

## ACKNOWLEDGEMENTS

---

The following staff contributed to this report:

**Timothy Davis** – Education Director and Chief Scientist

**Emily Shaw** – Education & Volunteer Coordinator

**Tom Kelly** – Executive Director

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 94,000 students have participated in ISEA programs.

Inland Seas Education Association  
100 Dame Street, P.O. Box 218  
Suttons Bay, MI 49682  
Phone: (231) 271-3077  
Fax: (231) 271-3088  
E-mail: [tkelly@schoolship.org](mailto:tkelly@schoolship.org)  
Website: [www.schoolship.org](http://www.schoolship.org)

Copyright 2012© by the Inland Seas Education Association. Permission is granted to use this material for educational purposes with appropriate credit given to ISEA.

---

---

**INLAND SEAS EDUCATION ASSOCIATION  
2012 EVALUATION REPORT**

---

---

**TABLE OF CONTENTS**

<b>I. EXECUTIVE SUMMARY.....</b>	<b>2</b>
<b>II. GREAT LAKES SCHOOLSHIP PROGRAMS</b>	
A. Teacher Evaluations.....	10
B. Student Evaluations- Level A (grades 4-6).....	13
C. Student Evaluations- Level B (grades 7-8).....	15
D. Student Evaluations- Level C (grades 9-12).....	20
<b>III. GREAT LAKES RESEARCH PROGRAMS</b>	
A. Young Women in Science.....	26
<b>IV. SPECIALTY PROGRAMS</b>	
A. Invasive Species Field Course	
i. Pre-/Post- Program Evaluation.....	30
ii. Program Evaluation.....	37
<b>V. ISEA VOLUNTEER INSTRUCTORS</b>	
A. Volunteer Instructor Training.....	44
B. Volunteer Instructor Year-End Survey.....	55
<b>VI. 2013 ACTION PLAN.....</b>	<b>60</b>

## **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 2012 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 2012**

During 2012, ISEA increased its shipboard experiential science learning opportunities by roughly 1%. In total, 4,175 people participated in 160 education programs, raising the total number of shipboard participants in ISEA's Schoolship Program to **94,609**.

In addition to the participants of shipboard education programs, 889 members of the public participated in shore-side educational tours of the schooner *Inland Seas* (in Frankfort, Charlevoix, Sault Ste. Marie, Escanaba, Suttons Bay, Traverse City, Petoskey and the Classic Boat Show), and 259 people attended one of our Great Lakes Seminars in 2012.

The following table is a summary of the participation in ISEA's shipboard education programs in 2012.

## Participation in ISEA's Shipboard Education Programs in 2012

Types of ISEA Programs	Number of Programs	Number of Participants
<b>Great Lakes Schoolship Programs</b>		
Great Lakes Schoolship Program – Spring	95	2,547
Great Lakes Schoolship Program – Summer* <sup>α</sup>	15	350
Great Lakes Schoolship Program – Fall	24	577
Family Ecology Sail*	10	214
Making The Great Lakes Great*	10	260
<b>Great Lakes Research Programs</b>		
Young Women in Science	4	36
Young Men in Science <sup>Y</sup>	1	10
Lake Superior State University – Oceanography*	1	7
<b>Professional Development Workshops</b>		
Invasive Species Field Course <sup>β</sup>	1	43
Advanced Invasive Species Field Course	1	10
<b>Great Lakes Specialty Programs</b>		
Gull Island Cruise*	1	19
Maritime History Cruise	1	22
Astronomy Under Sail*	3	63
Friends of Betsie Bay*	1	17
<b>TOTAL</b>	<b>168</b>	<b>4,175</b>

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

† Includes Making the Great Lakes Great Programs

α: Programs include, but are not limited to Special Olympics, Sailabration, Delta Force, ASD Family Sail, Child & Family Services,

β: A total of 19 participants but with two separate trips we educated 20 and 23 people respectively totaling 43 individuals educated through this course on various aspects of invasive species

Y: Only three evaluations were completed therefore in-depth evaluations were not possible

### SUMMARY OF PROGRAMS EVALUATED IN 2012

#### **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 119 Schoolship programs were offered in 2012 (spring and fall), a 7% increase from 2011, and included 70 schools from 30 counties in Michigan, Ohio and Indiana. There were 31 schools that brought multiple classes and 35 schools (50%) returned from 2011.

Evaluation forms were distributed to all teachers and students participating in spring and fall Schoolship Programs in 2012. 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 119 Schoolship programs offered during spring and fall 2012, there were 30 level A, 38 level B, and 26 level C programs. The remaining 25 classes had a combination of grade levels or the grade level was not known.

### **Teacher Evaluations**

Following each Schoolship Program, teachers or group leaders were given a post-trip packet including a teacher evaluation. Evaluations were provided to 118 classes in spring and fall 2012, from which 42 teachers responded resulting in a 36% return rate. Half of these teachers were participating for the first time, 14 teachers had participated for 2-5 years, and 7 teachers had participated for more than 6 years. Similar to past years, a majority (> 97%) of the teachers felt the content level was appropriate for the program. 93% reported an increase in the interest of their students in studying science and 95% reported an increased student concern for the Great Lakes ecosystem after their Schoolship experience.

### **Student Evaluations**

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. The online evaluation system was implemented for the entire 2012 season. While this new evaluation system did not yield an increased percent response from participating schools it reduced the workload for ISEA staff in compiling this report.

The following is a comparison of the average scores students received on their evaluations from 2004-2012.

**Average Student Evaluation Scores from 2004-2012**

	Average Score									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	Mean
<b>Level A (grades 4-6, '03 – '10; 4-5, '11 – '12)</b>	88%	88%	86%	91%	86%	90%	79%	81%	75%	85%
<b>Level B (grades 7-9, '03 – '10; 6-8, '11 – '12)</b>	83%	85%	86%	81%	84%	86%	84%	79%	75%	83%
<b>Level C (grades 10-12, '03 – '10; 9 -12, '11 – '12)</b>	86%	92%	82%	81%	83%	87%	88%	86%	76%	85%

Of the responses returned from the 2012 Spring and Fall Schoolship participants, the average scores on each exam level were 4 – 10% lower than in 2011. Also, in 2011 we rearranged the evaluation criteria for grade levels (see above table). Therefore from 2003 to 2010 the average score on Levels A, B and C were 87%, 85% and 86%, respectively. For 2011 to 2012 the scores for the three levels were 78%, 77% and 81% for A, B and C, respectively. Scores are between 5

– 9% lower on average from 2011 and 2012 then from 2003-2010. Although many explanations can be put forward to potentially explain this decrease, more data is needed to make more accurate conclusion. 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 13, Figure 2 on page 18, and Figure 3 on page 24).

Students who were given the Level A evaluation scored below average on 50% of the questions asked. They struggled with the concepts of pH, stewardship, benthos, water clarity and dissolved oxygen (see Figure 1). Similar to 2011, students completing the level B evaluation often incorrectly labeled which organisms represent phytoplankton (43% correct), zooplankton (48% correct), and benthos (46% correct), and had difficulty recognizing that shallow water has enough sunlight for rooted plants to grow (51% correct; see Figure 2). Similar to the Level B evaluation, students who took the Level C evaluation frequently mislabeled phytoplankton (60% correct), zooplankton (52% correct), and benthos (56% correct), and had difficulty recognizing that shallow water has enough sunlight for rooted plants to grow (60% correct; See Figure 3). This analysis describes key areas of difficulty that are addressed in the 2013 Action Plan (see pages 49-51).

## **GREAT LAKES RESEARCH PROGRAMS**

### ***Young People in Science***

Thirty-six high school women participated in four Young Women in Science Programs in Grand Traverse Bay and Little Bay de Noc during June, July and August 2012. 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 2.74 out of 5 (55% understood the content); after the program the average score was 4.46 (89% understood to content). Ninety three percent (93%) 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 but would like us to offer a more extensive project list than just the two project currently offered (i.e. dreissenid mussels and round goby projects).

Ten young men participated in one Young Men In Science program in August. Unfortunately only three participants returned evaluation forms therefore drawing any solid conclusions based on such limited feedback is not possible. However, of the three young men who did respond all found the trip enjoyable but expressed that they would like to have had an extra time (a day to a week) to complete their projects and learn more about the ship.

## **SPECIALTY PROGRAMS**

### ***Invasive Species Field Course***

Nineteen teachers and environmental professionals from around the Great lakes region (Illinois, Ohio, Michigan, Minnesota) and 8 faculty members participated in ISEA's 10<sup>th</sup> Annual Invasive Species Field Course in June 2012. 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 51%; the post-program average was 75% (a statistically significant improvement;  $p < 0.001$ ). The largest individual improvement between pre- and post-program evaluations was a difference of 48% (pre-program score was 10%; post-program score was 58%). 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.

### ***Advanced Invasive Species Field Course***

For the first time since 2008, ISEA was able to expand on our educational offerings through an Advanced Invasive Species Field Course. This course was offered to educators that had either participated in our annual field course or demonstrated some prior knowledge of AIS. This five day, four night live-aboard course gave teachers the opportunity to sail from Sault Ste. Marie to Petoskey, MI onboard the schooner *Inland Seas*. During the trip they conducted research, discussed important AIS scientific research articles and assisted the crew in sailing the vessel. In addition to the learning and sailing, they were able to visit some of Lake Michigan's hidden treasures including Lime Island and St. Helena Island.

Ten educators from three different states (Michigan, Illinois, Ohio) participated in this advanced field course. Although no pre/post-evaluation was given, the participants were asked to rate the communications prior to the course, the organization and content of classroom and shipboard activities, and the quality of written materials. 96% of all participants rated the quality of each of these categories as "good" or "great."

### **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 203 volunteers that taught aboard the Schoolship or in the Education Center during 2012. Of the 65 volunteers that responded (32% response rate), 90% 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-two percent (92%) of the responding volunteers agreed that their experience was enjoyable and worthwhile, and that ISEA had provided opportunities for their feedback.

In 2012, 242 volunteers contributed a total of 12,031.79<sup>1</sup> hours to the operation of ISEA. The average number of hours per volunteer was 49.72. 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](http://www.independentsector.org/volunteer_time)), volunteers provided ISEA with time and services worth approximately \$262,172.70<sup>2</sup>. 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.

