



# Great Lakes Maritime Research Institute

A University of Wisconsin - Superior and  
University of Minnesota Duluth Consortium

## Great Lakes Maritime Education for K-12 Teachers & Community

Final Report (Eastern Upper Peninsula Workshop July 16 – 20, 2012)

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# Michigan Tech

Michigan Technological University

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## **Executive Summary**

The Center for Science & Environmental Outreach at Michigan Technological University (MTU) partnered with the Center for Freight & Infrastructure Research and Education (CFIRE) at the University of Wisconsin-Madison (<http://cfire.wistrans.org>) and the Great Lakes Maritime Research Institute ([www.glmri.org](http://www.glmri.org)) to conduct the 2012 summer teacher institute *Great Lakes Maritime Transportation* in Michigan's Eastern Upper Peninsula, July 16-20, 2012. In addition, the Center disseminated participant support stipends of up to \$500 each for four teachers attending the summer institute. Emphasis was on recruiting teachers from urban and under-represented populations to participate in the institute. A total of 19 teachers attended the institute. Teachers earned two graduate credits from Michigan Tech for attending the institute and developing two lessons. A total of 25 new lessons have been created to date, and are posted online. Teachers attending the summer institute estimate that they will teach 1150 students, about Great Lakes maritime transportation this school year. Two more Great Lakes maritime transportation education teaching chests were assembled and distributed to Port of Milwaukee and to Cleveland State University (bringing the total of chests distributed in all five Great Lake watersheds to 44 chests). Three presentation stipends were given to teachers who presented their maritime lessons at conferences in 2012 & 2013. The Great Lakes Maritime Transportation website [http://wupcenter.mtu.edu/education/great\\_lakes\\_maritime/index.htm](http://wupcenter.mtu.edu/education/great_lakes_maritime/index.htm) is regularly updated with lessons and new resources.

### **Project Objectives were to:**

1. Conduct a 5-day Great Lakes Maritime Transportation Summer Teacher Institute in Michigan's Eastern Upper Peninsula in July 2012.
2. Disseminate up to four \$500 participant support stipends to urban under-represented teachers.
3. Provide three \$200 stipends to past participants to present at state conferences.
4. Regularly update Great Lakes Maritime Transportation Education website.
5. Assemble and disseminate TWO Great Lakes Maritime Transportation Education teaching chests to museums and education centers in the Great Lakes region.

## Introduction

Few K-12 students or the public have a well developed understanding of maritime transportation on the Great Lakes. This lack of familiarity translates directly into a high demand for mariners. The Maritime Administration says about 10,000 replacements are needed in the graying officer corps, and a U.S. Coast Guard study predicts shipping trade will double or triple by 2020.

*(Shipping Industry Runs Short of Young Mariners...What to Do?*

<http://www.thinkmaritime.com/2009/02/24/shipping-industry-runs-short-of-young-mariners-what-to-do/> )

This project is designed to raise public awareness of the role that the maritime transportation plays in our lives, economy, harbor and community development, and the current challenges the maritime industry faces, including prevention of the spread of invasive species, dredging for harbor and channel maintenance, and/or impacts of climate change, in addition to the growing opportunity for maritime careers.

To meet this need for greater maritime knowledge and awareness, the investigator conducted summer teacher institutes, facilitated the creation of lessons accessible online by K-12 educators throughout the Great Lakes region and nationwide, and assembled and disseminated maritime education chests full of resources to support formal and informal education programs throughout the Great Lakes region.

## Report

This project is designed to address the lack of awareness and knowledge the general public has about the maritime industry, although there are many who enjoy “ship watching.” To reach out to a varied audience, we have identified a number of programs and products that would reach a wide range of ages most efficiently across the Great Lakes region, using a variety of learning styles. Programs were successful and well received.

The *Great Lakes Maritime Transportation Teacher Institute* was conducted in Michigan’s Eastern Upper Peninsula from July 16-20, 2012. The Maritime Teacher Institute agenda and Teacher Institute Evaluation summary are in Appendix.A.

