



Great Lakes Maritime Research Institute

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

Great Lakes Maritime Transportation K-12 Education Program for Teachers, Students & Communities

Final Report

Project Period: October 15, 2007 - November 30, 2008

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Great Lakes Maritime Transportation K-12 Education Program for Teachers, Students & Communities

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Executive Summary

This project addressed the GLMRI Focus Area of K-12 public education and outreach programs.

While many Great Lakes residents enjoy ship-watching, few know what is being shipped, nor the economics of shipping. Why is Great Lakes shipping preferable to alternate modes of transportation? How does the system of locks at the Soo, Welland Canal, and St. Lawrence Seaway allow ships to safely navigate waterfalls? How can the shipping industry help slow the spread of invasive species, improve air quality, and help promote biofuels? How does weather affect the speed, route, and amount of cargo ships can carry? How is technology used in navigation? What is the legacy and what is the future of Great Lakes shipping? Few adults and still fewer students can answer these questions. However, the future of the Great Lakes shipping industry depends, in part, on having an informed citizenry.

To address the need for an informed citizenry the Center:

- conducted a 2-day lesson-writing workshop for pre/post-visit use by classroom teachers at Whitefish Point Lighthouse in Paradise, MI, in partnership with the Great Lakes Shipwreck Historical Society;
- conducted three teacher workshops in Hancock, Sault Ste. Marie, and Alpena, Michigan in partnership with two intermediate school districts and the Thunder Bay Marine Sanctuary;
- conducted a 6-day summer teacher institute in Duluth, Minnesota;
- assembled and disseminated 12 Great Lakes Maritime Transportation Education Treasure Chests to museums and education centers in PA, MI, WI, MN with financial support from Lake Carriers' Association;
- made four conference presentations at the Michigan Science Teachers Association, Michigan Council of Social Studies Teachers, National Science Teachers Association, and the Ship Operators Cooperative Program;
- provided incentives for program participants to conduct conference presentations and submit articles related to Great Lakes shipping;
- completed the text and graphic design for "F is for Freighter: An Introduction to Great Lakes Shipping";
- maintained the Great Lakes Maritime Transportation Education website;
- completed the text and graphic design for "K-8 Great Lakes Maritime Transportation Lessons."

Thousands of students and teachers in the Great Lakes basin and nationwide have been and will continue to be reached by the wide variety of educational tools that have been developed between 2006-2008. A summary of outcomes is listed in Appendix J. The project was coordinated by Joan Chadde, K-12 program coordinator for the Western Upper Peninsula Center for Science, Mathematics and Environmental Education at Michigan Technological University.

Implementation of Project Goals & Objectives

1. (Proposed) Conduct a ONE week-long *Great Lakes Maritime Transportation Summer Teacher Institute*.

The summer teacher institute took place July 20-25, 2008 in Duluth, MN, Superior, WI, and Minnesota's north shore, and had ten participants. The institute addressed maritime history, Great Lakes shipping challenges, careers, ports, and cargoes; and required teachers to develop one maritime transportation lesson that could be implemented in their math, social studies, language arts, and/or science classes. A summary of the 2008 recruitment publicity, agenda, and a list of lessons developed by participating teachers is contained in Appendices A-D.

All of the presenters provided their time and expertise at no cost! This represents an approximately \$4,000 value at \$100 per hour x 40 hours. Presenters included: GLMRI, Duluth Seaway Port Authority, U.S. Army Corps of Engineers, U.S. Coast Guard, Lake Superior Maritime Visitors Center, Hibbing Taconite, Great Lakes Fleet, Split Rock Lighthouse, Midwest Energy Resources Co., Burlington Northern Railroad, Murphy Oil, Minnesota Sea Grant, Great Lakes Aquarium, Fraser Shipyards, Harvest States Grain terminal, and UW-Superior Department of Biological Sciences.

Teacher participants were able to earn two graduate credits from Michigan Technological University for their work before, during, and after the Institute. The lessons developed by the teachers will be posted on Michigan Tech's *K-12 Maritime Transportation Education* website, with a link to the GLMRI website. The best lessons will become part of the *Great Lakes Maritime Transportation Educators' Guide*.