---

<sup>1</sup> This number is based on the available volunteer timesheets as of January 29, 2013. This number is subject to change and will be shared if that happens.

<sup>2</sup> This value is based on the 2011 value of volunteer time because the 2012 value was not yet available as of January 29, 2013. When that value becomes available, applicable changes will be made.

## **2013 ACTION PLAN**

IN 2012, the Stewardship station incorporated the rope demonstration designed to teach students about water resources and the percent of total water on Earth that is available as freshwater. We also re-incorporated the use of the foam-core food web tool into this station. These adjustments will continue into 2013.

During the Fall 2011 Schoolship Programs, we switched to an internet based survey instrument run by Survey Monkey. In 2013, evaluation materials will again be distributed to all teachers and students participating in the Schoolship Program and will continue to be done electronically. Although we did not see the anticipated increase in responses, we expect that with the timely distribution of evaluations as well as a follow up reminder we will be able to increase the response rate.

In 2013 the structure of the volunteer instructor training was modified from a once a week 2-hour session to a once a week 3-hour session. This adjustment was made to accommodate two topics per session instead of just one topic. While the slightly longer session is helpful, cuts to the lecture portion of the training had to be made in order to maintain the length of the hands-on component, which many veteran and new instructors find to be the most helpful aspect of the training. We plan to compensate for the decreased lecture time by relying on the new instructors excitement and commitment to becoming a well-educated instructor. Additional supplementary resources will continue to be provided on an on-going basis throughout the year.

In addition to the modified length we have also added an additional session for each topic. Classes take place Saturday morning and are repeated Wednesday evenings. This structure makes us more flexible, and also allows us to engage with people who are still working, or are unavailable weekday evenings.

For student evaluations, of particular concern are questions that less than 70% of the students answered correctly. There were four questions on the Level A student evaluation, seven questions on the Level B evaluation and seven questions on the Level C evaluation that less than 70% of the students answered correctly. The major areas of concern for Level A students were with regard to the water chemistry concepts of pH and the importance of dissolved oxygen as well as being able to distinguish where benthic organisms live. For Level B and C students, the labeling of phytoplankton/zooplankton/benthos on a food web and understanding the differences between shallow water habitat (trawl sample) and deep water habitat (dredge sample) were the largest concerns. These areas of concern will be expressed to the Schoolship instructors and the ISEA staff and volunteers will work to clarify these concepts through their teaching aboard the Schoolship in 2013.

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](http://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 5<sup>th</sup> 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 4-5)

---

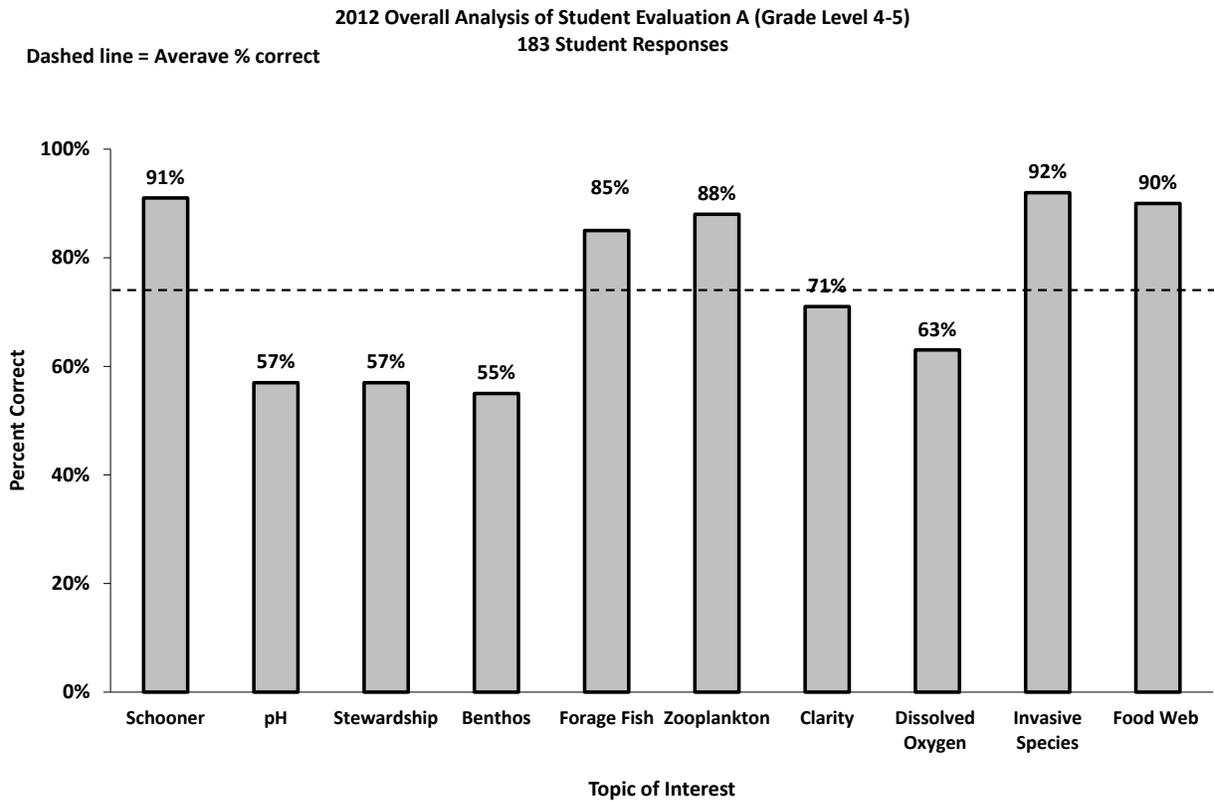
### 183 Student Responses

**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
Invasive species	zooplankton	pH	schooner
stewardship	dissolved oxygen		

1. The Schoolship is a special type of sailing ship called a schooner, which has at least two masts. (91%)
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. (57%)
3. The responsibility to protect and preserve the Great Lakes is called stewardship, something that can be practiced everyday at your house or school. (57%)
4. Benthos are organisms that live on or near the bottom of the lake. (55%)
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. (85%)
6. Zooplankton are microscopic animals that float freely in the water and are a very important part of the food web since they eat phytoplankton and are fed on by forage fish. (88%)
7. The black and white Secchi disk is used to measure the clarity of the water. (71%)
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. (63%)
9. Some Invasive 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. (92%)
10. The feeding relationships between organisms is best described as a food web, which uses arrows to show what each organism eats. (90%)

**Figure 1: Summary of the Student Evaluation – Level A results. The dashed line represents the average score (75%).**



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

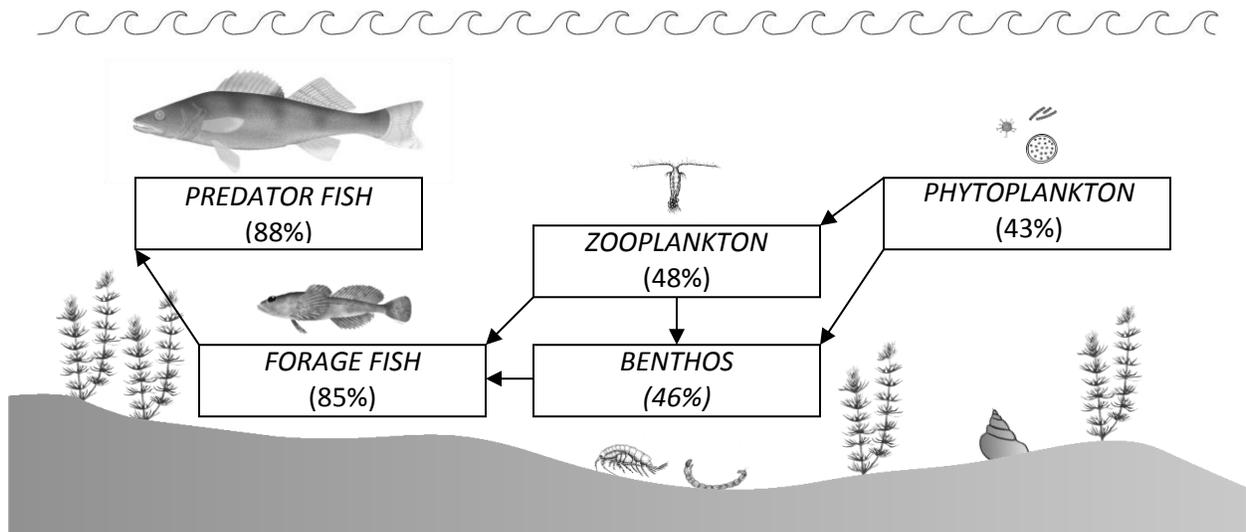
### 281 Student Responses

**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 (feed on smaller fish)	FORAGE FISH (feed on benthos or zooplankton)	



#### 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. (96%)
2. Even though the Schoolship is made of heavy steel, it floats. This is because of:  
(a) sail lift.  
(b) wave action.  
(c) buoyancy. (89%)

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. (67%)
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. (64%)
  - (c) buffer the pH of the water.
5. Twenty percent of the world's available fresh water is found in:
  - (a) the Great Lakes. (90%)
  - (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 (79%)
  - (c) clarity
7. Dissolved oxygen in the water comes from:
  - (a) phytoplankton, aquatic plants, and the atmosphere. (69%)
  - (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. (51%)
9. Benthos are an important part of the food web because they:
  - (a) are food for forage fish and recyclers of organic material. (76%)
  - (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 (87%)
  - (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> (89%) | 1. Term that best describes the feeding relationships between organisms.  | a. Secchi disk  |
| <u>f</u> (91%) | 2. Equipment used by scientists to collect samples of benthos, plankton, forage fish, and water.                | b. Food web   |
| <u>d</u> (73%) | 2. Plant plankton.  | c. Benthos  |
| <u>i</u> (86%) | 3. Threats to the fish population.  | d. Phytoplankton  |
| <u>c</u> (60%) | 4. Organisms that live on or near the bottom of the lake.   | e. Exotic species   |
| <u>i</u> (80%) | 5. Diagrams and descriptions used by scientists to identify benthos and fish.                                   | f. Ponar dredge, plankton net, otter trawl, and Van Dorn bottle       |
| <u>g</u> (72%) | 6. Animal plankton.   | g. Zooplankton  |
| <u>e</u> (84%) | 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> (81%) | 8. Equipment used to measure the clarity of the water.  | i. Dichotomous keys   |
| <u>h</u> (77%) | 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:***