Two new maritime chests were created and distributed to::

- Port of Milwaukee (Betty Nowak)
- Dept. of Geological & Biological Sciences, Cleveland State University (Dr. Jay Reynolds)

A user survey of Great Lakes Maritime Education Chest recipients was conducted on Survey Monkey to evaluate the chest contents, assessing their educational benefit and programmatic usefulness. There was a 60% response rate.

The most useful items in the chest are:

- the Great Lakes floor map,
- ship cargo samples,

- NOAA #14500 map of the Great Lakes Waterway,
- children’s literature,
- brochures from the Lake Carriers’ Association,
- Great Lakes Environmental Atlas.

The recommendations included:

- providing a guide to show how to use various contents of the chest,
- presenting the chest at more science and social studies conferences so more educators learn about it,
- presenting it to pre-service teachers who will be more likely to incorporate into classroom science and social studies curricula in the future,
- pushing out more information to teachers of the location of the chests throughout the Great Lakes region,
- creating a website clearinghouse with links to webcams and maps that report ship positions, buoy data, etc.,
- adding webquests that students could complete, etc.

## **Dissemination of Study Results**

### **(1) Publications** NA

### **(2) Conference Presentations**

Geerer, Chris. **Great Lakes Barge-Building**. Michigan Science Teachers Association Annual Conference. Ypsilanti, MI. March 8, 2013.

Lund, Mary. *Sunken Treasure: The SPORT a Great Granddaughter's Journey* at Michigan Joint Social Studies Conference. Nov. 2-3, 2012. Macomb County, MI.

Mikesell, Laura. **Great Lakes Shipping Across The Country & Around The World and Great Lakes Floor Map**. Michigan Science Teachers Association Annual Conference. Ypsilanti, MI. March 8, 2013.

### **(3) Use of material in classrooms**

Teachers attending the summer teacher institute were asked to quantify the number of students that they are likely to reach each year with their new lessons about *Great Lakes Maritime Transportation*.

**Great Lakes Maritime Transportation Teacher Institute = 19 teacher participants (2012)**

**Number of Students      Response %      Total Students reached:**

15-25 students	17.6%	3 = 75
26-50 students	35.34%	6 = 300
51-75 students	5.9.6%	1 = 75

76-100 students	0	0
101-125 students	17.6%	3 =300
>125 students	17.6%	3 =400

**Total Number of Students Reached per Year: 1150 students**

**On the following pages is a list of the lessons developed by the 2012 Great Lakes Maritime Transportation Teacher Institute participants.** One teacher withdrew after attending the class, due to losing her teaching job in Detroit Public Schools. Four teachers have not yet submitted their lessons as of this report date.

# **2012 Great Lakes Maritime Transportation Lessons**

Developed by 2012 Great Lakes Maritime Transportation Summer Teacher Institute Participants

## **ELEMENTARY**

- 1. Aggregate Activities!** by Heather Keckes  
1<sup>st</sup> Grade, Science

### **Lesson Overview**

We will explore the connections between mining aggregate materials and their uses and properties through hands on activities. We will identify specific properties of different rock particles and classify them into certain categories. We will also discuss the importance of mining earth materials, as well as how their properties aid in the use of each of these natural resources.

- 2. Great Lakes Geography,** by Lydia Pakenas  
Kindergarten, Social Studies & Language Arts

### **Lesson Overview**

The lesson is intended to introduce kindergarten students to the location of the Great Lakes in context to where they live. Most live only miles away from the Detroit River. I want to use these lessons to build background knowledge of the many resources the Great Lakes offer.

- 3. Vessels on the Great Lakes,** by Lydia Pakenas  
Kindergarten, Social Studies & Language Arts

### **Lesson Overview**

The lesson is intended to introduce kindergarten students to the location of the Great Lakes in context to where they live. Most live only miles away from the Detroit River. I want to use these lessons to build background knowledge of the many resources the Great Lakes offer.