Institute participants paid a total of \$450 for the 6-day institute which included 5 nights lodging at Canal Park Inn on Lake Superior, field trip transportation, 2 MTU graduate credits, most meals, and entrance fees. In addition, participants received informational packets, NOAA Great Lakes map, and a CD of Powerpoint presentations made by most presenters, and photos.

A summary of recruitment for the 2008 teacher institute is listed in Appendix A.

"This was the best summer teacher institute yet!"

2. (Proposed) Conduct a 3-day *Great Lakes Maritime Transportation Institute* in eastern Upper Peninsula (UP) and northern lower peninsula of Michigan in collaboration with Great Lakes Shipwreck Historical Society and/or the Thunder Bay Marine Sanctuary in Alpena.

Rather than conducting one 3-5 day workshop for teachers, the Center conducted two workshops totaling 3 days. A workshop was held for 16 teachers in Sault Ste. Marie, MI on May 2, offered in collaboration with the Eastern Upper Peninsula Intermediate School District. The workshop agenda and summary of evaluation comments is in Appendix C.

A second workshop was held on Oct. 2-3 at the Thunder Bay Marine Sanctuary in Alpena, MI with 13 teacher participants. The workshop agenda and summary of evaluation comments is in Appendix E.

3. (Proposed) **Maintain and enhance *K-12 Maritime Transportation Education website***
http://wupcenter.mtu.edu/education/great_lakes_maritime/index.htm

This website lists: programs for educators, educational resources, teachers' newly developed lessons, *Great Lakes Shipping: Across the Country & Around the World* interactive web module, upcoming maritime events, and links. New materials, photos, events, links, etc. were added throughout the year.

4. (Proposed) **Disseminate *Great Lakes Shipping Activity Guide for Educators*.**

The table of contents for this publication is printed in the Appendix. The book draws lessons from all of the professional development that has been conducted 2006-2008. Lessons are posted on the website (See #3 above).

5. **Provided financial incentives for Institute participants to make conference presentations.**

- Lisa Bircher, a 2007 summer teacher institute participant, presented "Invasive Species Into and Out of the Great Lakes" at the Science Educators of Ohio (SECO) Conference on February 7 in Akron, OH, and at the Council of Ohio workshop in Loudonville, OH in April 2008.
- Carolyn Rock, a 2007 summer teacher institute participant, made a presentation using the trunk to nature center educators, naturalists and interpreters on February 22 at the Northeast Wisconsin Naturalist Association (NEWNA) annual meeting.
- Carolyn Rock and Wendy Lutzke, Museum Educator, Wisconsin Maritime Museum, conducted a teacher workshop on Feb. 23, 2008 at the maritime museum in Manitowoc, WI.
- Carolyn Rock, a 2007 summer teacher institute participant, made a presentation using the trunk at the Wisconsin chapter of the National Association of Interpretation conference in Rochester, MN on April 10, 2008.
- Carolyn Rock conducted a teacher workshop on March 8 in Door County, WI.
- Carolyn Rock conducted a family program at the local library in Sturgeon Bay, WI on March 29.
- Carolyn Rock used the trunk for two school groups at Whitefish Dunes State Park where she works (30 students).
- Wendy Lutzke (2007 treasure chest recipient) presented at Elementary School Principals Meeting, Manitowoc, WI.

6. (Proposed) **Disseminated 12 Great Lakes Maritime Transportation Education treasure chests for a total of 24 disseminated in 2007-08.** The chests contain a Great Lakes floor map, cargo sample, children's books, activity guides, and other teaching tools to maritime museums in MI, WI, MN, IL, IN, and OH with financial support from Lake Carriers' Association.

The treasure chests are designed for upper elementary and middle school classrooms and provides a wide variety of resources for teaching about Great Lakes shipping, including sample cargo, such as iron ore (taconite) pellets, coal, salt, limestone; a 12'x14' canvas floor map of the Great Lakes watershed showing major shipping ports, children's books, videos, and several curricula on Great Lakes shipping.

