- a (87%) 4. Collects sediment from the bottom of the lake. d. Van Dorn bottle
- c (88%) 5. Collects forage fish. e. Plankton net

YOUR EXPERIENCE

Answer the following questions in complete sentences.

- 1. After your trip on the Schoolship, how would you describe the water quality in Grand Traverse Bay and the general health of this ecosystem? Support your answer using specific examples from the data collected aboard the Schoolship.**

Example Comments:

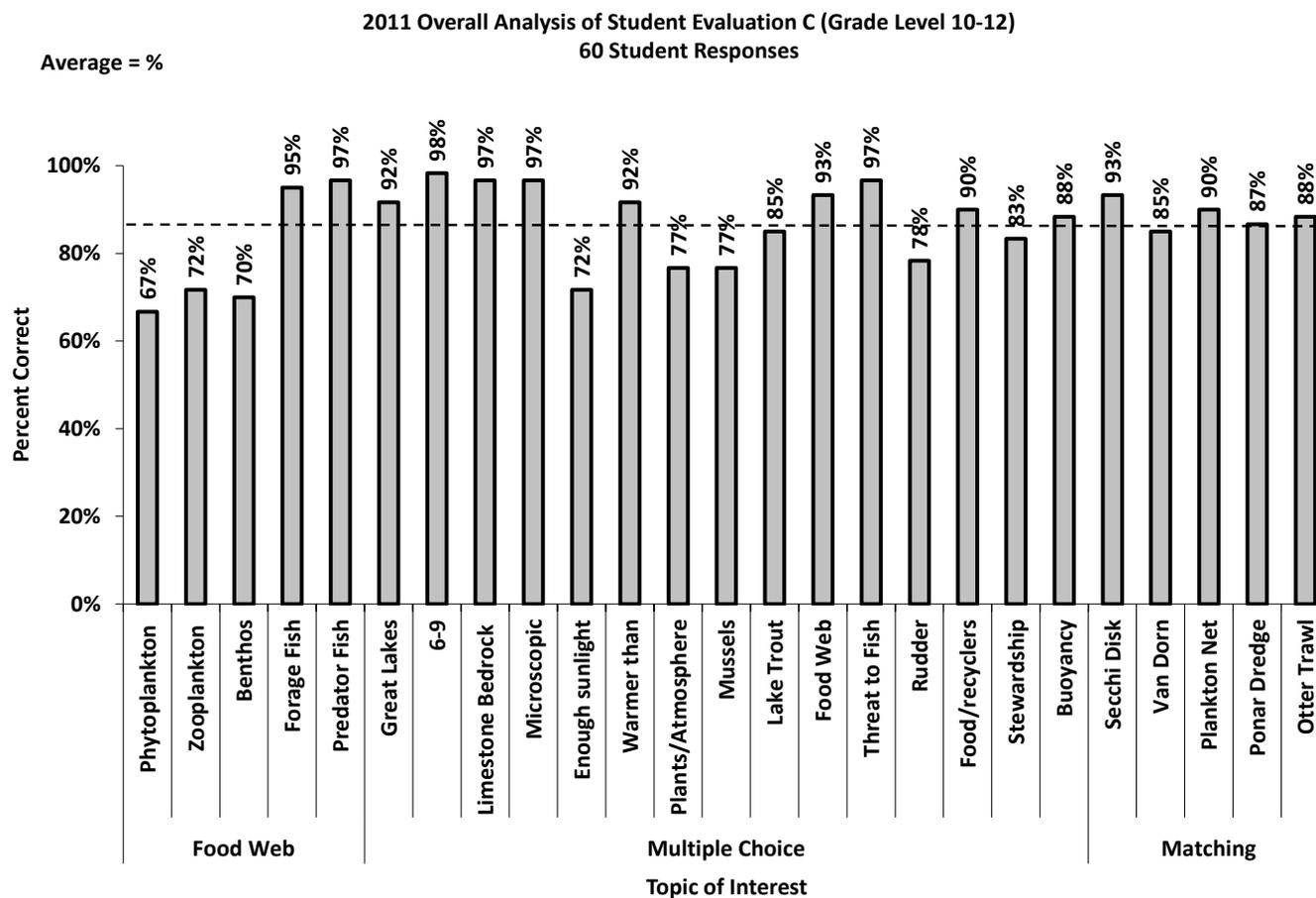
No comments were acceptable for this section.

- 2. What will YOU do to become a better steward and help protect the Great Lakes? Respond in terms of water quality, habitat, exotic species, pollution, education, etc.**

Example Comments:

- What I will do to help preserve the water quality and habitat of the Great Lakes is always clean my boat before traveling and will not dump oil or other forms of pollution into the water.
- I will become a better steward by using more organic and natural cleaners. Whenever I go boating I will remind myself and others to clean the boat before and after going in the water. I will also help educate my peers and others around me about why it is important to protect not only our Great Lakes but all of our waters.
- I will tell people about what I learned and how the lakes are affected. I will try as hard as I can to not pollute the ground around my house that could potentially run into the waters in my area.