- 4. Comparing Two Towns,** by Donna Vincent  
2<sup>nd</sup> grade, Social Studies & Geography

### **Lesson Overview**

The Overall theme/topic to be addressed is comparing the theme of place between two local communities by constructing maps and using critical thinking skills to see if it's possible for locks to be built at Tahquamenon Falls. This lesson plan connects to the curriculum at my school by dealing with local history of Newberry, MI and Sault Ste. Marie, MI and constructing maps. With this lesson I hope to accomplish the student using map symbols and legends correctly to an authentic learning experience.

- 5. Investigating the Relationship of Mass to Volume,** by Juanita Richardson  
3<sup>rd</sup> grade, Physical Science, Economics

### **Lesson Overview**

Two materials can have the same mass and yet have different volumes.  
Science progresses by asking meaningful questions and conducting careful investigations.  
Scientists share their findings with other scientists to create a shared body of knowledge.

**6. Ships and Shipping**, by Juanita Richardson  
3<sup>rd</sup>-8<sup>th</sup> grades, Social Studies: Economy & Geography

**Lesson Overview**

Students will gain knowledge of the shipping industry using resources from the *Know Your Ships* guide and <http://www.boatnerd.com> website to locate freighters on the Great Lakes, know where they are going to and where they came from, and what cargo they are carrying, as well as the history of that ship.

**7-9. Great Lakes Cause & Effect: The Eastland v. The Tug Sport v. The Arthur J.** by Mary Lund  
5<sup>th</sup> grade, Social Studies

**Lesson Overview**

Students will examine cause and effect relationships related to the sinking of the Eastland, the Tug Sport and the Arthur J. Students will examine YouTube videos, historical publications, current newspaper articles, etc. as to clue words and phrases that identify the cause and effect of each of the three incidents. Students will create a triple Venn Diagram comparing the similarities and differences of the three incidents and briefly summarize their opinion as to the cause and effect of each incident.

**MIDDLE SCHOOL**

**1. The Physical Features of Canada** by Jonathan Hill  
7<sup>th</sup> Grade, Geography

**Lesson Overview**

Students will use a map of the Great Lakes basin, a textbook resource, and the teacher to locate the different physical features and natural resources found in Canada.

**2. The Economy of the St. Lawrence Seaway**, by Jonathan Hill  
7<sup>th</sup> Grade, Geography

**Lesson Overview**

Students will use a map of the Great Lakes basin to make connections between resources and movement of goods. Students will discover the ways in which the Great Lakes affect the economy of Canada.

**3. Model Lock System**, by Barbara L. Maxwell  
Middle School Science or Social Studies

**Lesson Overview**

Students will construct a working lock system and successfully float a marshmallow “boat” through its opening.

**4. Great Lakes Graphing** by Chris Geerer  
6<sup>th</sup> Grade Science

**Lesson Overview:**

This lesson is on graphing skills, but starts with some Great Lakes shipping background to build interest and to lead into a barge building activity for the following week.

**5. Great Lakes Barge-Building** by Chris Geerer  
6<sup>th</sup> Grade Science

**Lesson Overview:**

Students are engaged in the engineering design processes through the design and construction of a Great Lakes barge using a 15 cm<sup>2</sup> piece of foil. Students will measure the mass and volume of the barge and calculate its density with and without marbles (cargo). Great Lakes shipping is a springboard for both local content (Great Lakes literacy) and skills instruction (data analysis and engineering) is a win-win situation.

**6 & 7. Great Lakes Shipping Across the Country & Around the World and Great Lakes Floor Map** by Laura Mikesell  
6-8 grade, Earth Science

**Lesson Overview:**

This is a two-part, 2-day lesson. On Day 1, students utilize the Great Lakes Maritime Interactive Web Module independently on the computer. On Day 2, students work with the teacher and use the Great Lakes floor map to examine maritime shipping--- how/why it relates to them and the types of ships and goods that travel upbound and downbound on the Great Lakes. Students will demonstrate with hands-on authentic assessment their ability to interpret diagrams and data tables on shipping and receiving of goods on the Great Lakes.