7. (Proposed) **Conduct presentations at state and national conferences to recruit institute participants and disseminate teaching tools.**

- ◆ Presentation at Michigan Council of Social Studies, Detroit, MI, Feb. 26-27, 2008
- ◆ Presentation at Michigan Science Teachers Association, Lansing, MI, March 7, 2008
- ◆ Presentation at National Science Teachers Association, Boston, MA, March 27, 2008
- ◆ Presentation at Ship Operation Cooperative Program conference, Baltimore, MD, April 1-2, 2008

8. (Proposed) Developed “*F is for Freighter: An Introduction to Great Lakes Shipping*” children’s book.

Text for the 26 letters of the alphabet is finalized (see Appendix I). Tom Farnquist, maritime historian with the Great Lakes Shipwreck Historical Society reviewed the text. Susan Sanders has completed the graphic design. A printing quote was obtained.

For either 10 x 7 or 10.5 x 8.125 final bound trim size:

1,000 @ \$6,094.00 (\$6.09 per book)
3,000 @ \$7,992.00 (\$2.664 per book)
5,000 @ \$9,785.00 (\$1.957 per book)

Ten prototype books will be printed to help with raising printing funds.

9. Collaborated with the Great Lakes Shipwreck Historical Society to host 2-day lesson-writing workshop to develop pre/post field trip lessons and activities for teachers at Whitefish Pt Lighthouse in October 2007. A total of twelve lessons were written by participants, edited, and formatted by graphic designer, Susan Sanders. Approximately 100 copies of the lesson notebooks have been distributed. They are now being sold in the Whitefish Point museum store.

Evaluation Measures and Results

To evaluate overall project success, several evaluation measures were gathered. Participants from the summer teacher institute and the four teacher workshops completed evaluations which are included in the Appendices. Participants in all of the education programs conducted over the past three years with GLMRI funding were surveyed in September 2008 regarding long-term impacts. A summary of their comments on the educational value of their experiences and their ability to share their new knowledge with others is included in the Appendix. In addition, teachers and treasure chest recipients provided examples of how they are using the educational materials. Significant findings from the teacher institute evaluation form are listed below.

Dissemination of Results

Publications referencing or related to this funded project:

- *Whitefish Point Lighthouse & Great Lakes Shipwreck Museum K-8 Lessons & Activities*
- YouTube video highlighting Great Lakes Maritime Transportation Teacher Institute in Duluth, July 20-25, 2008 produced by Tim Sweet
- *Great Lakes Maritime Lessons* developed by summer teacher institute participants
- *F is for Freighter: An Introduction to Great Lakes Shipping*

Summary of Publicity & Recruitment for 2006 Summer Teacher Institutes

MICHIGAN

- ◆ Michigan Science Teachers' Association (MSTA) list-serve
- ◆ Michigan *Building A Presence for Teachers* list-serve
- ◆ Email to 1,000+ past MTU teacher workshop/institute participants (2001-2006)
- ◆ Resource agencies & organizations: conservation districts, county extension offices
- ◆ Michigan DEQ statewide Environmental Education website <http://www.michigan.gov/deq/>
- ◆ U.P. Environmental Educators website
- ◆ Michigan Earth Science Teachers' Association (MESTA) website <http://www.mestarocks.org/>
- ◆ Michigan Math & Science Centers list-serve
- ◆ Michigan Project Wild list-serve
- ◆ Michigan Project WET list-serve
- ◆ Michigan Project Learning Tree list-serve
- ◆ Michigan Association of Environmental & Outdoor Educators (MAEOE) list-serve and online calendar
- ◆ Michigan Teacher Network list-serve for MI educational institutions and organizations
- ◆ NMU Seaborg Center list-serve of teachers

WISCONSIN

- ◆ Wisconsin Assn of Environmental Educators (WAEE) wae@uwsp.edu annual conference Oct. 25-27, 2007.
- ◆ Wisconsin Education Association Council (WEAC) <http://www.weac.org/>
- ◆ Wisconsin Center for Environmental Education - UW-Stevens Point www.uwsp.edu/cnr/leaf/sf