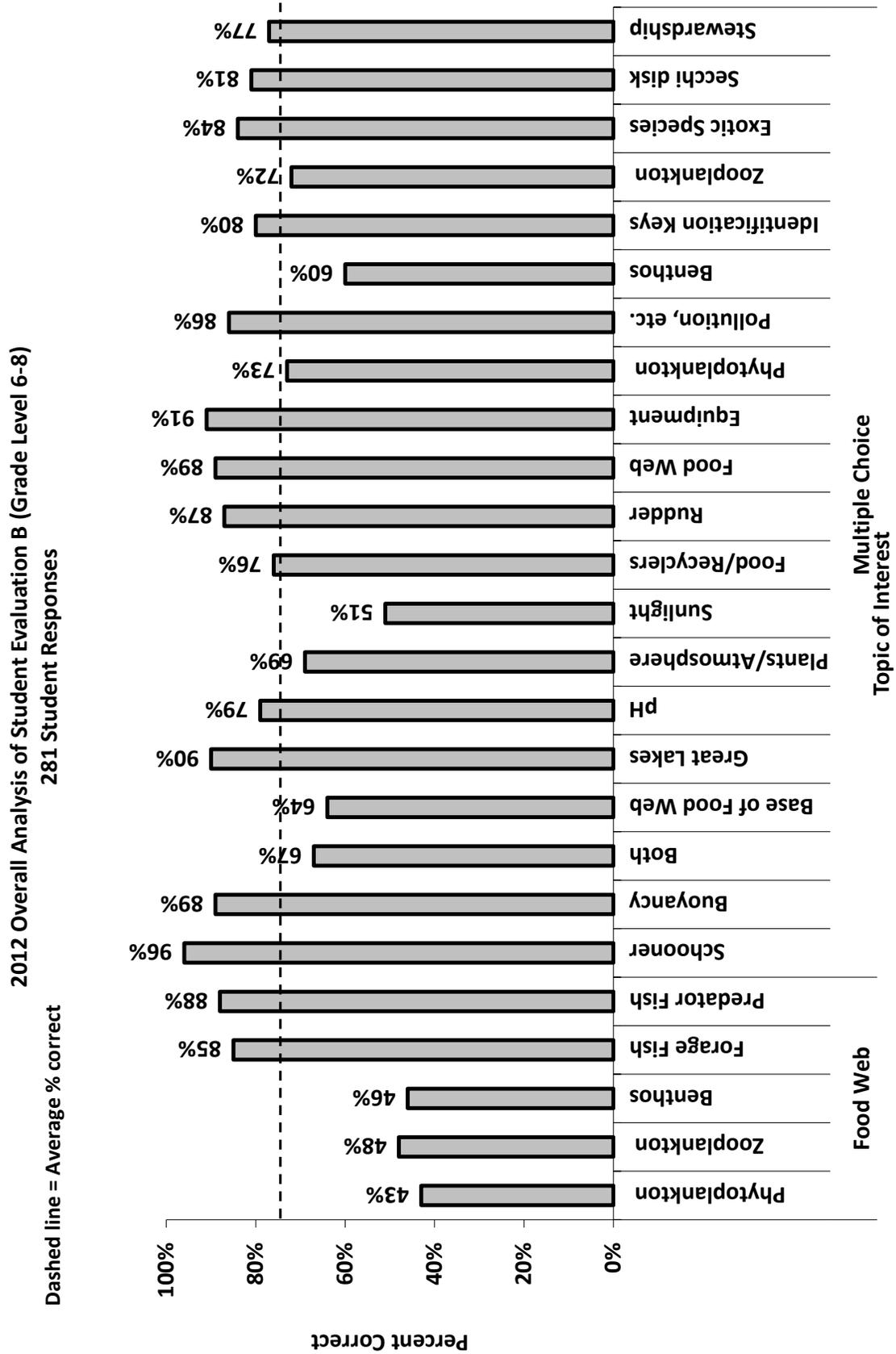
- Take shorter showers
- Don't keep the water running while you brush your teeth, don't litter in lakes and rivers, re-use water bottles from the store and fill the water bottle up when needed.
- Recycle, make compost piles, and use more reusable things like reusable water bottles instead of plastic water bottles.
- What I could do to become a better steward is to try and stop MORE Invasive Species from coming in, and to take care of it, such as picking up litter in the Lakes.
- I could take better care of the lakes by not taking my boat from one water to another without taking a hose one rinsing it off first.
- What I can do to help protect the Great Lakes is not litter, and help keep the invasive species out of our Great Lakes.
- Watch over the lakes by doing research and keeping up with the lakes' conditions and when I see something bad I should discuss it and see what i could do with a group of people.

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

***Example Comments:***

- It helped me to appreciate the fish, the water, and the fact that we have 20% of the earth's available fresh water
- Appreciate the people who dedicated their time to explain and help with all our questions. Also, who taught me a lot. I appreciate The Great Lakes more.
- The trip on the schoolship helped me to appreciate the balance of nature and that if we upset one thing it will most likely upset a lot more. It also help me appreciate the fish and other living things in our great lakes and how to keep the lakes clean and not pollute them.
- My Trip on the "Schoolship" helped me appreciate the beauty of the Great Lakes. It helped me appreciate the Fish and the Plant life in them.
- it helped me cause now i know there's more than 1 plankton.
- the plankton and how important they are
- that 20% of or fresh water comes from the great lakes and that we need to protect it
- It helped me appreciate the zooplankton, phytoplankton, and benthose organisms because they are the base of the food web and basically support the whole lake ecosystems in the great lakes.

Figure 2: Summary of the Student Evaluation – Level B results. The dashed line represents the average score (75%).



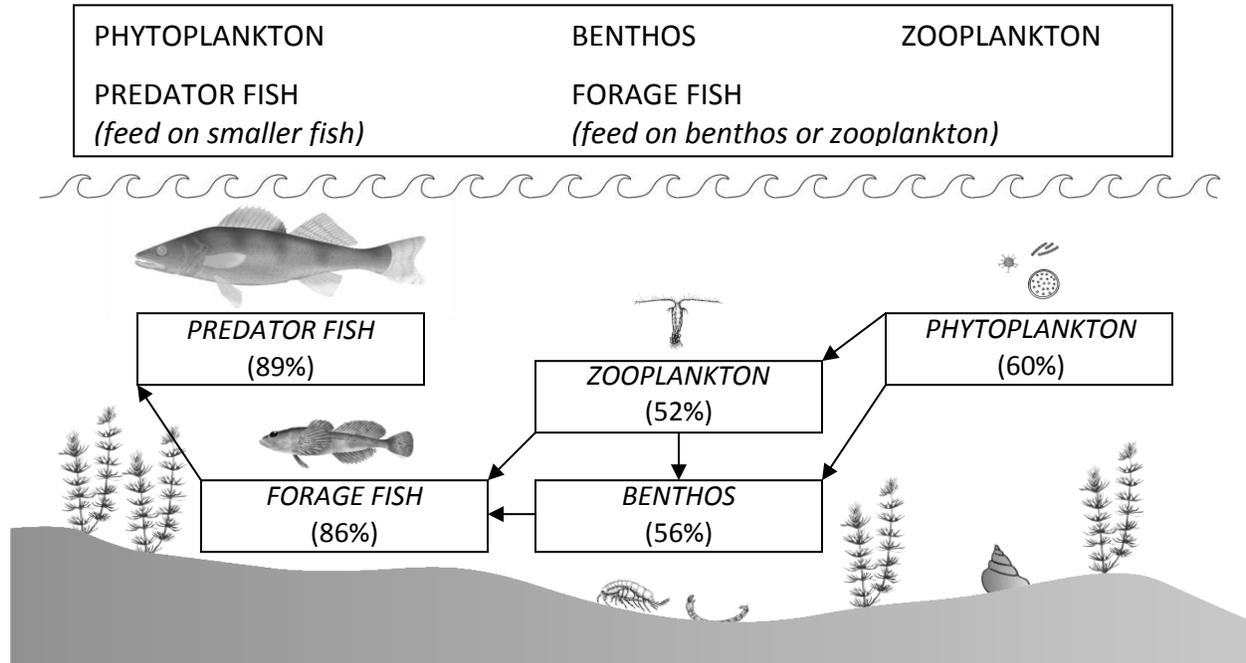
## D. STUDENT EVALUATIONS – LEVEL C (grades 9-12)

### 132 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. (77%)
  - 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 (86%)
  - 10-12
- What geological condition in the Great Lakes keeps our water within the healthy pH range?
  - sandy beaches

- (b) high moraines
  - (c) limestone bedrock (90%)
  - (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. (80%)
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. (60%)
  - (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 (89%)
  - (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. (74%)
  - (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 (65%)
9. Which of the following is NOT an exotic species in the Great Lakes Region?
- (a) round goby
  - (b) lake trout (67%)
  - (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. (85%)

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 (82%)
12. On the schooner, the wheel turns the \_\_\_\_\_, which turns the ship.  
 (a) sail  
 (b) spar  
 (c) rudder (83%)  
 (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. (82%)  
 (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. (77%)  
 (c) friendship.  
 (d) responsiveness.
15. The ability of a boat to float is called:  
 (a) buoyancy. (89%)  
 (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> (79%) | 1. Measures water clarity.                                  | a. Ponar dredge    |
| <u>d</u> (71%) | 2. Collects a water sample from deep in the lake.           | b. Secchi disk     |
| <u>e</u> (82%) | 3. Filters microscopic plants and animals out of the water. | c. Otter trawl     |
| <u>a</u> (64%) | 4. Collects sediment from the bottom of the lake.           | d. Van Dorn bottle |
| <u>c</u> (74%) | 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:*