**HIGH SCHOOL**

**1. Invasive Species**, by Barbara L. Maxwell  
9<sup>th</sup> – 12<sup>th</sup> Grade, Biology

**Lesson Overview**

Students will collect Zebra Mussels from a nearby lake and experiment with a variety of substances to kill them without harming indigenous wildlife.

**2. Ballast for Balance**, by Mike Clifford  
11<sup>th</sup> & 12<sup>th</sup> grade, Physics or Physical Science

**Lesson Overview**

Students will review the concept of momentum and assess the value of Great Lakes shipping for moving freight. The lesson will begin with problems focused on moment of inertia that lead into the lesson’s focus on *center of gravity* introduced with a demonstration and short PowerPoint.



Through class discussion of the demonstration students will be encouraged to come up with the solution of ballast tanks to stabilize a boat. The lesson will close with a discussion of *invasive species* in ballast water.

3. **Energy Into Steel**, by Michael Clifford  
11<sup>th</sup> & 12<sup>th</sup> grade, Physics or Physical Science

#### **Lesson Overview**

This lesson will take students through the energy transfers that take place during the production of steel. Students will do calculations of energy transfers and compare how much energy recycling steel can save. Energy transformation is an important concept. This lesson will also involve heat, temperature and efficiency. Energy calculations and transformation will be reviewed during this lesson while also informing students about steel production and the importance of recycling.

4. **Great Lakes Natural Resources**, by Robert Ziegler  
9<sup>th</sup> – 12<sup>th</sup>, Ecology & Language Arts

#### **Lesson Overview**

Students prepare reports on natural resources found in the Great Lakes region and their distribution via the Great Lakes. Reports should include information on the direct impact of the removal of these natural resources on the environment as well as the indirect effects that may involve other components of the ecosystem. Students will choose a specific natural resource to research.

5. **Invasive Species: Another Form of Environmental Pollution**, by Robert Ziegler  
9<sup>th</sup> – 12<sup>th</sup> Ecology

#### **Lesson Overview**

Students will research invasive species in the Great Lakes and prepare reports that will be presented to classmates for discussion.

6. **Soo Locks Exploration: The Place Where Michigan was Born**, by Dr. Delbur Reese  
10<sup>th</sup> – 12<sup>th</sup>, Life Science/Social Studies (Special Needs Students)

#### **Lesson Overview**

Students will explore the Soo Locks' colorful history that includes the early native Ojibway Indian residents of the area, via a scavenger hunt titled Locks Quest that challenges students to find the answers to 26 questions about the Soo Locks.

7. **Great Lakes Shipping Routes**, by Dr. Delbur Reese  
10<sup>th</sup> – 12<sup>th</sup>, Life/Earth Science (Special Needs Students)

**Lesson Overview:** This lesson will address the Great Lakes ecosystems, natural resources, water cycles, weather patterns, and the three states of matter in which water on Earth can be found. Students will name the Great Lakes, identify locations of major ports; and examine how human interactions affect the natural resources of the Great Lakes.

8. **Time, Speed, Distance and Great Lakes Freighters** by Deb Del Zoppo  
9<sup>th</sup> grade, Physical Science

**Lesson Overview:**

Students will calculate time, distance, and speed and explain how they relate to one another, and use these to estimate the arrival time into the Ludington Harbor of approaching freighters.

9. **Introduction To Great Lakes Ecology: Where In The World Are We?** by Deb Del Zoppo  
10<sup>th</sup> Grade Biology

**Lesson Overview**

Students will identify the location of each of the five Great Lakes, some notable geological feature of each Lake, and the states surrounding the Great Lakes, plus Canada. Students will explain how the Lakes are interconnected, with flow from one affecting another, and how they act as thermal regulators.