MINNESOTA

- ◆ Minnesota SEEK website seek@moea.state.mn.us or mnseek.net
- ◆ University of Minnesota Duluth
- ◆ MN Association for Environmental Education maceinfo@naaee.org
- ◆ Great Lakes Aquarium education@glaquarium.org
- ◆ Minnesota Science Teachers Association (MnSTA)

REGIONAL

- ◆ Great Lakes States Seagrass coordinators; Marie Zhuikov, MN Seagrass, and Steve Stewart, MI Seagrass.

NATIONAL

- National Science Teachers Association March 25-27, 2008

Appendix B

Great Lakes Maritime Lesson-Writing Workshop at Whitefish Point Lighthouse & Great Lakes Shipwreck Historical Museum Oct. 25-26, 2007

AGENDA – DAY 1

- 11:00 am Introductions & Welcome by Tom Farnquist, Director,
Great Lakes Shipwreck Historical Society
- 11:15 Workshop purpose & overview
- 11:30 Introductions by participants
- 11:45 LUNCH
- 12:30-2:00 pm Tour Museum & Lighthouse Station - History & Background
- 2:30 pm Overview of Great Lakes Shipping
- Did You Know – Great Lakes Shipping Pre-/Post-test
 - Great Lakes Shipping Across the Country & Around the World (web module)
 - Great Lakes Shipping from Duluth to the Atlantic (powerpoint)
- 3:30 pm *Identify What We Want Students to Know*
- What do students need to know about this topic relative to Michigan's & Wisconsin's Grade Level Content Standards and relative to living in the Great Lakes basin?
 - What skills do students need to learn to understand this topic?
- 3:45 PM *Idea Pools* – Brainstorm BIG Ideas, Essential Questions, & Desired Background Knowledge
- Brainstorm lesson ideas
 - Create Master List of lesson ideas and post in classroom
 - Each teacher selects one lesson idea to develop outline
- 5-6 pm Reflection & journal-writing: Find a special place and get inspired!
- 6:00 PM DINNER
- 7-9 PM Lesson-Writing Session (work in small groups of 3)
team members work together to share ideas for each lesson topic, including resources, activities, field investigations. Visit exhibit area to connect with the topic, as needed.

AGENDA – DAY 2

- 8:00 AM *Lesson-Writing Session:* in small groups or working individually
- Noon LUNCH
- 1:00 PM Each participants presents a summary of their lesson outline.
Discussion: look for overlap, common themes, reinforcement of concepts, etc.
- 3:00 PM What comes next?
- 3:15 PM Adjourn

Sponsored by Great Lakes Shipwreck Museum at Whitefish Point ♦ Great Lakes Maritime Transportation Institute

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Appendix B

**Great Lakes Maritime Transportation Lesson-Writing Workshop
At Whitefish Point Lighthouse & Shipwreck Museum**

~ October 25-26, 2007 ~

EVALUATION SUMMARY (13 Responses)

	Poor	Fair	Average	Good	Excellent	NA
Logistics:						
1. How well did the registration process keep you informed? <ul style="list-style-type: none"> • Very well indeed. 				1	9	2
2 How did you find the accommodations? <ul style="list-style-type: none"> • Outstanding, the best. • Wonderful • Very comfortable 				2	10	
3. How was the food? <ul style="list-style-type: none"> • I liked everything • Great 				2	10	
Educational Usefulness:						
4. How useful are the educational materials that you received? <ul style="list-style-type: none"> • Very wonderful • Nice to have guidelines and examples from other teachers. 				4	8	
5. Overall, how well did the workshop meet your curriculum needs? <ul style="list-style-type: none"> • Exceeded my expectations. 				3	8	1
6. Would you recommend attending this same workshop to your peers? Please explain: <ul style="list-style-type: none"> • It is a workshop geared to individual/classroom needs/interests of teachers. 	YES 11	NO	MAYBE			
7. How did you hear about the workshop?	Flyer at school 3	White-fish Point 3	Friend 2	Email 2	Website:	Other (be specific)? 1 Joan @ Seaborg conference