Figure 3: Summary of the Student Evaluation – Level C results. The dashed line represents the average score (86%).



III. GREAT LAKES RESEARCH PROGRAMS

Objective 3: To help design, complete, summarize, & present an independent research project.

Score	Pre-program		Post-program	
	# Participants	% Participants	# Participants	% Participants
1	0	-	0	-
2	1	8%	0	-
3	1	8%	0	-
4	6	46%	4	31%
5	5	38%	9	69%

Average:

Pre-program = 4.15 Post-program = 4.69 Difference = 0.54*

* Indicates a statistically significant difference ($p < 0.01$; t-test)

Objective 4: To promote a sense of stewardship towards the Great Lakes watershed.

Score	Pre-program		Post-program	
	# Participants	% Participants	# Participants	% Participants
1	3	23%	0	-
2	3	23%	0	-
3	4	31%	1	8%
4	3	23%	6	46%
5	0		6	46%

Average:

Pre-program = 2.54 Post-program = 4.38 Difference = 1.84*

* Indicates a statistically significant difference ($p < 0.001$; t-test)

REACTION TO THE PROGRAM

To what extent do you agree with the following statements? Please circle the number that represents your feedback.

	Not at All		Somewhat		A Great Deal
The Science Educator instructed in a clear & concise manner.	-	-	-	15%	85%
The instructors & crew answered questions completely & knowledgeably.	-	-	-	8%	92%
The program was exciting & held my interest.	-	-	-	23%	77%
The program materials were complete & useful.	-	-	-	38%	62%

The program activities were organized & clearly defined.	-	-	8%	46%	46%
Participating in this program was a quality experience worth my time.	-	-	-	-	100%
This experience will help in considering future educational or occupational goals.	-	-	-	23%	77%
I will recommend this experience to others.	-	-	-	15%	85%

HOW CAN WE IMPROVE?

Please take a minute to give us any suggestions or feedback about how we might improve this experience.

Example Comments:

- No suggestions, great trip!
- Such an awesome experience
- Maybe two nights, not just one.
- Do more sampling over a longer period of time.

IV. SPECIALITY PROGRAMS

A. INVASIVE SPECIES FIELD COURSE

1. PRE-/POST-PROGRAM EVALUATION

17 Pre-Program Participant Responses; 15 Post-Program Participant Responses

Instructions: As part of the evaluation process for the 8th Annual Invasive Species Field Course, we would like you to complete the following content assessment at the beginning and end of the course. The information will help us determine the effects of the program on participant knowledge and understanding of course content. Remember that you are not expected to have any background in this area at the beginning of the course!

1. What is an aquatic invasive species?

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	1	6%	-	-
1	12	71%	4	27%
2	3	18%	6	40%
3	-	-	2	13%
4	1	6%	3	20%

Average:

Pre-Program = 1.29

Post-Program = 2.27

Difference = 0.98*

* Indicates a statistically significant difference ($p < 0.01$; t-test)

2a. About how many aquatic invasive species have been documented in the Great Lakes region?

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	16	94%	4	27%
1	1	6%	11	73%

Average:

Pre-Program = 0.06

Post-Program = 0.73

Difference = 0.67*

* Indicates a statistically significant difference ($p < 0.001$; t-test)

2b. If you can, list 5 of these species.

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	-	-	-	-
1	-	-	-	-
2	3	18%	-	-
3	4	24%	-	-
4	3	18%	1	7%
5	7	41%	14	93%

Average:

Pre-Program = 3.82 Post-Program = 4.93 Difference = 1.11*

* Indicates a statistically significant difference ($p < 0.001$; t-test)

3a. Name three ways in which aquatic invasive species have been introduced in to the Great Lakes.

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	0	-	-	-
1	2	12%	-	-
2	4	24%	1	7%
3	11	65%	14	93%

Average:

Pre-Program = 2.53 Post-Program = 2.93 Difference = 0.40*

* Indicates a statistically significant difference ($p < 0.05$; t-test)

3b. Which method of introduction is the source of the largest number of invasive species in the Great Lakes?

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	5	29%	1	7%
1	12	71%	14	93%

Average:

Pre-Program = 0.71 Post-Program = 0.93 Difference = 0.22

4a. Why do populations of invasive species increase rapidly upon introduction?

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	3	18%	0	-
1	8	47%	5	33%
2	6	35%	10	67%

Average:

Pre-Program = 1.18 Post-Program = 1.67 Difference = 0.49*

* Indicates a statistically significant difference ($p < 0.05$; t-test)

4b. Name 3 common characteristics that many invasive species share that help to promote this rapid population increase.