# APPENDIX A

## A-1

### AGENDA

**Great Lakes Maritime Transportation Institute  
Great Lakes Maritime Teacher Institute in Eastern U.P. of Michigan  
AGENDA ~ M-F, July 16-20, 2012 (as of 7-14-12)**

#### **Day 1: Monday, July 16 (Houghton to Marquette, MI)**

- 10 am - Meet Jennifer Huetter, District Mgr Public Affairs, at Iron Industry Museum in Negaunee.  
Tour Cliffs' Natural Resources Tilden Iron Ore Mine & Processing facility.
- 1 pm – Tour Iron Industry Museum
- 2 pm – Visit Cliffs' Natural Resources ore dock, Marquette harbor
- 3:30 pm – Harbor Gentrification & Economic Development by Fred Stonehouse, historian, author, Marquette city commissioner and Vice-Chair Michigan Ports Collaborative
- 7:30-9 pm - Course Overview, Schedule, Requirements & Great Lakes floor map

#### **Day 2: Tuesday, July 17 (Marquette to Sault Ste Marie, MI)**

- 7:00 am – *Intermodal Transportation* by Carol Wolosz, GLMRI Exec. Dir.
- 8:30 am – Depart Marquette. Drive to Munising.
- 9:45 am – Glass-bottom Boat Tour in Munising Harbor
- 1 pm – Drive to Whitefish Point Museum
- 2:30-4:30 pm - Whitefish Pt Lighthouse & Shipwreck Museum
- 5 pm – Drive to Sault Ste. Marie
- 6:30 pm – Dinner at Freighters at Ojibway Hotel
- 8 pm – Soo Locks Visitor Center & Park (open 9 am – 9 pm) *on your own*

#### **Day 3: Wednesday, July 18 (Sault Ste Marie, MI)**

- 8:00 AM Army Corps: water levels, lock operation, homeland security (Kevin Sprague, area engineer)
- 10:00 U.S. Coast Guard Vessel Traffic Service
- 1 pm Tour of *Valley Camp* freighter museum
- 3-4 pm - *Intro to Maritime Jobs* by Rick Brown, The Maritime Academy of Toledo
- 4:30 pm - Soo Locks Boat tour (Dock #2 at 515 E. Portage Ave.)

#### **Day 4: Thursday, July 19 (Sault Ste Marie, to Manistique, MI)**

- 8:00-10:30 am Drive 2.5 hrs to Port Inland.
- 10:30 am Tour Port Inland limestone quarry & port
- 1 pm – Tour of Seul Choix Lighthouse
- 3:00 pm – Tour Fayette Historic State Park (former iron smelting site). Last tour at 3:30 pm.  
Park in handicap lot.; activities on picnic tables by water.
- 4:30 – *Boats & Ships on the Great Lakes* Presentation by Rick Brown, Maritime Academy of Toledo
- 5:30 – Maritime boat-building & Lake Bathymetry activities
- 6:30-8:30 pm – More maritime activities. Return to hotel.

#### **Day 5: Friday, July 20 (Manistique to Marquette to Houghton, MI)**

- 8:00 am *Navigation & the Great Lakes* by Rick Brown, The Maritime Academy of Toledo
- 11:30 – Taking it back to the Classroom
- Noon - Group discussion & wrap-up: *What are the “big ideas” that your students need to know?*
- 1 pm – Course ends. Return to Marquette.