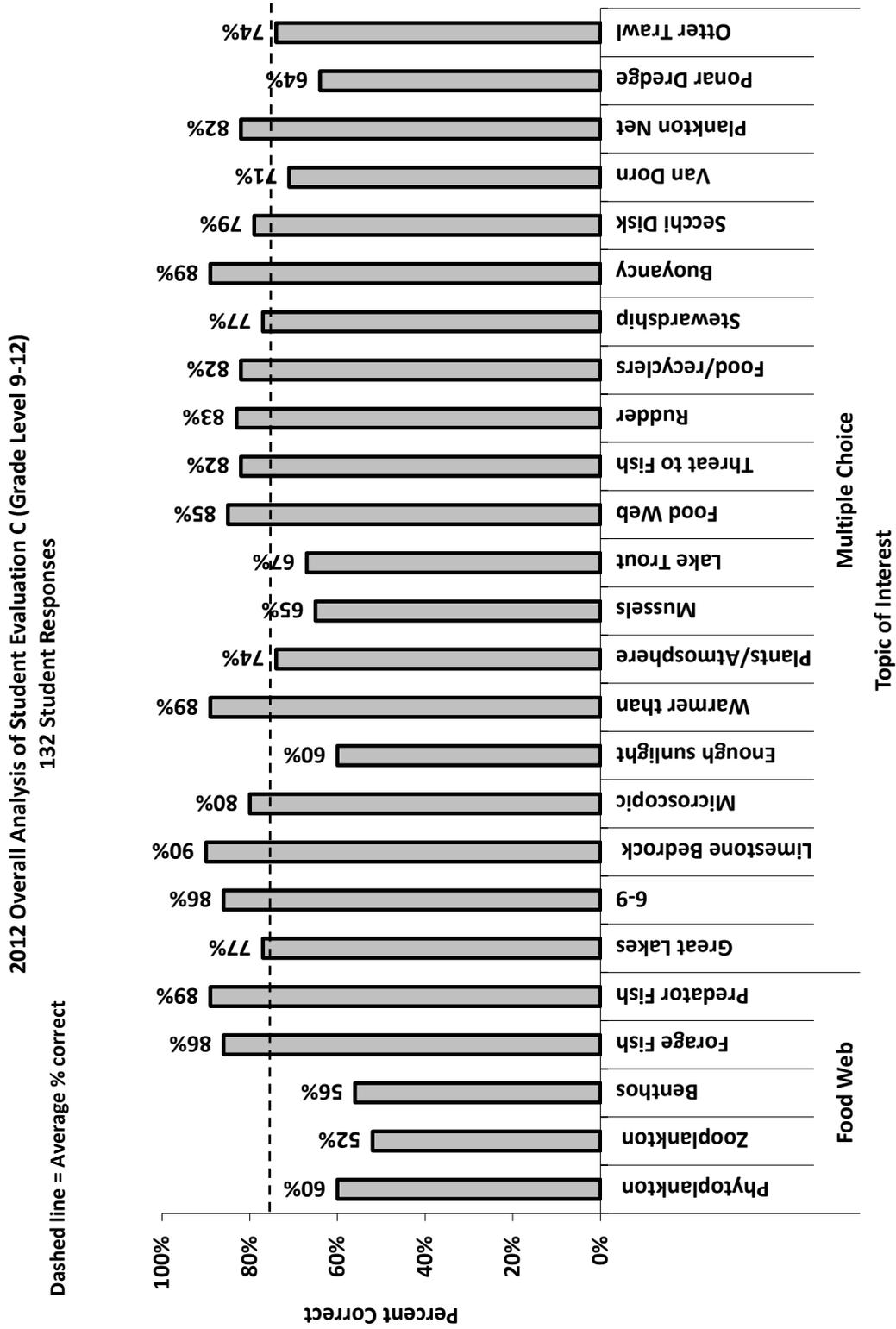
- I would say that overall the water quality in the Grand Traverse Bay is deteriorating over time, due in large part to exotic invasive species such as the zebra mussel and the round goby. When we did our depth test with the Secci disk, it was much clearer than it was around this time of year in the past, due to the clearing of the water by the zebra mussels.
- The water in the Great Lakes is quite clear. The ecosystem is in danger, as evidenced by the abundance of invasive species. Round goby and invasive plankton are incredibly commonplace.
- I would say that the water quality is good, as evidenced by a healthy dissolved oxygen content. The ecosystem is being threatened by invasive species, which have decreased the number of plankton. This decrease is visible in the clear water of the bay.
- The water is very clear, clearer than it has been in many years. This is good for Swimmers and tourist, but doesn't always mean good things for the ecosystem. The clearer water means it is not rich in plankton. The water is lacking plankton because of invasive species like quagga mussels eating them. Without the plankton, the other species are lacking the good nutrients they provide.

- 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:*

- I will do my best to educate my peers on the service we need to participate in in order to assure future generations of the availability of the largest fresh water resource in North America. I will tell my peers about the threats some exotic species pose to the overall water quality and total ecosystem of the Great Lakes, and I will impart to them the environmental impact of littering, especially in the Great Lakes.
- I will be conscious of how and where any waste I produce will be processed and disposed of, and attempt to educate my peers on the importance of stewardship for our generation.
- conserve, reuse, recycle
- When I'm older I want to become a scientist. After learning the Great Lakes needs all the support and understanding it can get, I would like to become a marine biologist and help preserve our great treasure.

**Figure 3: Summary of Student Evaluation- Level C results. The dashed line represents the average score (76%).**



### **III. GREAT LAKES RESEARCH PROGRAMS**



**Objective 3: To help design, complete, summarize, & present an independent research project. (30 responses)**

Score	Pre-program		Post-program	
	# Participants	% Participants	# Participants	% Participants
1	0	-	0	-
2	2	6%	1	3%
3	11	37%	3	10%
4	6	20%	11	37%
5	11	37%	15	50%

**Average:**

Pre-program = 3.87    Post-program = 4.33    Difference = 0.46\*

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

**Objective 4: To promote a sense of stewardship towards the Great Lakes watershed. (29 responses)**

Score	Pre-program		Post-program	
	# Participants	% Participants	# Participants	% Participants
1	3	10%	0	-
2	9	31%	0	-
3	10	35%	4	14%
4	4	14%	8	27%
5	3	10%	17	59%

**Average:**

Pre-program = 2.83    Post-program = 4.45    Difference = 1.62\*

\* 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		Somewhat		A Great Deal
	All				
	1	2	3	4	5
The Science Educator instructed in a clear & concise manner.	-	-	-	30%	70%
The instructors & crew answered questions completely & knowledgeably.	-	-	-	24%	76%
The program was exciting & held my interest.	-	3%	12%	21%	64%
The program materials were complete & useful.	-	-	6%	31%	63%

The program activities were organized & clearly defined.	-	-	6%	44%	50%
Participating in this program was a quality experience worth my time.	-	-	9%	25%	66%
This experience will help in considering future educational or occupational goals.	-	3%	12%	19%	66%
I will recommend this experience to others.	-	-	6%	19%	75%

---

### HOW CAN WE IMPROVE?

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

#### **Example Comments:**

- I had a great time and it helped me narrow down on my scientific career goals. The only change I would make would be to include more scientific water testing other than just a dissolved oxygen and pH test.
- It was such an amazing experience I don't know how it could be improved upon. Fantastic!
- The girls felt pretty tired on the second day. Maybe an earlier lights out or shorter presentation time and more above-cabin time would wake people up.
- Have a night talk or some designated time to discuss everyone's aspiration in future science endeavors so (the) girls can bounce ideas off one another.
- More constructive feedback on how to create a scientific presentation worthy of a professional conference.
- Maybe make the sessions a little longer. That way you don't have to rush everything.
- I loved being on the sailboat. I had never been on one before and now I want to go all the time. I have made some good friends and am really glad I came.
- Amazing experience! Learned a lot about the Great Lakes. Maybe a wider variety of research projects would be a good idea.

## **IV. SPECIALITY PROGRAMS**

## **A. INVASIVE SPECIES FIELD COURSE**

### **1. PRE/POST-PROGRAM EVALUATION**

#### ***19 Pre-program Participant Responses; 19 Post-program Participant Responses***

*Instructions: As part of the evaluation process for the 10<sup>th</sup> Annual Invasive Species Field Course, we would like you to complete the following content assessment at the beginning of the course. You will be asked to respond to the same set of questions at the end of the course. The information will help us determine the effects of the program on participant knowledge and understanding of course content.*

*Your feedback is important and appreciated, and your responses are strictly confidential. You do NOT have to write your name on the top of the evaluation. Your pre- and post-program assessments will be matched via the confidential ID number. Respond to the questions to the best of your ability, and 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	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	3	16%	2	11%
0.5	1	5%	1	5%
1	8	42%	4	21%
2	5	26%	10	53%
3	2	11%	1	5%
4	0	-	1	5%

**Average:**

Pre-Program = 1.29

Post-Program = 1.66

Difference = 0.37

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

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	16	84%	8	42%
1	1	5%	0	-
2	2	11%	11	58%

**Average:**

Pre-Program = 0.26

Post-Program = 1.16

Difference = 0.90\*

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

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

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	1	5%	1	5%

1	1	5%	0	-
2	2	11%	0	-
3	2	11%	2	11%
4	4	21%	2	11%
5	9	47%	14	74%

**Average:**

Pre-Program = 3.79

Post-Program = 4.42

Difference = 0.63

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

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	1	5%	0	-
1	1	5%	0	-
2	5	26%	4	21%
3	12	63%	15	79%

**Average:**

Pre-Program = 2.47

Post-Program = 2.79

Difference = 0.32

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

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	9	47%	3	16%
0.5	1	5%	0	-
1	9	47%	16	84%

**Average:**

Pre-Program = 0.50

Post-Program = 0.84

Difference = 0.34\*

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

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

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants
0	5	26%	4	21%
0.5	1	5%	0	-
1	13	69%	14	74%
2	0	-	1	5%

**Average:**

Pre-Program = 0.71

Post-Program = 0.84

Difference = 0.13

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

Score	Pre-Program		Post-Program	
	# Participants	% Participants	# Participants	% Participants

0	6	32%	0	-
1	4	21%	3	16%
2	6	32%	2	11%
3	3	16%	14	74%

**Average:**

Pre-Program = 1.32                      Post-Program = 2.58                      Difference = 1.26\*

\* 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	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	3	16%	1	5%
1	6	32%	1	5%
2	5	26%	4	21%
3	5	26%	13	69%

**Average:**

Pre-Program = 1.63                      Post-Program = 2.53                      Difference = 0.90\*

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

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

Score	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	8	42%	0	-
1	7	37%	5	26%
2	2	11%	3	16%
3	1	5%	2	11%
4	1	5%	9	47%

**Average:**

Pre-Program = 0.95                      Post-Program = 2.79                      Difference = 1.84\*

\* 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	<u>Pre-Program</u>		<u>Post-Program</u>	
	# Participants	% Participants	# Participants	% Participants
0	1	5%	0	-
1	0	-	0	-
1.5	0	-	1	5%
2	7	37%	0	-
3	11	58%	18	95%

**Average:**

Pre-Program = 2.47                      Post-Program = 2.92                      Difference = 0.45\*  
 \* Indicates a statistically significant difference ( $p < 0.05$ ; t-test)

1.