8. What did you like *BEST* about the workshop?

- Working as a small group sharing ideas, then coming together to share with full group.
- Many, many great ideas.
- It was a wonderful chance to focus on content and goals and network with other teachers.
- Good access to new materials and resources; the location was inspiring.
- Sharing time, and time to encourage each other on our lesson writing.
- The setting inspires you to inspire the students. Being on-site is very helpful for hands-on information gathering.
- I liked being able to develop a lesson plan based on what I know my students need to learn. Staying at Whitefish Point during the lesson writing process was excellent because it provided such focus and inspiration.
- All the ideas. The location!
- The accommodations were wonderful. I really enjoyed the enthusiasm and creativity of all the teachers.
- Networking, brainstorming with group. Teachers were all great – as was the facilitator. Very hospitable and exciting place to be.
- Learning about Michigan. Meeting new friends. Getting good information and resources to use later.
- Time to share ideas with other teachers was most informative.
- The hands-on experience. The guides were fabulous and very proud of this location. What a nice way to get excited about teaching.
- The great atmosphere! Everything from the setting, the food, the accommodations and especially the people were top notch!

9. Suggest ways to improve the content or schedule of the workshop.

- I enjoyed everything about this workshop. Thanks.
- I think the schedule was fine – structure provided, and then support offered as we worked on our lessons and integrated materials. Two days worked well for me also, as it's hard to stay away longer.
- I'm glad you moved the cranberry tour to the first day. Maybe schedule some time in for Tahquamenon Falls.
- Joan did an excellent job of setting up the content and schedule. When something works so well, don't "fix" it!!
- Weather permitting, meet outside for some part of the day. What a view!
- A little confusion on the objective. Are lessons based on Whitefish Point museum visit or any maritime themed topic?
- Keep doing it.
- Take the whole first day to explore and see and hear the presentations rather than trying to rush everyone to get to writing the lessons. Let the day go as long as it needs to.

Other Comments

- Everything was great! Thanks for providing such a quality product. Great opportunity!
- Thanks and Kudos! To the Whitefish Point staff! Everything was absolutely wonderful, from the food to the accommodations and tours! Wow!

*Western Upper Peninsula Center
for Science, Mathematics and Environmental Education*
EVALUATION SUMMARY

Workshop Title: Great Lakes Maritime Transportation Workshop

Date: May 1, 2008

Location: EUP-ISD

Instructor: Joan Chadde

	Poor	Fair	Average	Good	Excellent
Overall Content:					
Useful ideas, techniques, and skills were presented.				9	7
The handouts enhanced my learning experience.			1	7	8
The activities enhanced my learning experience				10	6
The information was relevant and useful.			1	8	7
My understanding of the topic was increased.				7	9
I would recommend this workshop to others.			1	9	6
Presenter:					
...held my interest.			1	8	7
...was knowledgeable about the topic.				9	7
... responded effectively to questions.				7	9
...delivered content in a structured manner.			1	8	7
...was easy to follow and used relevant examples.				10	6
... provided opportunities for active participation.			1	8	7
... kept the pace appropriate for the content.			1	10	5
... used handouts to enhance the workshop.				10	6
...facilitated activities effectively.			2	7	7
... motivated me to apply what I learned.			1	7	8
... overall, the presenter met my expectations.				9	7
Logistics:					
The workshop site was comfortable.			2	4	10
The presenter and visual aids were easy to see.				6	10
The registration process kept me informed.			3	5	8
Educational Value					
Classroom resources provided			1	3	11

What did you like BEST about this workshop?

- Speakers
- The pace! It was well worthwhile!
- Historical Shipwreck presentation
- Local Information
- Moving to different spots
- Tours (2)
- Materials and lesson plans and chance to look at activities
- Very informative and useful for our area
- Coast Guard info and Captain Ed
- Videos and photos

How could this workshop be improved?