## 2012 Great Lakes Maritime Teacher Institute ~ Teachers' Evaluation Comments

### Which parts of this Teacher Institute will you be able to use in your curriculum?

- Mining, Invasive species
- I can use the information about the history and the use of resources in the economy.
- Information on pollution and invasive species. Plus info on maritime employment will be shared with our business instructor and used during our career day.
- The Lighthouse and the Great Lakes Ship Wrecks.
- As I continue to shape and develop our Advanced Bio class to be exclusively focused on Great Lakes issues, I intend to also inform students of the job opportunities available in the shipping industry.
- Lighthouses and optics, steel manufacturing and thermal energy, or the locks and pressure or buoyancy.
- I believe that developing a mini unit incorporating middle school science GLCE's and many aspects of the institute is appropriate. Mining, geology and responsible use of the earth is of particular use to me and corresponding that with the economic needs of mining make students think twice before taking a side. I like the geography portion of the Great Lakes and understanding the roles the freighters take transporting goods.
- Importance of shipping (form of transportation), student inquiry: where, why and, how about iron ore, limestone etc., career opportunities, identification of ports around Michigan and Great Lakes.
- All.
- The mining and how ships get to Michigan and the natural resources, etc. that are shipped on the Great Lakes.
- transportation, products, mining in Michigan
- I will be able to use the mining information, The Great Lakes and locks information and the shipping information.
- There are many parts that can be implemented in my classroom. I have great pictures to show about the Great State of Michigan. There are pictures to show for the different industries in Michigan (Midwest) that ties into the Grade 4 Social Studies Curriculum with focus on how important the Great Lakes shipping industry is to this region. There were hands-on activities modeled during the Institute. With the many places we visited, there is a wealth of information to give to students about career opportunities in the Maritime Industry.
- Information on mining in Michigan ties with geosphere GLCEs; shipping activity on the lakes ties with hydrosphere GLCEs; weather predictions for mariners ties with atmosphere GLCEs. I especially like the Great Lakes literacy standards - would like to rewrite my curriculum around them!
- Website with interactive games, ideas for lessons.
- Environmental issues, economics, listening and speaking skills, language arts persuasive writing and so much more. The experience was awesome and really motivated me. The presenters were all great.
- All the materials, information, pictures, and videos

**What did you like the BEST about this Teacher Institute?**

- The variety the workshop provided
- The variety of locations visited and the behind the scenes tours
- The amount of info and knowledge I personally gained about the Great Lakes as well as information I can add to my ecology curriculum.
- The field trip to the Soo Locks, Boat Tour, and the Port Inland limestone quarry and port tour.
- The behind the scenes look at The Locks. Without a doubt, very cool. All the "back stage" access to all our stops was wonderful.
- Touring the factories, mines, and the locks.
- I really liked the outdoor field trip activities. We were able to cover many aspects of mining, ship traffic, economics and geography into this week. I liked meeting with the Army Corps of Engineers and the Coast Guard. I especially liked our trip to White Fish Point and the Glass Bottom Boat Tour! Awesome!
- Learning the history and importance of Great Lake shipping while visiting many beautiful landmarks. White Fish Point and the Glass bottom ship wreck tours were two of my favorite places to visit.
- The tours of the various sites.
- I really enjoyed the tour we had at the mine and also the tour at the Soo Locks. I also enjoyed the map activity we had the last day (learning how to pinpoint where a ship is). Sharing ideas with other teachers about everything I learned was great too.
- The behind the scene learning at the mines and the Soo Locks
- The best part of the institute was the exposure to the Upper Peninsula. The distance from the Detroit area makes it seem like another world. The drive was really not that bad. It has motivated me to visit other places in Michigan.
- I liked actually going to all of these places and seeing them in action. All of the speakers were fantastic and gave a wealth of information.
- Awesome access to mining sites and the Soo Locks gave great insight into how the whole system works...solidifying it in my mind so I can teach it well to kids. New respect/interest in shipping on the lakes, as well.
- Visiting the various sites.
- The hands on experience of the tours and discussions.
- Joan and Carol were an awesome team.
- All was new and rewarding.