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	1	6%	-	-
1	2	12%	-	-
2	7	41%	-	-
3	7	41%	15	100%

Average:

Pre-Program = 2.18 Post-Program = 3.00 Difference = 0.82*

* Indicates a statistically significant difference ($p < 0.001$; *t*-test)

5. List three steps that could be taken to help prevent the introduction of aquatic invasive species.

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	2	12%	-	-
1	6	35%	-	-
2	3	18%	3	20%
3	6	35%	12	80%

Average:

Pre-Program = 1.76 Post-Program = 2.80 Difference = 1.04*

* Indicates a statistically significant difference ($p < 0.001$; *t*-test)

6. How would you collect samples of the following as part of an invasive species research project? (water, plankton, benthos, fish)

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	9	53%	-	-
1	2	12%	-	-
2	5	29%	2	13.3
3	1	6%	2	13.3%
4	-	-	11	73.3%

Average:

Pre-Program = 0.88 Post-Program = 3.60 Difference = 2.72*

* Indicates a statistically significant difference ($p < 0.001$; *t*-test)

7. List 3 ways in which you could teach others about invasive species in the Great Lakes Region and identify your audience(s).

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	-	-	-	-
1	2	12%	-	-
2	5	29%	-	-
3	10	59%	15	100%

Average:

Pre-Program = 2.47 Post-Program = 3 Difference = 0.53*

* Indicates a statistically significant difference ($p < 0.01$; *t*-test)

2. POST-PROGRAM EVALUATION

16 Participant Responses

Instructions: Please respond to the following. Your feedback is important and appreciated! Responses will be compiled and reported only as group data. You do not need to put your name on this form.

ABOUT YOU

Which of the following best describes you?

Elementary School Educator (1)

College Educator (0)

Middle School Educator (3)

Non-formal Educator (3)

High School Educator (8)

Other (1)

WORKSHOP OBJECTIVES

The following are the intended outcomes for the 2011 Invasive Species Field Course. Please rate each objective according to your perception of the VALUE of the workshop in meeting the objective and whether you think it was ACCOMPLISHED. Please circle the appropriate value; a "1" on the scale represents the lowest value and a "5" represents the highest value.

1. To gain content knowledge about aquatic invasive species in the Great Lakes region.

	1	2	3	4	5	Mean Score
Value	-	-	-	6%	94%	4.94
Accomplished	-	-	-	20%	80%	4.80

Example Comments:

- Great overview, I would have liked even more details/science. I most appreciated the presentations on the sea lamprey and Asian carp.
- It was a good review and I learned more too.
- Lots more info.!

2. To learn and practice field sampling techniques aboard the schooner *Inland Seas*.

	1	2	3	4	5	Mean Score
Value	-	-	6%	25%	69%	4.62
Accomplished	-	-	-	-	100%	5.00

Example Comments:

- Not as important to me personally, but awesome experience.
- Great!

3. To research, summarize, and complete an invasive species presentation.

	1	2	3	4	5	Mean Score
Value	-	6%	6%	50%	38%	4.20
Accomplished	-	-	-	40%	60%	4.60

Example Comments:

- Would have liked more time, get on boat sooner vs. waiting on the dock. Maybe plan projects day before.
- Lots of fun!
- Too many limitations
- Loved it!

4. To become prepared to teach others about invasive species following the course.

	1	2	3	4	5	Mean Score
Value	-	-	12.5%	12.5%	75%	4.63
Accomplished	-	-	7%	33%	60%	4.53

Example Comments:

- Most important to me. Maybe add component to research programs that includes how you would incorporate into classroom.

5. To promote a sense of stewardship to help prevent the introduction and spread of invasive species.

	1	2	3	4	5	Mean Score
Value	-	-	-	6%	94%	4.94
Accomplished	-	-	-	7%	93%	4.87

Example Comments:

-

WORKSHOP ACTIVITIES

1. What activities in the Invasive Species Field Course were most important to you?

Example Comments:

- Sampling/learning vocabulary
- Sampling, designing experiments, but the info was important to get.
- Lectures followed by brainstorming
- Learning the background and being on the actual ship.
- Research on the boat
- I think it was a great balance of class work and field work.
- Resources for my students and experience to share with kids

2. Please rate the following aspects of the Invasive Species Field Course by placing a check mark in the most appropriate category:

	Poor	Fair	Good	Great
Communications prior to course	-	6%	25%	69%
Organization of seminars/classroom activities	-	-	4%	96%
Organization of shipboard activities	-	-	19%	81%
Content of seminars/classroom activities	-	-	25%	75%
Content of shipboard activities	-	-	12%	88%
Quality of written materials provided	-	-	-	100%
Overall quality of experience	-	-	6%	94%

3. How well prepared are you to share what you have learned in this course with your students, volunteers, colleagues and/or others? Will you use the materials provided?