**2. PROGRAM EVALUATION**

**11 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 (3) | College Educator (0)    |
| Middle School Educator (3)     | Non-formal Educator (0) |
| High School Educator (3)       | Other (2)               |

**WORKSHOP OBJECTIVES**

The following are the intended outcomes for the 2012 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 (10 responses)	-	-	-	10%	90%	4.90
Accomplished (11 responses)	-	-	-	36%	64%	4.64

**Example Comments:**

- Discussion and daily homework using packet would have furthered the experience for educators
- Could have covered a wider range of species, including more terrestrial and/or wetland
- Enjoyed the number of speakers and their various backgrounds

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

	1	2	3	4	5	Mean Score
Value (10 responses)	-	10%	-	20%	70%	4.50
Accomplished (11 responses)	-	-	-	27%	73%	4.73

**Example Comments:**

- Everyone was patient with me
- Use of PowerPoint- could be a problem for some not familiar with software
- Very informative and helpful

- I wish we had begun Monday by dock so we could have completed the other two planned sites on Wednesday
- Already knew how to do most of them, but did learn a new perspective aboard a schooner

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

	1	2	3	4	5	Mean Score
Value (9 responses)	-	-	-	22%	78%	4.78
Accomplished (10 responses)	-	10%	-	40%	50%	4.30

**Example Comments:**

- Presenting was rushed and couldn't enjoy it
- More time to work with samples, develop project in more detail, prepare and present
- More computers would have been helpful
- More days, more laptops needed
- Time was a problem

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

	1	2	3	4	5	Mean Score
Value (10 responses)	-	-	10%	10%	80%	4.70
Accomplished (11 responses)	-	-	9%	36%	55%	4.45

**Example Comments:**

- I would like Mr. Davis to spend some time with the class pulling out important pictures and articles to read in the evening
- Homework! Discuss in A.M. on mtl's
- Very prepared in some facets: quagga mussels, lampreys and ballast, but could round out knowledge some more
- I'm overwhelmed with all the great material!
- The portfolio was very helpful to prepare us to teach others, but I would suggest a flash drive loaded for next year; could also be used for presentations

**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 (10 responses)	10%	-	10%	10%	70%	4.30
Accomplished (11 responses)	9%	-	18%	27%	45%	4.00

**Example Comments:**

- I thought we were going to do original research to help the DNR, etc.
- We put them back in the water, why?

## WORKSHOP ACTIVITIES

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

#### *Example Comments:*

- The ship activities
- Seeing the sea lamprey
- Having a great crew and Mr. Davis!
- The project and sampling
- Being on board Inland Seas, collecting samples
- Preparing presentations and listening to everyone's presentations, fun and helpful
- Hands-on activities along with interaction with others
- Email addresses should be exchanged to discuss how info will be used next school year
- Content, resources, "research" were most valuable
- Macros were least valuable (love them, but seminar was on invasives)
- Kid's Creek
- 3<sup>rd</sup> day research
- Great lectures by Tim Davis and David Reid
- I really learned from the lectures
- Ship experiences were interesting and fun
- Preparing presentations based on field research so it can be modified for use in teaching others
- Day 1 presentations extremely informative and interesting, sampling and research also great
- Fish and mussels trawls, info on ballast water, seeing the sea lamprey
- Lectures on the history and current issues of invasive species

### 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	-	-	64%	36%
Organization of seminars/classroom activities	-	-	27%	73%
Organization of shipboard activities	-	-	36%	64%
Content of seminars/classroom activities	-	9%	27%	64%
Content of shipboard activities	-	-	9%	91%
Quality of written materials provided	-	-	18%	82%
Overall quality of experience	-	-	18%	82%

### 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:*

- I will use some, I only have ~3 lessons to teach/time to present information

- Good background
- Very prepared and eager to share what I learned with students, materials will be helpful
- Feel good about sharing info, will use information provided
- I will use materials and think I have enough for my needs
- I will use much of what I learned, especially about stewardship
- I feel knowledgeable to teach students about invasive species
- Yes, I feel well prepared to share the materials provided
- I'm not an expert, but am much more prepared to share this info and plan on doing so
- I feel well prepared, will use many of the papers and show students my pictures
- I will definitely use the presented materials and notes from class

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

***Example Comments:***

- Program evaluation and test done on the boat, while we have fresh feedback
- More time for presentations and to look at the shop and buy some things
- For teachers, more activities that could be used in classroom would have been more valuable
- Shorten presentations re: quagga mussels and ballast water, good info but too long
- Make course longer with a variety of hands-on activities
- For shorter days, could have been given topic and assignment the night before to start planning and making PowerPoint
- Instead of straight lecture, could add activities and/or small group discussions
- Providing flash drives loaded
- Having five computers on board
- Excellent course, but allow more time for research and putting together findings
- Have people sign the manifest as they board to save time
- It would be nice if presenters forwarded PowerPoints to teachers

**5. 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:***

- Thank you for selecting me. In the process of writing an article, which I'll send to Mr. Davis: "Do you know what's in the Mississippi?"
- Notifying two principles about course
- DTE slideshow was fine, but could have been half as long, some material redundant
- Beautiful experience to be on ship and network with other educators
- Great experience, would do it again in a heartbeat
- Accommodations were fine
- Speakers knowledgeable about various materials
- Seemed like most people were from out-of-town, so could start lectures on Sunday and be done earlier on Monday and/or Wednesday
- Walk by Kids' Creek unnecessary, could have been a short talk on bus
- I would have liked more hard core science about the invasives

- Speakers good but hard to listen to so many in a row, could use different format
- You guys did a wonderful job
- I enjoyed the workshop, thanks!
- Thanks Tim, I really enjoyed the whole thing
- Remind participants that they are a reflection of ISEA during class, on board and in dorms
- Good program!
- Excellent job by all, thanks Tim!
- I enjoyed the course and know my students will benefit, I'm grateful for the opportunity
- Totally enjoyed the whole experience, learned a lot about invasive history, etc.

## **B. Advanced Invasive Species Field Course**

### **1. PROGRAM EVALUATION**

#### ***10 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?**

Non-Formal Educator (1)  
 Scientist (1)  
 Environmental agency (0)  
 Other (3)

Formal Educator- Grade Level:  
 Elementary (4)  
 Middle School (1)  
 High School (4)

#### **WORKSHOP OBJECTIVES**

The following are the intended outcomes for the 2012 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 (10 responses)	-	-	10%	-	90%	4.80
Accomplished (9 responses)	-	-	22%	33%	45%	4.20

##### ***Example Comments:***

- This wasn't really a presentation of general info- it was to build on current knowledge
- Not a lot of challenge to prior knowledge, mostly from literature reviews
- Selected articles in advance so time can be put into reading and comprehension

- Tim’s knowledge and way to explain info was invaluable

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

	1	2	3	4	5	Mean Score
Value (10 responses)	-	-	-	20%	80%	4.80
Accomplished (9 responses)	-	-	-	23%	77%	4.78

**Example Comments:**

- We had a hands-on experience!
- Did not ever get to work with the ponar dredge
- Awesome
- Great
- Yeah! Hands on science!

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

	1	2	3	4	5	Mean Score
Value (10 responses)	-	10%	10%	40%	40%	4.20
Accomplished (9 responses)	-	33%	22%	11%	34%	3.44

**Example Comments:**

- Not enough time to do a decent job; needed more laptops and tech stuff, maybe bring own
- Did not take as many samples as expected/planned
- Could have gone better, but didn’t seem that important compared to other activities
- More time and equity of access resources
- More time or tech.; need cable for camera
- Recording, putting together the data into a project was invaluable, it can be shared with students

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

	1	2	3	4	5	Mean Score
Value (10 responses)	-	-	-	10%	90%	4.90
Accomplished (9 responses)	-	-	-	33%	67%	4.66

**Example Comments:**

- Tim- you are an excellent teacher/presenter!
- A dummy sheet of talking points would be helpful
- While teaching about the GL, it will be important to teach preservation by teaching about invasive species

**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 (10 responses)	-	-	-	20%	80%	4.80
Accomplished (9 responses)	-	-	-	33%	67%	4.66

**Example Comments:**

- The mix of activities was superb
- General discussion
- No way to have this multi-day trip and not feel protective of the Lakes' resources
- Perhaps more discussion on strategies for teaching others and taking action

**WORKSHOP ACTIVITIES**

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

**Example Comments:**

- Seeing how the program works; actually participate; loved the sailing and 'crewing'
- Community with peers
- Opportunities to physically collect specimens and learn of their environments/behaviors
- Readings and discussions
- Sampling; hands-on work; listening to Tim speak about eDNA
- Paper discussions; research project (though not focused sufficiently on invasives)
- Sailing large area to gain sense of scale of GL and invasives
- Sampling, reading and discussion
- The science activities
- Learning new techniques and hands on work
- The crew's knowledge, discussions and taking samples; all the knowledge everyone brought

**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 (9 responses)	-	11%	56%	33%
Organization of seminars/classroom activities (9 responses)	-	-	33%	67%
Organization of shipboard activities (10 responses)	-	-	10%	90%
Content of seminars/classroom activities (10 responses)	-	20%	40%	40%
Content of shipboard activities	-	-	20%	80%