- Everything felt very rushed
- It was great!
- Not so time crunched
- Better time coordination
- Field trips in the A.M and lecture in the P.M.
- 2 days

Please comment on each part of the workshop.

1. Great Lakes Shipping “*Did You Know*” Pre-Test

- Loved this-amazing facts
- Good information, but hard to follow along
- Good idea to test “students” prior knowledge
- Interesting focus device
- Super- didn’t know much!
- Ok
- Enjoyable
- Neat
- Very good
- Not here
- Great information
- Good idea
- Informative

2. Overview of Great Lakes Maritime Transportation (powerpoint)

~ Joan Chadde, Western UP Center for Science, Math & Environmental Education

- Excellent
- Great intro!
- Great information
- Thanks!

C-2

- Good to see you again
- Great
- Good
- Very interesting and important facts
- Good intro
- Nice brief, good facts
- Informative
- Very interesting info, I will use this to show my students

3. Great Lakes Maritime Transportation Activities

- Great Lakes Shipping & Receiving Ports
 - Looks like fun
 - Great and interactive
 - Good activity
 - Loved this hand-on experience!
 - Useful for classroom K-6
 - Good
 - Wonderful
 - Hard! My students could do this with help
 - Great
- **Great Lakes Ship Cargoes & Products - matching the cargo with its product**
 - Started out confusing, but caught on
 - Great and interactive
 - Good activity
 - Never thought about lots of this
 - Useful for classroom K-6
 - Good
 - N/A
 - Great
 - Very difficult
- **Plot the Path – find safe passage into the harbor for your ship**
 - Great for middle school application
 - Great and interactive
 - Good activity
 - Super activity
 - Useful for classroom K-6
 - Good (2)
 - I'm going to try this!
 - Great
 - Excellent for 6th grade
 - A little too young for my kids, but could be adjusted

C-3

- **What Floats Your Boat – who can build a boat that holds the most cargo?**
 - I have seen this before
 - Good
 - N/A
 - Didn't get to do this
 - Good

- **Great Lakes Shipping Education Resources in the “Treasure Chest”**
 - I will check this out!
 - Okay
 - I'd like to borrow this before our trips to Whitefish Point
 - Awesome
 - Good
 - Lots of cool things
 - Can't wait to use
 - Great and interactive
 - Excellent

4. Whitefish Pt & Great Lakes Shipwreck Museum & What Happened to the Edmund Fitzgerald?

~ Tom Farnquist, Director, Great Lakes Shipwreck Historical Society

- Super, can't wait to visit
- Adaptable to early elementary
- Thanks for coming
- So informative
- Very interesting (2)
- Excellent
- Very good (2)
- Cool
- Wonderful
- It was nice to hear the diver/teacher perspective!
- Awesome
- Excellent opportunities

5. *Life Aboard Lakers: job/life of a ship captain, federal pilots, job outlook, benefits, pay* ~ Ed Harris, Captain Tel: 231-342-1651

- So interesting!
- Awesome
- Enjoyable and informative
- Wonderful
- Very informative
- Excellent (2)
- Very good

C-4

- Good presenter
- Really informative and good information for our students
- Very interesting
- Learned new things
- Very informative/interesting

6. *Wrecks & Rescues* ~ Carrie Miller, Newberry Middle School

- Awesome
- Looks great!
- Adaptable to other grades
- Not enough time
- Good (2)
- Short
- Great ideas-I appreciate the comments and ideas we discussed informally!

7. **Tour of U.S. Coast Guard Vessel Tracking System & role in shipping and invasive species control**

~ LCDR Chris Friese, Mr. Mark Gill, LTJG Caren Damon

- Wow! They do more than I realized!
- Great (2)
- Super
- Awesome
- Enjoyed
- Could have skipped the conference room
- Very good
- Very interesting
- Excellent info! I loved seeing behind the scenes
- Interesting

8. **Water Level Management, Lock Operation, Security & Tour of Army Corps' facility at Soo** ~ Al Klein, Area Engineer, Tel: 906-635-3464

alvin.j.klein@usace.army.mil

- Great tour! (2)
- Needed more time
- Very good (2)
- Wanted to touch ship
- Informative
- Fascinating!
- I've never been "behind the scenes." I plan to attend Engineer's Day!