Example Comments:

- Above average
- I will use the materials and it should be a great help with any unit
- I feel fairly well prepared and definitely use the materials
- I feel very prepared and I will use the materials

4. What suggestions do you have for improving this course in future years?

Example Comments:

- More breakfast!
- Better breakfast and note Tuesday’s dinner is on your own
- All meals provided ≠ 2 of 3 dinners not provided. Please provide protein options for breakfast
- Keep coffee and drinks available all day

Please provide additional written comments below on the seminar speakers, ISEA staff, course format, course content, written materials, accommodations, etc. Your thoughts are important to us!

Example Comments:

- The dorm was a great opportunity but too congested.
- Again, liked the presentation on sea lampreys and Asian carp and detail speakers went into
- I gained a lot of experience and knowledge
- Very informative. All staff and speakers were focused and informative
- You guys do a great job. The overall experience is one most people won’t have. The kids in this area are very lucky.
- Should spread out more in dorms

V. ISEA VOLUNTEER INSTRUCTORS

A. VOLUNTEER INSTRUCTOR TRAINING

SESSION 1: Introduction to ISEA, the Great Lakes Schoolship Program, and Education Center

38 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	24%	76%	-
Pace of the presentation	-	-	29%	71%	-
Quality of the visuals used	-	-	21%	79%	-
Clarity of the written materials	-	-	29%	68%	3%
Effectiveness of the small groups	-	-	-	-	100%

How would you rate the amount of material presented?

Not Enough (0)

Just Right (100%)

Too Much (0)

Are you a new volunteer or a veteran?

New (92%)

Veteran (8%)

Comments/Questions:

- Just great!
- Clear and concise. It helped having veteran instructors at the training.
- Training keeps getting better and better! Thanks!
- Fabulous training session! Informative and engaging! Very friendly staff and veteran volunteers.
- Good overview – could talk more about importance of the science and why this is such an important way to teach.
- Very well organized and presented.
- Looking forward to this experience.
- Good explanation of the stations and how most of the kids are.
- Sounds like it is a great program.
- I like your presentation style – both Christine and Tom – walking around is fine!
- Nice to have more than one presenter. Helped to have experienced instructors to add information.
- Great presentation, enthusiasm, response to questions.
- Excellent!
- I am excited about this. Nice job – wish I hadn't schedules my vacation time already.

SESSION 2: The Great Lakes and Global Freshwater

26 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	23%	77%	-
Pace of the presentation	-	-	27%	73%	-
Quality of the visuals used	-	-	15%	85%	-
Clarity of the written materials	-	-	12%	88%	-
Effectiveness of the small groups	-	-	-	-	100%

How would you rate the amount of material presented?

Not Enough (4%)

Just Right (96%)

Too Much (0)

Are you a new volunteer or a veteran?

New (77%)

Veteran (23%)

Comments/Questions:

- Really enjoyed the “5th grade” game.
- Very interesting, especially the glacier history lesson.
- Visuals have improved immensely!
- Suggest at start of class to turn off pagers and cell phones.

SESSION 3: Sample Collections and Weather

17 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	6%	29%	65%	-
Pace of the presentation	-	18%	41%	41%	-
Quality of the visuals used	-	-	18%	82%	-
Clarity of the written materials	-	-	18%	82%	-
Effectiveness of the small groups	-	-	18%	82%	-

How would you rate the amount of material presented?

Not Enough (13%)

Just Right (87%)

Too Much (0)

Are you a new volunteer or a veteran?

New (100%)

Veteran (0%)

Comments/Questions:

- Having lights out completely did not allow us to see your demonstration of the equipment. Can you do the entire class as a small group? Better to see and understand.

- Percent cloud cover is important that they learn how to figure it out and what 50% looks like.

SESSION 4: Water Chemistry

20 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	35%	65%	-
Pace of the presentation	-	-	25%	75%	-
Quality of the visuals used	-	-	10%	90%	-
Clarity of the written materials	-	-	20%	80%	-
Effectiveness of the small groups	-	-	20%	80%	-

How would you rate the amount of material presented?

Not Enough (0%)

Just Right (95%)

Too Much (5%)

Are you a new volunteer or a veteran?

New (80%)

Veteran (20%)

Comments/Questions:

- Stations very valuable.
- Couldn't quite grasp the density of water.
- The visual charts were helpful this session. Veteran instructors very helpful in explanation of questions!
- Small groups were really helpful.
- Hands-on by veterans really helpful.
- Much better pace – not stressed to jam too much information.

SESSION 5: Cancelled due to weather

SESSION 6: Plankton

25 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	16%	84%	-
Pace of the presentation	-	-	20%	80%	-
Quality of the visuals used	-	-	16%	84%	-
Clarity of the written materials	-	-	16%	84%	-
Effectiveness of the small groups	-	4%	20%	76%	-

How would you rate the amount of material presented?

Not Enough (0%)

Just Right (96%)

Too Much (4%)

Are you a new volunteer or a veteran?