## **APPENDIX B**

**B-1**

**Great Lakes Maritime Transportation Education Treasure Chest ~ Lending Sites**

	<b>Contact Person</b>	<b>Site</b>	<b>Great Lake</b>	<b>State</b>
1	Beth Landers Tel: 440-3502730	Lake Co. Soil & Water Cons. District 125 E. Erie St. Painesville, OH 44077	Lake Erie	Ohio
2	Wendy Lutzke Tel: 866-724-2356 Ext.115	Wisconsin Maritime Museum 75 Maritime Dr., Manitowoc, WI 54220	Lake Michigan	Wisconsin
3	Tami Schacknies Tel: 269-471-7725 Ext.1124	Berrien Co. Intermediate School District 711 St. Joseph Ave. Berrien Springs, MI 49103	Lake Michigan	Michigan
4	Meaghan Black Education Specialist Tel: 989-356-8805 Ext. 25	Thunder Bay National Marine Sanctuary 500 W. Fletcher St. Alpena, MI 49707	Lake Huron	Michigan
5	Rachel Randolph Museum outreach coordinator Tel: 906-492-3747	Great Lakes Shipwreck Historical Society 18335 N. Whitefish Pt. Rd. Paradise, MI 49768	Lake Superior	Michigan
6	Christine Gerlach Education Specialist Tel: 219-395-1885	Indiana Dunes National Lakeshore 1100 N. Mineral Springs Rd. Porter, IN 46304	Lake Michigan	Indiana
7	Tammy Barrientos Director Tel: 989-964-4117	Saginaw Valley State University Regional Math/Science Center 7400 Bay Rd., University Center, MI 48710	Lake Huron	Michigan
8	Thom Holden / Mary George Tel: 218-720-5260 X. 35272	Lake Superior Maritime Visitor Center 600 Lake Ave. South, Duluth, MN 55802	Lake Superior	Minnesota (2)
9	Loret Roberts Tel: 906-482-0331	Western UP Center for Science, Mathematics & Environmental Education PO Box 270, Hancock, MI 49930	Lake Superior	Michigan
10	Carolyn Rock Park Interpreter Tel: 920-823-2400	Whitefish Dunes State Park 3275 Clark Lake Rd. Sturgeon Bay, WI 54235	Lake Michigan	Wisconsin
11	Carrie Fries Tel: 906-226-2006	Marquette Maritime Museum 300 Lakeshore Blvd. Marquette, MI 49855	Lake Superior	Michigan
12	Dante Centuori Tel: 216-696-2098	Great Lakes Science Center 601 Erieside Ave., Cleveland, OH 44114	Lake Erie	Ohio
13	Art Sulzer, Director Tel: 202- 366-2625	Maritime Academy Charter School Ship Operations Cooperative Program 2 Peter Gamble Lane, Glen Mills, PA 19342	Lake Ontario	Pennsylvania
14	Joann Arasim Tel: 517-373-1905	Michigan Historical Museum 702 W. Kalamazoo, Lansing, MI 48909-8240	Lake Huron Lake Michigan	Michigan
15 16	Gary Goren Tel: 989-354-3101	Alpena-Montmorency Area Educ. Services Dist. 2118 US-23, Alpena, MI 49707	Lake Huron - 2	Michigan ( 2)
17	David Hales Social Studies Consultant Tel: 734-334-1311	Wayne Co. RESA 33500 Van Born Road, Box 807 Wayne, MI 48184-2497	Lake Erie & Detroit River	Michigan
18	Rene Marrazon, Supt. Tel: 419-244-9999	Maritime Academy of Toledo 1000 Monroe St., Toledo, OH 43604	Lake Erie	Ohio
19	Carol Kubert Administrative Support Tel: 586-228-3465	Macomb ISD 44001 Garfield Rd. Clinton Township, MI 48038	Lakes Erie Lake Huron	Michigan
20	Tim Sweet Library Media Specialist Tel: 715-823-7215 ext.3233	Clintonville Public School District 105 S. Clinton Ave. Clintonville, WI 54929	Lake Michigan	Wisconsin