C-5

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Great Lakes Maritime Transportation Summer Institute

~ Sunday, July 20 to Friday, July 25, 2008 ~

Sunday, July 20

5 pm (CST) Check into Canal Park Lodge (250 Canal Park Dr., Tel: 218-279-6000)

7-9 pm (CST) Course overview, introductions & Great Lakes Maritime Treasure Chest activities

Monday, July 21 – How Great Lakes Shipping Fits into Overall U.S. & Global Transportation of Goods

8:00-9:30 am *Transportation Logistics Overview* by Dr. Richard Stewart, GLMRI co-director

9:45-10:45 Shipping routes, cargoes & challenges on the Great Lakes
by Mr. Ron Johnson, Duluth Seaway Port Authority

11:30-1:00 Lunch & Harbor Tour aboard *Vista Queen* - Ron Johnson, Duluth Seaway Port Authority

2-5 pm *Lake Superior Maritime Visitor Center Programs & Tour* by Thom Holden, USACE

Tuesday, July 22 – Following a Raw Material from Source to Ship Cargo

9:30-Noon Tour iron ore mine & taconite processing plant

Noon Lunch at mine hosted by Hibbing Taconite

3:00 pm Tour S.S. William A. Irvin Lake Freighter

4:00 pm Great Lakes Aquarium *on your own* (open 'til 7 pm)

Wednesday, July 23 – Terminal Operations & Ship Repair

8:30 am Presentation & tour Midwest Energy Coal terminal (Tom Nicodemus).
Tour of American Integrity ship.

12:30 pm Burlington Northern Taconite Facility & Ore Docks (Gary Amos)

2:00 pm Harvest States Grain terminal (Richard Carlson)

4:00 pm Fraser shipyards (US Coast Guard cutter Alder in dry dock) – Gene Walroos

6:30 pm Dinner with Ken Gerasimos, Port Captain, Great Lakes Fleet/Key Ships, Inc.

Thursday, July 24 Shipping Logistics and Safety of Ships & Crew

9-10 am *Shipping Logistics* by Katie Ferguson (Great Lakes Fleet) at Canadian National Ore Dock

11 am Split Rock Lighthouse

2 pm Tour of Split Rock Lighthouse

3-5:30 pm *Coast Guard responsibilities for maritime transportation*

Friday, July 25 Challenges of Shipping: Potential Pollution & Ballast Water Management

7:45 am *Exotic Species & Ballast Water Management* by Dale Bergeron, MN Sea Grant

9:00 am Refueling ships - tour of Murphy Oil by Joe Cuseo

10:30 am *Ballast Water Management Research* by Mary Balcer, UW-Superior

1:00 pm Discussion & course evaluations

2:30 pm (CST) Course ends; depart Duluth

Great Lakes Maritime Transportation Teacher Institute

~ July 20-25, 2008 ~

EVALUATION SUMMARY

Your opinions and suggestions are important to us. Please respond thoughtfully to the following questions so that we can make necessary improvements to next year's teacher institute.

10 Responses	Poor	Fair	Average	Good	Excellent	NA
Logistics:						
1. How well did the registration process keep you informed?				2	8	
2 How did you find the accommodations at Canal Park Lodge?			1		5	4
3. How was the food throughout the week?					10	
Educational Usefulness:						
4. How useful are the educational materials that you received?				1	10	
5. Overall, how well did the variety of activities meet your curriculum needs?					10	
6. How well did the course meet your personal learning objectives?					10	
7. Would you recommend attending this same institute to your peers? Please explain:	YES 8	NO	MAYBE			
8. How did you hear about the Institute?	Flyer at school 3	News paper	Friend 1	Email List Source: 1	Website List: 1	Other (be specific): 6

Other:

- LSMAA
- Joan at SOCP Conference (2)
- Co-worker
- Wendy Lutzke at Wisconsin Maritime Museum (2)

D-2

9. Suggest ways to recruit more teachers in your state for next summer's institute. Providing names of specific people or organizations would be greatly appreciated.