New (84%)

Veteran (16%)

Comments/Questions:

- Christine always does a wonderful job.
- Very helpful PowerPoint/videos/charts. Simple breakdowns are great! Individual station time has been rushed each time (well done, but not enough time).
- During small group, people not in the group who are in the room should be quiet.
- Good class. Like that instructor advised class they could check-in during break. This allowed class to start on time. I drive an hour to get to this class so if we run late it makes for a very long day for me.
- For elementary and middle grade students, it might be better to develop names that are easier to remember when it comes to identifying the common zooplankton, i.e. Cyclops, spiny water flea, fishhook water flea...

SESSION 7: Fish

24 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	42%	58%	-
Pace of the presentation	-	17%	50%	33%	-
Quality of the visuals used	-	-	33%	67%	-
Clarity of the written materials	-	8%	29%	63%	-
Effectiveness of the small groups	-	-	33%	67%	-

How would you rate the amount of material presented?

Not Enough (4%)

Just Right (83%)

Too Much (13%)

Are you a new volunteer or a veteran?

New (92%)

Veteran (8%)

Comments/Questions:

- Was a lot more information for this section than others – maybe move exotic species to another section like stewardship.

SESSION 8: Stewardship

26 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	4%	35%	61%	-
Pace of the presentation	-	12%	46%	42%	-
Quality of the visuals used	-	4%	38%	58%	-
Clarity of the written materials	-	-	31%	69%	-
Effectiveness of the small groups	-	-	-	-	100%

How would you rate the amount of material presented?

Not Enough (4%)

Just Right (92%)

Too Much (4%)

Are you a new volunteer or a veteran?

New (88%)

Veteran (12%)

Comments/Questions:

- Activity after break seemed like repeat of earlier discussion and presentation.
- Open discussion (even opinionated) was very good.
- Like engagement with multiple choice questions on water.
- The extra conversation in the back is sometimes very distracting and sometimes means missing what others say/contribute.

SESSION 9: Seamanship

16 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	37%	63%	-
Pace of the presentation	-	-	56%	44%	-
Quality of the visuals used	-	-	44%	56%	-
Clarity of the written materials	-	-	37%	63%	-
Effectiveness of the small groups	-	7%	37%	56%	-

How would you rate the amount of material presented?

Not Enough (12%)

Just Right (88%)

Too Much (0)

Are you a new volunteer or a veteran?

New (94%)

Veteran (6%)

SESSION 10: Safety

10 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	10%	90%	-
Pace of the presentation	-	-	20%	80%	-
Quality of the visuals used	-	-	10%	90%	-
Clarity of the written materials	-	-	10%	90%	-
Effectiveness of the small groups	-	-	-	-	100%

How would you rate the amount of material presented?

Not Enough (0%)

Just Right (100%)

Too Much (0)

Are you a new volunteer or a veteran?

New (70%)

Veteran (30%)

Comments/Questions:

- I appreciate the teaching crew thinking weather! Thank you.

SESSION 11: Sediment & Benthos

14 responses

How would you rate the following?

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	14%	86%	-
Pace of the presentation	-	-	14%	86%	-
Quality of the visuals used	-	-	7%	93%	-
Clarity of the written materials	-	-	21%	79%	-
Effectiveness of the small groups	-	7%	22%	71%	-

How would you rate the amount of material presented?

Not Enough (0%)

Just Right (100%)

Too Much (0%)

Are you a new volunteer or a veteran?

New (71%)

Veteran (29%)

Comments/Questions:

- Lots of material here.
- At times both small group instructors were talking at the same time. Suggested to stay on track.

B. VOLUNTEER INSTRUCTOR YEAR-END SURVEY

ORGANIZATION'S PERFORMANCE

Please rate the following aspects of ISEA's performance:

1. The information provided about what is expected of you as a volunteer (32 responses).

Poor (0%) Fair (3%) Good (44%) Great (53%)

Comments:

- Are in the book if people can read them
- Excellent training. Felt like grad school again!
- Good training and excellent ship work.
- Better lately. Have been known to muddle a few things!
- The classes are valuable but actually on-ship experiences are invaluable. The classes we will teach require prior experience on ISEA ships.
- The "old instructor" update sessions are good in the spring.
- Sometimes I feel a little confused but that is probably just me

2. The information provided about what volunteers can expect from ISEA (33 responses).

Poor (0%) Fair (3%) Good (67%) Great (30%)

Comments:

- Accurate schedule? Prompt notification of cancellations—no one called me on ours this year
- Great written manual
- Very good
- Should be stated clearly, perhaps. At lease provided for each station. What is expected of the instructor.
- A little overpromising sometimes on follow up, but generally good.

3. The amount of practical training you have received (31 responses).

Poor (0%) Fair (3%) Good (42%) Great (55%)

Comments:

- The method to have new instructors observe on their first sail was very beneficial.
- Observation and the manual fill in when lack of training happens. I felt prepared to do the sessions.
- Not sure much needs to be changed, as the best training is on-the-job. Shadowing program seems slightly more organized this year, which should help new volunteers become comfortable.
- Good opportunities to be trained
- Keeps me informed on new classes
- Good preparation and ship work.
- Was nice for experienced to help un-experienced when first started.
- The years always increase knowledge and experience.
- N/A years and years
- More might be nice, but not essential.