(10 responses)	Quality of written materials provided	-	-	60%	40%
(10 responses)	Overall quality of experience	-	-	-	100%

---

**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:**

- Absolutely, I can imagine referencing the experiences and knowledge gained from this trip
- Great! Yes!
- Very- especially knowing that support is just a contact away
- I am leaving with new knowledge and ideas to use in classroom
- Very well prepared, yes
- Material from course will serve as background for my students, but not primary
- I'm excited to present to students and colleagues; plan to make a PP to encourage others to participate
- I will use materials and knowledge this fall with students
- Yes, very well prepared
- Absolutely will share and teach

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

**Example Comments:**

- Totally, control the weather so that Beaver Island happens ☺
- Would have liked to have own laptop and known to bring camera cords
- More data/stations for project, too thin to do a project
- First night- slighted by lack of invitation to eat with crew with no other food available
- More ideas/projects to do in classroom
- Maybe suggest that students come prepared to create presentations, ie camera cords, etc.
- Already learned sampling, etc. in basic IS class, maybe for advanced focus more on invasives, specific species, etc.
- Readings before lunch so not so sleepy :/
- Set up lab so final project would be better
- Give schedule and time for presentation for each group and more time to put things together
- Extra time to include another island

**5. 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:**

- Staff was exceptional in the spirit they brought to our time; I have a very high regard for ISEA and hope for continued association

- Loved the teamwork, staff was FABULOUS, great food and accommodations
- Thank you all!
- Crew were great!
- ISEA staff made this trip an incredible learning experience for everyone, thank you!
- Crew was professional and outstanding; Tim's scientific expertise was invaluable but focus more on invasive species next time; Ben's sailsmanship was impressive; Kathy's cuisine and snacks more than satisfied; great crew!
- Awesome- Tom thank you for your vision and your awesome crew! Hope to return to sail with all of you again!



## **V. ISEA VOLUNTEER INSTRUCTORS**

## A. VOLUNTEER INSTRUCTOR TRAINING

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

**14 responses**

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	29%	71%	-
Pace of the presentation	-	-	29%	71%	-
Quality of the visuals used	-	-	43%	57%	-
Clarity of the written materials	-	-	50%	50%	-
Effectiveness of the small groups	-	-	21%	21%	58%

**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:**

- Well Organized
- Excellent “pace”

### **SESSION 2: The Great Lakes and Global Freshwater**

**18 responses**

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	39%	61%	-
Pace of the presentation	-	-	17%	83%	-
Quality of the visuals used	-	5%	17%	78%	-
Clarity of the written materials	-	-	22%	67%	-
Effectiveness of the small groups	-	-	17%	83%	-

**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 (78%)

Veteran (22%)

**Comments/Questions:**

- I learned a lot!! Thanks!
- You do a nice job
- Some pages didn't match up.
- Leave lights on

**SESSION 3: Sample Collections and Weather****13 responses****How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	8%	54%	38%	-
Pace of the presentation	-	-	62%	38%	-
Quality of the visuals used	-	-	38%	62%	-
Clarity of the written materials	-	-	23%	77%	-
Effectiveness of the small groups	-	-	15%	85%	-

**How would you rate the amount of material presented?**

Not Enough (0)

Just Right (92%)

Too Much (8%)

**Are you a new volunteer or a veteran?**

New (46%)

Veteran (54%)

**Comments/Questions:**

- Start with homework
- I thought the idea of titration and what happens during the winkler titration wasn't clearly explained. Explain why measuring the iodine is the same as oxygen, and why there's a color change.
- Hands on is easier to understand.
- Instructor really did not have a clear idea of doing some of the tasks. Prior practice of the presentation could help. Practice it yourself then when ready present to Tom.

**SESSION 4: Water Chemistry****13 responses****How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	8%	92%	-
Pace of the presentation	-	8%	15%	77%	-
Quality of the visuals used	-	-	15%	85%	-
Clarity of the written materials	-	-	23%	77%	-
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 (62%)

Veteran (31%)

**Comments/Questions:**

- Small groups are very helpful
- Have a recording of the presentations to listen to later
- Lots of information to take in

**SESSION 5: Sediment & Benthos**

***21 responses***

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	52%	48%	-
Pace of the presentation	-	4%	48%	48%	-
Quality of the visuals used	-	-	29%	71%	-
Clarity of the written materials	-	5%	33%	62%	-
Effectiveness of the small groups	-	-	24%	76%	-

**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 (48%)

Veteran (52%)

**Comments/Questions:**

- The red does not show up well.
- Having a break in the homework allowed for mid way review.

**SESSION 6: Plankton**

***15 responses***

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	-	87%	-
Pace of the presentation	-	7%	7%	73%	-
Quality of the visuals used	-	-	7%	87%	-
Clarity of the written materials	-	-	7%	87%	-
Effectiveness of the small groups	-	-	13%	73%	-

**How would you rate the amount of material presented?**

Not Enough (n/a)

Just Right (n/a)

Too Much (n/a)

**Are you a new volunteer or a veteran?**

New (53%)

Veteran (33%)

**Comments/Questions:**

- Presentation fast (2)

**SESSION 7: Fish**

***14 responses***

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	29%	71%	-
Pace of the presentation	-	-	36%	64%	-
Quality of the visuals used	-	-	43%	57%	-
Clarity of the written materials	-	-	36%	64%	-
Effectiveness of the small groups	-	-	7%	93%	-

**How would you rate the amount of material presented?**

Not Enough (7%)

Just Right (86%)

Too Much (0%)

**Are you a new volunteer or a veteran?**

New (71%)

Veteran (21%)

**Comments/Questions:**

- Look forward to Wednesdays
- Red print hard to read
- Lots of mistakes in the manual. The page numbers and references are wrong. I have to go searching for things.

**SESSION 8: Stewardship**

***12 responses***

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	33%	67%	-
Pace of the presentation	-	16%	42%	42%	-
Quality of the visuals used	-	-	25%	67%	18%
Clarity of the written materials	-	17%	18%	58%	17%
Effectiveness of the small groups	-	-	17%	83%	-

**How would you rate the amount of material presented?**

Not Enough (0%)

Just Right (83%)

Too Much (17%)

**Are you a new volunteer or a veteran?**

New (83%)

Veteran (17%)

**Comments/Questions:**

- Your program is great. I'm w/ MHA and would enjoy learning about the life/ecology w/ your group.
- It was fast but I knew it had to be

**SESSION 9: Seamanship---CANCELLED**

**SESSION 10: Safety-Seamanship (Tom Kelly)**

**16 responses**

**How would you rate the following?**

	Poor	Fair	Good	Great	NA
Clarity of the presentation	-	-	25%	75%	-
Pace of the presentation	-	6%	25%	69%	-
Quality of the visuals used	-	-	38%	63%	-
Clarity of the written materials	-	6%	32%	63%	-
Effectiveness of the small groups	-	-	6%	44%	50%

**How would you rate the amount of material presented?**

Not Enough (0%)

Just Right (94%)

Too Much (6%)

**Are you a new volunteer or a veteran?**

New (75%)

Veteran (25%)

**Comments/Questions:**

- NONE

**SESSION 11: Teaching Strategies (Ken Cerny)**

**8 responses**

**How would you rate the following?**

	<b>Poor</b>	<b>Fair</b>	<b>Good</b>	<b>Great</b>	<b>NA</b>
Clarity of the presentation	-	-	37%	63%	-
Pace of the presentation	-	25%	12%	63%	-
Quality of the visuals used	-	12%	-	88%	-
Clarity of the written materials	-	12%	25%	50%	13%
Effectiveness of the small groups	-	-	25%	75%	-

**How would you rate the amount of material presented?**

Not Enough (0%)

Just Right (75%)

Too Much (12%)

**Are you a new volunteer or a veteran?**

New (63%)

Veteran (25%)

**Comments/Questions:**

- Having a log book would be helpful for practice.

## 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? (65 responses)

Poor (2%)

Fair (3%)

Good (55%)

Great (40%)

#### Comments:

- As a volunteer I assume a certain responsibility to learn the info from the training manual. However most of what I have learned is from shadowing someone else. I don't feel staff has been given the time to train on the ship. On the other hand I live far away, so I also assume that my time is best used for participants.
- The lecture/demo format of the winter training is very effective. However, I really didn't understand how it all came together until my first sail. Maybe I zoned out and missed something, but I didn't understand the sequence very well, particularly how weather and large group collections were done. I did feel that I could do the individual stations based on the in class trainings. Good job on those!
- I volunteered for green-agers. I was embarrassed by the lack of organization and direction in front of students, teachers and parents. I tried to answer their questions upon their arrival, but was unable to get answers myself. Staff was unavailable and when they arrived, they seemed unprepared.
- As always, I would encourage new instructors to shadow for confidence building.
- Be nice to have more information about the groups such as age, grade, and any special needs students.
- Good, sometimes rising to the level of Great.
- Thought the refresher training was just excellent. I would just wonder about the, was it boy scouts part. Seems like there could be a more relevant, shorter way to complete this aspect? I'm sure you have looked though.....
- I think that the quality of training, overall, is terrific. However, I have one issue: The roll of helping lead instructors - referred to by "veteran" volunteers as "being Vanna" (as in Vanna White - Wheel of Fortune). Since I don't watch this show, I didn't have a clue what people were talking about when they first asked me to "be Vanna". I think it's important to have someone assist the lead instructor, and there always seems to be someone who takes over this roll. My only question is: Why aren't people trained to "be Vanna"? If you happen to be a new volunteer who has the misfortune to be assigned to benthos, you are (physically) in a position to help out, but are not necessarily trained to fulfill this role. I volunteered for almost a full summer before I felt comfortable in this unofficial role. These activities are probably second nature to veteran volunteers, but they aren't necessarily obvious to a new volunteer. The level of assistance required/desired by lead instructors also seems to vary.
- Emergency aspects when help is needed, feedback needs to be given as quickly as possible. Maybe a phone message would work quicker than an email.

#### 2. Did ISEA clearly communicate these volunteer expectations? (60 responses)

Yes (93%)

No (7%)

**Comments:**

- I volunteered on a Tuesday and was on the boat on Thursday for three days. Emily and Kathy took time to give me info in addition to their duties which was awesome. I could not have done it without them.
- It is adequate for me but newer volunteers may need refreshers.