21	Ruth Mancina Tel: 989-752-2861 Ext.315	Castle Museum of Saginaw Co. 500 Federal Ave. Saginaw, MI 48607	Lake Huron	Michigan
22	David Boughton Maritime Educ. Specialist (Marti Martz) Tel: 814-217-9015	Pennsylvania Sea Grant c/o Tom Ridge Environmental Ctr 301 Peninsula Drive, Suite 3 Erie, PA 16505	Lake Ontario	Pennsylvania
23	Rachel Maki Tel: 218- 492-4400 ext. 19	Northern Lights Community School	Lake Superior	Minnesota
24	Terry Toby, Site Manager Tel: 218-226-6372 <a href="http://www.mnhs.org/splitrock">www.mnhs.org/splitrock</a>	Split Rock Lighthouse, MN Historical Society 3713 Split Rock Lighthouse Rd. Two Harbors, MN 55616	Lake Superior	Minnesota
25	Carol Ward Park Naturalist Tel: 216-881-8141 x3001	Cleveland Lakefront State Park 8701 Lakeshore Blvd. Cleveland, OH 44108	Lake Erie	Ohio
26	Dean Haen, Director Port of Green Bay Tel: 920-492-4950	Brown Co. Port & Solid Waste Dept. 2561 So. Broadway Green Bay, WI 54304	Lake Michigan	Wisconsin
27	Marie Nelsen, Secretary Tel: 231-873-6340	Hart Schools 302 W. Johnson St., Hart, MI 49420	Lake Michigan	Michigan
28	Sasha Tetzleff <a href="http://www.sanduskymaritime.org">www.sanduskymaritime.org</a> Tel: 419-624-0274	Maritime Museum of Sandusky 125 Meigs St., Sandusky, OH 44870-2834	Lake Erie	Ohio
29-30	Betty Nowak Tel: 414-286-8131	Port of Milwaukee 2323 S. Lincoln Memorial Drive Milwaukee, WI 53207	Lake Michigan	Wisconsin (2)
31	Lisa Appel Tel: 248-645-3223	Cranbrook Institute of Science 39221 Woodward Ave. Bloomfield Hills, MI 48303	Lake Erie	Michigan
32	Jane Wonders Tel: 920-236-0532	CESA 6 PO Box 2568 801 Elmwood Ave. Oshkosh, WI 54942	Lake Michigan	Wisconsin
33	Joan Voigt	Wild Rose Fish Hatchery – WI DNR N5871 State Road 22 Wild Rose, WI 54984	Lake Michigan	Wisconsin
34	Stacy Tapp	Racine Unified School District Mitchell Elementary School 2713 Drexel Aven., Racine, WI 53403	Lake Michigan	Wisconsin
35	Mike Reed (313) 852-4056	Belle Isle Nature Zoo 176 Lakeside Dr., Detroit, MI 48207	Lake Erie/Detroit R.	Michigan
36	Tobi Voigt (313) 833-0481	Detroit Historical Society Dossin Great Lakes Museum 5401 Woodward Ave., Detroit, MI 48202	Lake Erie/Detroit R.	Michigan
37-41	Kathryn Kwiatkowski Ctr for Sci & Math Educ. Tel: 216-368-5075	Case Western Reserve University Guilford House 412, 10900 Euclid Ave. Cleveland, OH 44106-7158	Lake Erie	Ohio
42	Tamera Steele	Armitage Academy 6032 - 8th Ave., Kenosha, WI 53143	Lake Michigan	Wisconsin
43	Susannah Hamm 440-885-5362	<a href="#">Cuyahoga County Public Library Parma-South Branch, 7335 Ridge Rd., Parma, OH 44129</a>	Lake Erie	Ohio
44	Jay Reynolds	Cleveland State University Biological-Geological Sciences office Cleveland, OH 44106-7158	Lake Erie	Ohio
	<b>TOTAL</b>		6-Superior 14-Michigan, 7-Huron 15- Erie; 2-Ont	21-MI, 2-PA 9-WI, 1-IN, 9-OH, 3-MN