4. The content of the practical training you have received (31 responses).

Poor (0%)

Fair (0%)

Good (55%)

Great (45%)

Comments:

- Doing observation was the best way to learn.
- The content in the manual is good and informative.
- Training manual and course were a good starting point. Then it's just additional info from articles, seminars, etc. in areas or teachers.
- Each year new information is added and it is sometimes hard to collect it into existing information.
- Very good
- I think we all need to better know the boat's electrical switches where things are kept. Especially newbies- so they can help in putting things away.
- The more I do, the better I feel I do with the student.
- Stewardship station needs curriculum attention.
- N/A years and years

5. The support provided by ISEA during your volunteer experience. (32 responses)

Poor (0%)

Fair (0%)

Good (41%)

Great (59%)

Comments:

- Much improved over past years. Goal to have 1 contact at ISEA – and have all info and equipment go through me (Dr. Bill) to Manitou.
- Seasoned people were very helpful.
- Very good.
- Emily- great; Others- good.
- Questions always answered and help when needed.
- It helps a lot to be “experienced” for first-timers, it can be a little intimidating, unless people are not shy about asking.
- OK

6. Your impression of the overall organization of Schoolship Programs this year (32 responses).

Poor (0%)

Fair (0%)

Good (44%)

Great (56%)

Comments:

- (Dr. Bill) Lots cured through the years, but biggest screw-ups remain: (1) notification on early morning cancellations—call me direct at breakfast 7 am—so crew is not standing around until word comes from our office. (2) Last minute instructor fill-ins—but with me anyways onboard Manitou—I just stay in (emailing at 5 pm not too effective) (3) One school putting extra slots on ebay to be bought by home schoolers—disaster. (4) Split classes on 1 bus. ISEA should find out if it is a split bus and schedule early drop off at your ed center (or you sail early or something) (people think we can just start early or cut program—or mind read their arrival.) (We can't watch/babysit kids, or even some instructors, at 7:45 am or if they are on the dock when we land morning group—and kids get crazy if they have to wait to get on—and we can't leave if we have our couple chronically late instructors.) But neither the instructors nor I will knock 95 minutes out

of a program because bus schedule is messed up. We'll keep sailing and make the bus driver, parents, etc. mad at you. So—get this all set up ahead of time!!

- Wonderful.
- The programs are well-tuned.
- There is a lot going on with this program and from a volunteer perspective, it runs well.
- Teaching equipment needs to be maintained at least weekly. Things disappear and force you to scramble at times. Maybe an inventory list in each box or education director's book.
- Well-run program
- Seemed to go really well. Lots of smiles.
- Always professional or friendly.
- Excellent
- It seemed to go well. Let's not go to "Bay Harbor" again!
- I would like to see a bit more continuity between lead instructors. Some will cover certain points and others do not.
- It took a few trips with changes in staff to make everything work to the benefit of all.
- In light of all the problems, things went quite smoothly (from my point of view).

7. Your interactions with ISEA's Education Director (33 responses).

Poor (0%) Fair (3%) Good (24%) Great (73%)

Comments:

- Last couple years were great with Christine.
- New coordinator great—previous coordinator great.
- Do you mean Emily? If so—GREAT!
- Friendly, helpful
- We'll miss Christine!
- Christine was terrific, but I was very happy to hear that Emily would be taking over the position. She's doing a fine job and is fun to work with.
- Yea Emily!
- So far there has not been very much, but what there was, was good.
- Not much interaction...

8. Your interactions with ISEA's sailing crew (34 responses).

Poor (0%) Fair (0%) Good (24%) Great (76%)

Comments:

- Captain is always helpful
- They are a fun bunch.
- They are terrific and ready to give help.
- I especially enjoy working on the Inland Seas.
- Argh
- Everyone was very helpful.

9. Your interactions with lead instructors (32 responses).

Poor (0%) Fair (3%) Good (28%) Great (69%)

Comments:

- We're all cool on Manitou and Wayne gets us duplicates of stuff we don't really need.
- Lead instructors were very informative and fully understood the concerns of new volunteers.
- Some-not at all most- excellent
- Some leads lose control of spirited groups. Maybe define more support from the group teachers and parents.
- A few need to watch their timing better.
- Set goals—provide assistance
- There may be one or two that should retire but all are very dedicated!
- Always feel some are better than others it would be helpful if leads tell instructors how they can be helpful during large group sampling.
- I am impressed with the quality of lead instructors.