**3. The amount of practical training you have received? (61 responses)**

Poor (2%)                      Fair (2%)                      Good (54%)                      Great (42%)

**Comments:**

- I haven't really done the training recently
- It was a long time ago.
- I appreciate the option to shadow a veteran instructor to learn how to teach a new station.
- Want more! Want to study plankton with someone next to me to help ID!
- The background info from class was vital, but I didn't really get it until I did it myself. I had lots of support my first few times through.
- I asked for directions prior to arrival via e-mail and upon arrival, but got none. I was finally told, just follow me and help me, then left to my own devices. I was then asked to take a group and then given written instructions that I needed to read and implement simultaneously. Parents were asked to supervise groups, but given no direction.
- Great because you can always get more training, more observations opportunities if you feel you need them.
- have not been available for training, but know you offer opportunities
- I'm fine but again may be needed by newcomers. Some barely had it before the first time on board. That experience needs to be required.

**4. The quality of the practical training you have received? (62 responses)**

Poor (2%)                      Fair (5%)                      Good (55%)                      Great (38%)

**Comments:**

- I think shadowing on actual trips and slowly taking over stations is the best method.
- This is probably not a fair comment since I was not available much of the summer
- This is my fault, not ISEA's since I live so far away (3.5) and have limited income and reliable car I find it hard to attend training. I am however willing to put in the time.
- The volunteer training manual and classes were excellent.
- There is no substitute for actual experience
- I definitely picked and chose who I learned from when I shadowed. Some people are much better at their stations than others. I'm not sure how to tactfully re-train some of the veterans. I'll give it some thought and share ideas if I come up with anything. It's a tough one when you're working with volunteers.
- Additional training on teaching techniques would be helpful for volunteers w/o a background in education.
- I wonder if volunteers could get any helpful hints or additional feedback (especially new folks) during the sails. Or immediately following...or maybe in the log book have a page

for entering unusual findings or questions that came up, so when we sign in we can also have updates?

**5. The ease of transition from training to teaching aboard the Schoolship? (63 responses)**

Poor (0%)                      Fair (6%)                      Good (16%)                      Great (13%)  
N/A, veteran instructor (62%)                      N/A, I don't volunteer on the boat (3%)

**Comments:**

- Veterans are a good resource: (3)
- Some veterans are better to shadow than others
- I think a "student teaching" session or to would be beneficial
- Oh was I supposed to transition? Skipped that part since they did not have enough instructors when I started. Oopsie
- I was not able to attend training sessions due to the distance we live from Suttons Bay. But, the manual is very complete and I have learned a lot just from observation and conversations with other instructors.
- This is my second year...does that make me a "veteran instructor" because I still am learning and sometimes ask for assistance.
- The onboard training is very important.

**6. The quality of the support provided by ISEA during your volunteer experience?**

**(65 responses)**

Poor (2%)                      Fair (6%)                      Good (37%)                      Great (55%)

**Comments:**

- I only had direct help form Kathy and Emily other than shadowing other volunteers
- Lots of support and appreciation from ISEA staff.
- Some leads are more in tune with the team than others
- Everyone is always very helpful; but, too many times changes need to be made to adjust for a lack of volunteers. More effort needs to be made beforehand to get volunteers for each teaching station.

**7. The quality of the communication between ISEA and its volunteers? (64 responses).**

Poor (0%)                      Fair (11%)                      Good (41%)                      Great (48%)

**Comments:**

- A few-some miscommunication regarding scheduling: (3)
- Much improvement since spring
- The emails are excellent. I know when there is an event or when newsletters come out
- The regular newsletters and emails from Emily kept me informed of happenings and reminded me of the duty assignments.
- I get the newsletter and request for donations and volunteer help. It is not useful to me at this time.
- Emily is on top of things.
- Too many times there weren't enough volunteers for a program (especially on Manitou). Reminders are always a good idea. These problems never arose in the past when reminder calls were made. Email is a good way to communicate for some things, but volunteer reminders and requests for volunteers when we're short just doesn't

work. There's nothing like a phone call to get people to step up. It's just too easy to get an email for a volunteer position and then just ignore it as "someone else will call". Email as a first step is ok, but then you need that important phone call.

- This is greatly improved and I feel much more connected! Thank you!
- Weekly notes are good. It would be helpful if the volunteer calendar online could be kept up to date.
- It seemed there were a lot of gaps each week on the volunteer schedule, which caused for a lot of necessary phone calls to fill them. I don't know if this was due to a lack of volunteer participation or a lack of advanced planning? It seemed like there were always enough volunteers on the boat on the day of, but it would be nice if the schedule were able to be filled in advance to save the last minute push to find people.

**8. I feel well informed about my volunteer times and expectations (63 responses).**

Disagree (2%)      Agree some (9%)      Agree (48%)      Agree greatly (41%)

**Comments:**

- Reminder phone calls would be good
- Slow getting a paper copy of the schedule.
- All my communication goes through Emily for that. Is there another way?
- Seemed to be lots of changes and last minute open spots.
- I liked the email reminders.
- Mostly, though last minute changes are made sometimes, but adjustments are relatively easy.
- I was not totally clear where I was to be/logistics when ship was in Frankfort. (I thought it was back in SB.)

**9. I feel the way volunteer information is given to me is convenient and reliable. (63 responses)**

Disagree (2%)      Agree some (5%)      Agree (52%)      Agree greatly (41%)

**Comments:**

- Reminder phone calls would be good
- on-line is great - just make sure that it is always up to date
- Email works well for me.

**10. Your interactions with Tim Davis, ISEA's Education Director? (46 responses).**

Poor (9%)      Fair (17%)      Good (41%)      Great (33%)

**Comments:**

- Who?/NA/Never Met Him: (15)
- Enjoy the night programs, very helpful
- Never heard of him until I attended one of the evening seminars...he seemed kind of arrogant. Sorry. Nobody can compare to Christine.
- Haven't had many chances to work with Tim, but he's been great any time- very knowledgeable.
- I didn't have a lot of contact with Tim, but what I had was very good.

- I met him once when we were on the same sail. Very impressive guy—he seemed a good fit for ISEA...and then he told me that he was taking another job. I wished him good fortune and meant it.
- I had one short conversation with him about the program at the Soo. And he was very helpful, but do not interact with him on a regular basis.
- I'm only saying "fair," because I didn't have much occasion to interact with Tim but those occasions were good.
- Excellent.
- Do not think I met him. I thought Emily was the Education Director.
- I didn't really have that much interaction, but the times I did interact were always positive.
- Only was with him once.
- Poor, because I didn't receive any training from him. All of my training was with Emily.
- I haven't had a lot of interaction with Tim this year. I'm not sure I know how to really describe the interactions I have had with him. He has been cordial to me, but I feel like he's far more distant than other crew members and volunteers. I believe he is very knowledgeable, but not as engaging as others.
- Didn't see him at the pot luck. Hope he's still around.

#### **11. Your interactions with Emily Shaw, ISEA's Education and Volunteer Coordinator?**

**(64 responses)**

Poor (2%)

Fair (3%)

Good (22%)

Great (73%)

#### **Comments:**

- Occasionally confusing
- Her enthusiasm is catching, and she is a sweetheart. Fun to have young people in the program, to balance out the rest of us. :)
- Amazing. Cheerful. knowledgeable and eager to learn and share
- Emily's smile and unflappability are great assets! You really do a superb job of training and appreciating your volunteers. Wish the scheduling was a little more precise, but we all seem to make it work. You run a great program and your passion is infectious! Keep up the good work.
- Emily is very accessible and communicates effectively.
- I love Emily!
- She continues to impress me in her interactions with volunteers, staff and students. She is friendly, flexible and professional in a job that can be very frustrating.
- I believe she was the person in charge when I volunteered
- Should be made Education Director and given some support.
- Emily has great enthusiasm - it is infectious!
- Emily's enthusiasm & energy are inspiring to me.
- Always fun, positive, and informative. I enjoy working with Emily and she has a terrific attitude.
- Could do better to keep the online volunteer calendar up to date, and to get volunteers to fill all spots - a hard job, I know.
- Always positive and encouraging.

- Loved the enthusiasm.
- Emily is great. I think she makes an amazing lead instructor, she relates really well to the kids who participate in the schoolship program, and she keeps them engaged. She also makes a great volunteer coordinator; communicating well with everyone and making them feel like their contributions are important to the program. I feel like her excitement for the program is contagious and that she is a valuable asset to Inland Seas.

**12. Your interactions with ISEA's crew? (64 responses).**

Poor (0%)                      Fair (2%)                      Good (28%)                      Great (59%)  
 N/A, only *Manitou* volunteer (6%) N/A, not a boat volunteer (5%)

**Comments:**

- Great/Fun/Enjoyable/Helpful (3)
- Wish I could get to know them all better.
- Ben, Jan, and Len were always helpful.
- I had the fun of doing the transit from St. Ignace to the Soo and found the companionship to be extraordinary. Ben was very professional as Captain, as well as engaging as an individual. Kathy's cooking was a real treat!
- Kathy and Emily, Captains, Tom and Ben are very approachable. Other crew members not so much, but I don't see that as necessarily part of their job...to interact with me as they do their job.
- I spent almost all of my volunteer time sailing as crew.
- I have greatly enjoyed being on the boat with Bob Hagerman! The rest of the crew are fantastic, but Bob's my favorite, if I can admit to having favorites.

**13. Your interactions with *Manitou's* crew? (62 responses).**

Poor (2%)                      Fair (2%)                      Good (19%)                      Great (27%)  
 N/A, only *Inland Seas* volunteer (45%) N/A, not a boat volunteer (5%)

**Comments:**

- Only one session on the *Manitou*
- Great crew, excellent office staff support. A pleasure all the way around.
- Actually, I think I did one *Manitou* this year & it was OK. No problem.
- The few times I have volunteered on *Manitou* the CREW were fine – the CAPTAIN, Dave, was incredibly insensitive to the students and the volunteers. He kept everyone waiting on the dock while he did "I don't know what" and we were late boarding AND leaving the dock. Frankly, I don't want any part of dealing with him.
- It's been months since I've been on the *Manitou*, but I recall the crew being very friendly and helpful.