10. Your interactions with other volunteers (33 responses).

Poor (0%) Fair (3%) Good (36%) Great (61%)

Comments:

- We have a very short terminal black list on Manitou. Sally usually keeps them away from Capt. Dave (no incompetence at Seamanship please). I have to be rough on the observing people but last couple years we have had a much better group—well-studied and ready to jump in and do well.
- They are a great group of people. I only wish I could interact more.
- Great people!
- Very little interactions, really- we show up and do our session.
- Really enjoyed the end of season cookout. Great idea! Wish the recognition dinner was when we are still here. Others also must miss because it is in winter.
- Do newbies ever put anything away?
- Amiable.
- Always pleasant people to work with.

VOLUNTEER EXPERIENCE

Please rate the following aspects of your volunteer experience:

1. As a result of my volunteer experience, I understand more about ISEA's work of "Protecting the Great Lakes Through Education." (31 responses)

Disagree (0%) Agree Some (0%) Agree (19%) Agree Greatly (81%)

Comments:

- Absolutely!
- You woke me up to a great many things.

2. I am enjoying my volunteer experience. (33 responses)

Disagree (0%) Agree Some (3%) Agree (27%) Agree Greatly (70%)

Comments:

- Very much.
- Wish I had time to do more
- What a great bunch.
- Love being with the students.
- Super!

3. I am making a worthwhile contribution to the Schoolship Program's goals. (32 responses)

Disagree (0%) Agree Some (6%) Agree (63%) Agree Greatly (31%)

Comments:

- Since I come from a distance, I don't get to volunteer as often as I would like.
- Wish I could be more available- both to sign up for more sails and also to be able to help out when instructors are needed at the last minute.
- With more experience I will present better.
- I hope you feel so as well.
- Hope so!
- I feel I stress taking care of our water whenever we feel it's important to each to recycle.
- When I had to cut back all my volunteer activity, this is the one thing I kept doing.

4. My motivations for volunteering are being satisfied (33 responses).

Disagree (0%) Agree Some (3%) Agree (42%) Agree Greatly (55%)

Comments:

- To take kids on the boat
- Who doesn't like sailing on a beautiful sunny, warm day??
- I taught for years and enjoyed the interactions.

5. My contributions are recognized by ISEA. (33 responses)

Disagree (0%) Agree Some (6%) Agree (45%) Agree Greatly (48%)

Comments:

- I can't go to the social events because of distance, so I don't interact as much as I would like.
- Thanks are always given
- I believe so.

6. I have received opportunities to give feedback about my volunteer experience. (33 responses)

Disagree (0%) Agree Some (6%) Agree (39%) Agree Greatly (55%)

Comments:

- Aside from this survey, the staff of the ISEA creates an atmosphere where volunteers feel comfortable with providing feedback
- often

7. I have received opportunities to give feedback about suggested improvements to the Schoolship Program. (32 responses)

Disagree (3%) Agree Some (6%) Agree (44%) Agree Greatly (47%)

Comments:

- Not aware that any improvements have been vetted among volunteers.

- Wish navigation would be reinstated. Very important and interesting stewardship should be included in every subject.
- Generally after noticing an improvement is needed when something goes wrong
- I know I can do it at any time.
- This is really the first one and I don't feel qualified to suggest improvements at this time.

OVERALL EXPERIENCE

Is there anything we can do to help make your volunteer experience better?

Example Comments:

- Very good for 20 years!
- Fuzzy on what's up for stewardship next year—I heard some goofy ideas floating around—I can tell you what I don't want—the stuff about leaving toilets, recycling pop bottles, don't dump oil down drains—(nothing to do with boat!) My suggestion still is (1) quick watershed and St. Lawrence review. (2) quick history of invasive species—lamprey, salmon, mussels. (3) our data since '89 on charts- secchi, fish plus new plankton and benthos—changes, balance in trophic levels, biomass movements, possibilities for future—good or bad? I had instructors observe me on Manitou doing this last year and all thought it was the best option. When I'm lead I do part on dock prior to boarding—watershed and global fresh water during trawl. (sorry it doesn't take 10 min to teach kids to have a life.) so what's up with it?
- Overall, it's a terrific experience and I wish that I could participate more often. The only recommendations I can make involve the equipment. Things tend to deteriorate (e.g. diagrams become water smeared, plastic tends to break, magnifying glasses become scratched, etc.) over the course of the summer.
- The program is well thought out. All of the staff is knowledgeable, helpful and enjoyable to be with.
- Replace materials at fish station such as eel and fish as they are past their prime.

Example Additional Comments:

- Been a very good experience.
- Very rewarding to volunteer my time.
- Just very glad that the opportunity exists to volunteer with the Inland Seas.
- My contributions recognized? ISEA gave me "volunteer instructor of the year" a couple years ago. That swelled my head. Feedback? I use your email addresses frequently, as you'll discover eventually. Motivations satisfied? I trained first in winter 1994-5, serving first in spring 1995, so I think I'm up to 17 seasons so far. Something must be right!
- Congratulations to all the staff and volunteers who worked together to make this year an outstanding educational experience for many students!
- I think it was better when the fish station didn't have a weather group. If you want the fish teacher not to be the one having a break first, then just have the students who did the weather station with the stewardship teacher start the rotations with the fish instructor. That way you get what you need (the stewardship station to have the first "break") and the fish instructor will still have time to his/her own count and set-up.
- This year was the first time I sensed some weakness among lead instructors. Sounded a little 'tired' at times.

VI. 2012 ACTION PLAN

This evaluation process provides ISEA personnel with insight into the strengths and weaknesses of the education programs. Weaknesses are identified in terms of objectives not met and are addressed by implementing necessary changes to the Volunteer Instructor Manual, the Volunteer Instructor Training Program, shipboard program materials, shipboard instruction, and evaluation materials.

Stewardship Station.

In 2008, the Stewardship Station was introduced into the Schoolship Program. This learning station has been received well by teachers, students, and volunteer instructors and will continue to be a part of the Schoolship Program. ISEA strives to enhance this station each year to make it more hands-on and interactive for all age levels.

In 2011, the Stewardship Station incorporated a memory game that included stewardship options (ex: turning off the water while brushing your teeth) connected with an outcome that preserves or protects freshwater (ex: turning off the tap will save an average of 500 gallons of water a day). This activity was designed to involve the students in stewardship discussions and continue to encourage them to practice stewardship in their own community. However, this approach was unsuccessful as most volunteers stated that they rarely utilized this game. Therefore the 2012 Schoolship Program will not include the memory game. In 2012 we will be incorporating a rope demonstration, which is designed to teach the students about water resources and the percent of total water on Earth available as clean freshwater. We will also re-incorporate the foam core food web into this station. This activity will give the students an opportunity to draw the food web of the Great Lakes. This will help them learn the different food web levels in the Great Lakes and the ecological importance of each level.

Evaluation Instruments.

Schoolship Program evaluations have proven more effective since implementing evaluations based on student reading levels and subject matter complexity for elementary, middle, and high school levels. These evaluations are continually updated to reflect any changes in information taught during each learning station. During the fall 2011 Schoolship Programs, the evaluations were switched to an internet-based instrument run by Survey Monkey. The evaluation questions are the same but this change reduced the amount of paper used and hopefully will increase the response rate above the historical of average of 40%. The evaluation materials are used by teachers as a way to reinforce concepts learned aboard the Schoolship and to validate the importance of what was learned outside the classroom.

In 2012, evaluation materials will again be distributed electronically to all teachers and students participating in the Schoolship Program. In 2011 the three levels of student evaluations (Levels A, B, and C) were updated to better reflect the comprehension levels of students in each grade, and to better align with Michigan Grade Level and High School Content Expectations. In 2011, Level A student evaluations were given to students in grades 4 and 5, Level B to students in grades 6-8, and Level C to students in grades 9-12. These same categories will be used again in 2012. Finally, as the Michigan state curriculum Science standards will be changing, the Education Director and the Education and Volunteer Coordinator will host a 'Teacher Roundtable' where teachers who have been with ISEA for multiple years will be invited to

discuss how ISEA can update its programs to better reflect the needs of the new state curriculum.

An analysis of performance on each question of the Schoolship Program’s student evaluations was completed to identify areas of difficulty for students in different grade levels. Of particular concern are questions that less than 70% of the students answered correctly. There was one question on the Level A student evaluation and four questions on the Level B evaluation that less than 70% of the students answered correctly (all Level C questions were answered correctly by at least 70% of the students). The major areas of concern were identifying benthos as organisms that live on or near the bottom of the lake, labeling phytoplankton/zooplankton/ benthos on a food web, and recognizing that shallow water has enough sunlight for rooted plants to grow. These areas of concern were addressed when updating the student evaluations, and will be emphasized to all volunteers during the 2012 volunteer instructor training. ISEA staff and volunteers will work to clarify these concepts through their teaching aboard the Schoolship in 2012.

In addition to these specific modifications, efforts will be made to improve the quality of instruction and effectiveness of the evaluation tools for all of ISEA’s education programs. ISEA’s evaluation studies give staff and volunteer instructors important pieces of information used to increase the efficiency of instruction and to provide the most educational and memorable experience possible. ISEA is dedicated to continue this process of revisions and improvements in years to come.

2012 Education Program Action Plan Logic Model

Activity	Outcomes	
	Short-term	Long-term
Rope demonstration at the Stewardship Station	Students learn the importance of preserving our scarce clean freshwater resources using this technique.	This activity will help students remember important facts about our freshwater resources and as a simple model that other educators can use in their classrooms for further use.
Teacher roundtable discussions	Provide ISEA with valuable information so that we will be able to modify our programs to fit within the new MI science curriculum	To ensure that schools view the Schoolship experience as relevant to their overall science curriculum
Online student Schoolship evaluations	This will allow the Education Director to streamline the yearly Evaluation Report and give timely reports on how students are learn the Schoolship curriculum.	Improve evaluation response above 40% to improve accuracy. Reduce the amount of paper ISEA uses.

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