**14. Your interactions with the lead instructors? (64 responses).**

Poor (0%)                      Fair (5%)                      Good (39%)                      Great (55%)  
 N/A, not a boat volunteer (1%)

**Comments:**

- Especially appreciate Len's time keeping
- They are amazingly knowledgeable, flexible and great role models for all of us.

- Variety of styles, but all very dedicated to what they are doing. (If they'd just give us more time!)
- Sometimes the leader could do a better job of explaining how everything is going to go each time.
- Len and Emily were great. Some others did not control the group.
- Can't think of any lead instructors that I didn't enjoy.
- Lead instructors all seem to be very good.

**15. Your interactions with other volunteers? (64 responses).**

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

**Comments:**

- Amazing/Super/Fantastic People: (4)
- Not a lot of interaction.

**16. I feel comfortable explaining ISEA's mission of promoting stewardship of the Great Lakes through education and how the organization works to accomplish that goal (65 responses).**

Disagree (0%)                      Agree some (3%)                      Agree (38%)                      Agree greatly (59%)

**Comments:**

- Do it every opportunity I get!
- Anytime. wish I could do more
- This goal was clearly stated, explained and exemplified in the volunteer sessions and nearly every experience on board.
- This organization walks the walk - I feel proud to be identified with it.
- I am always open to additional information but don't always have time to avail myself of what is offered.

**17. I am enjoying my volunteer experience. (64 responses)**

Disagree (1%)                      Agree Some (5%)                      Agree (30%)                      Agree Greatly (64%)

**Comments:**

- Where else can I get cold and wet and heard a bunch of kids?
- My interests are in science, outdoor and environmental education...and I'm a sailor, too, so ISEA is a great fit for me. I love interacting with, and educating students in the non-classroom setting that is Inland Seas.
- I'm afraid that my poor experience has led me to discontinue volunteering. It's a shame because I think it is a great organization with a worthwhile goal, but poorly managed from my recent experience
- Except I don't like the way the fish station is done now I like to get my fish from the tub and not do the weather station but take that time to count fish and see what we have.
- Due to employment constraints, I was not able to participate, significantly, this past year. I look forward to more involvement in the future.

**18. I am making a worthwhile contribution towards the mission of ISEA. (63 responses)**

Disagree (0%)      Agree Some (8%)      Agree (56%)      Agree Greatly (36%)

**Comments:**

- Wish I could do more: (4)
- I hope so.
- I hope I am

**19. My motivations for volunteering are being satisfied (64 responses).**

Disagree (0%)      Agree Some (8%)      Agree (45%)      Agree Greatly (47%)

**Comments:**

- Love educating children and public about caring for the Great Lakes
- Teaching materials and methods have stagnated. Feel like attention needs to be given to programs so volunteers get out of teaching ruts, which leads to slacking off of enthusiasm.

**20. My contributions are adequately recognized by ISEA. (62 responses)**

Disagree (0%)      Agree Some (3%)      Agree (45%)      Agree Greatly (52%)

**Comments:**

- With they would do the recognition dinner when everyone is here.
- You do a nice job in this department

**21. I have received opportunities to give feedback about suggested improvements to the Schoolship program. (64 responses)**

Disagree (3%)      Agree Some (13%)      Agree (59%)      Agree Greatly (25%)

**Comments:**

- No previous opportunities: (2)
- not my place
- Going to send some stewardship suggestions any day now
- Still very new to the program, I feel I would not know enough to take advantage of offering improvement. However, if I did see something that would improve the program I am sure it would be well received.
- I've made the suggestion many times that the group time doing sampling is far too long. Many lead instructors seem to like to go over the entire program while the kids are becoming more and more listless. I think more time should be allotted to the small groups.
- I gave Emily one suggestion about the location of the Benthos station on the Inland Seas and imagine that it will have to be reviewed with the staff over the winter months. The suggestion was that there is never enough time to teach Benthos and it is even worse when the first group is being taught. Why? Because the crew is messing with the lines on the deck at the teaching station while the instructor is trying to get everything set-up. This delays the start of the instructions for the first group. My suggestion is to relocate the Benthos teaching station to the Fish station which requires no set-up and move the fish station to Benthos.
- Some of the stations on deck Fish, Benthos are difficult keeping the materials together in the wind, and limited space available. Also the props for the fish station are sorely

lacking and need to be replaced. At times doing the fish station it seemed to be better suited for an assistant or 2nd instructor. Doing the fish ID was sometimes difficult using the notebook and reading the clues upside down and showing the students the pictures. This was especially true when the group was more than 4 students. Also, some thoughts on Seamanship. It is a good station but can become a distraction to students when some of the students are steering the boat with the captain. I think taking the helm is great but it can be difficult to keep students engaged with the station especially when talking about MA.

**22. I enjoy reading the volunteer newsletter. (64 responses)**

Disagree (0%)      Agree Some (16%)      Agree (23%)      Agree Greatly (53%)  
N/A, do not read the newsletter (8%)

**Comments:**

- I love the newsletter and finding out more about my fellow volunteers...they all have such interesting and diverse backgrounds! And often don't talk about them, so it's nice to hear about them.
- Duh. Where is it?
- I find the online volunteer newsletter difficult to read because it is not formatted properly when I receive it and the font would be better if it was san serif.

**23. I enjoy reading the general ISEA E-newsletter. (59 responses)**

Disagree (0%)      Agree Some (17%)      Agree (25%)      Agree Greatly (53%)  
N/A, do not read the newsletter (5%)

**Comments:**

- Duh again
- Keep up the great work!!!!

## **VI. 2013 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 2012 we incorporated a segmented rope demonstration that was designed to teach the students about water resources and the percent of total water on Earth available as clean freshwater. We also re-incorporated an interactive food web diagram into this station. The diagram is made of foam core and has various aquatic organisms placed within the water. The students then draw arrows that represent the feeding relationships between the organisms. We found that the volunteers were able to more easily incorporate the rope demonstration and use it as a jumping off point for other aspects of stewardship. In 2013 we will continue to implement the rope as an integral part of the stewardship station. The continued use of the foam core board will give the students an opportunity to draw the food web of the Great Lakes which will help them learn the different food web levels in the Great Lakes and the ecological importance of each level.

### **Schoolship Instructor Training**

In 2013 the structure of the volunteer instructor training will be modified from a once a week 2-hour session to a once a week 3-hour session. This adjustment will be made to accommodate two topics per session instead of just one topic. While the slightly longer session is helpful, the lecture portion of the training will be made shorter in order to maintain the length of the hands-on component, which many veteran and new instructors find to be the most helpful aspect of the training. We plan to compensate for the decreased lecture time by relying on the new instructors excitement and commitment to becoming a well-educated instructor. Additional supplementary resources will continue to be provided on an on-going basis throughout the year.

Classes will take place Saturday morning and be repeated Wednesday evenings. This structure makes us more flexible, and also allows us to engage people who are working, or are unavailable weekday evenings.

### **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. In 2012, the evaluation materials were

distributed electronically to all teachers and students participating in the Schoolship Program. Although we did not see the anticipated increase in response rate, we were able to save a significant amount of staff time in the compiling of this report. We plan to distribute evaluation materials electronically again in 2013 and focus on a prompt delivery of the materials, as well as a follow-up reminder regarding the importance of receiving this feedback. We anticipate that this technique will help increase our response rate.

The Education Department intended to host a 'Teacher Roundtable' for teachers who have been with ISEA for multiple years in 2012. However, we were unable to implement this program. The Education Department will instead utilize its networks for feedback regarding the upcoming changes to the state curriculum and re-visit the 'Teacher Roundtable' idea in the future.

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 were four questions on the Level A student evaluation, seven questions on the Level B evaluation and seven questions on the Level C evaluation that less than 70% of the students answered correctly. The major areas of concern for Level A students were with regard to the water chemistry concepts of pH and the importance of dissolved oxygen as well as being able to distinguish where benthic organisms live. For Level B and C students, the labeling of phytoplankton/zooplankton/benthos on a food web and understanding the differences between shallow water habitat (trawl sample) and deep water habitat (dredge sample) were the largest concerns. These areas of concern will be expressed to the Schoolship instructors and the ISEA staff and volunteers will work to clarify these concepts through their teaching aboard the Schoolship in 2013.

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.

### **Liberty Programs**

The Friendship Sloop Liberty has been inactive for several years, with the exception of sailing during the Annual Classic Boat Show. Liberty programs will be discontinued for 2013 and the vessel put up for sale.

### **Motor Whale Boat**

Late in 2012 ISEA received a gift of an ex-Navy Motor Whale Boat. We intend to use this vessel as an additional platform for educational programs. We will develop a curriculum that is designed for a shorter period of time (1 hour). Students will have a hands-on experience with

the Great Lakes and will have the opportunity to learn about the role of the Great Lakes on the life of people living in the Great Lakes basin throughout history.

**Family Science Day**

Family Science Day is a program where families can come together to experience the Great Lakes. This will be a monthly program designed for children aged 5-12. Each day will have a theme related to the Great Lakes and there will be a story, a craft and a science activity. Typically the programs will take place Saturday mornings, with the flexibility of adding additional programs during the week over school vacations.

These activities will be designed to engage a younger audience and bring in more visitors to the education center.

### 2013 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 visual 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.
Online student Schoolship evaluations	This will allow the Education Department 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.
Modified Schoolship Instructor Training	This will allow the Education Department to more quickly and effectively train the incoming volunteer instructors. Also allows more new volunteers to participate in training.	ISEA will increase the number of volunteers as well as the diversity of backgrounds within the volunteer corps. This will enable ISEA to expand and diversify its program offerings.
Liberty Programs	Discontinue Liberty programs and sell the vessel	Invest time and resources into more effective teaching platforms.
Motor Whaleboat	Develop short durations (1 hour) programs to involve more people in hands-on Great Lakes learning.	The Whale Boat will bring more people in contact with ISEA and expand our annual number of students.
Family Science Day	Bring in a different audience an engage them with hands-on science education. Promote stewardship of the Great Lakes to a younger audience.	Expand ISEA's constituency and reach within the community.