- Make sure the school districts are aware of the institute through email and newsletters
- Use Wisconsin Science Teachers (WSST) organization, maybe someone to present at, share some activities we did from the chest and lighthouse workshop.
- More SOCP conference to get the word out
- Send materials directly to curriculum directors or department heads in school districts
- We present "the box" at L.S.M.M.A this is a contact for teachers in the area. As a resource person I can go out and intro to teachers in Duluth.
- Send emails/flyers to all school districts near the Great Lakes. Send to local libraries and universities.
- I suggest using teachers that previously attended the institute as contact persons for his/her school. They could promote it in his/her buildings.
- I would like to purchase a learning trunk for my school district (Clintonville Public Schools, WI). I could share those materials and video clips, along with my personal testimony advertising for other educators to sign up for the course.
- Providing names of specific people or organizations would be greatly appreciated. I feel that if more specifics of the course were included in the class description more people would be interested in the class. It was the best class I have ever taken and I would recommend it to anyone!

10. How useful were the pre-course readings and websites to enhance your content knowledge and prepare you for the course?

- The articles were more very helpful and not too many.
- They were helpful, but the hands on experience would be just as good without the readings
- It was really great to have the pre-course readings. It really set me up with some knowledge that prepared me for the class.
- Gave me background information about maritime transportation to help me build knowledge on new experiences I was having. I love the interactive website that I will use some parts of with my students.
- Good—not too overwhelming but enough to get started.
- Very useful. I plan on accessing them again
- They fit in very well. Some did not interfere with my computer
- Good intro to make me familiar with some of the topics.
- Yes they were. I especially appreciate the websites and will continue to use them.
- They were helpful. I could have spent more time previewing the materials then I did.

11. Which parts of the Great Lakes Maritime Transportation Teacher Institute will you be able to use in your curriculum or work?

- I will be able to use all parts of the institute to write articles. I know "The Beacon" (Great Lakes Lighthouse Keeper Association newsletter) and "Lighthouse Digest" (yes, there really is such a publication) will publish stories and photos about your project. I will also share this information with teachers in my district.

D-3

- I will be able to make use of the taconite mine, Midwest energies, grain and or docks, and Murphy's Oil as part of the supply chain
- The aspects of how raw materials are processed. The different legislation/regulations each industry has linked to the environment. The various careers.
- Touring in Duluth. Alder, MET maybe others
- Almost anything could be used in some way!
- Great to understand how other areas/systems work. Will provide context for compare/contrast to Seattle
- Pictures taken of taconite process, storage, and movement. Pictures taken of American Integrity loading. My own updated information about logistics and movement of ships on the Great Lakes
- Jobs in the maritime industry career
- Almost every part of the week will help in my econ lesson planning
- Shipping logistics and overall transportation logistics
- I will be able to teach my students about the split rock lighthouse, the 1,000 footers, the processing of iron ore at the Hibbing mine, invasive species, Great Lakes shipping, and the sinking of the Edmund Fitzgerald.

12. What did you like *BEST* about the Great Lakes Maritime Transportation Teacher Institute?

- Loading of the coal on the ship
- Fraser shipyard trip
- Vista Queen tour
- Transportation logistics with Dr. Stewart (2)
- The up close and personal tours
- The participants
- Going on American Integrity
- Being able to tour sites—the mine, terminals, and facilities. Seeing things from the water
- The fact that we, as a group, to get so in-depth, inside views of such amazing facilities and vessels. It was truly a once in a lifetime experience! It make many other tours I've been on seem so tame in comparison
- The ability to see first hand how the products move with the good, bad and ugly things happening and in the past.
- Getting aboard different vessels—very hands on!
- I appreciated the passion the presenters had for their work. The connection between academia and the private sector was quite clear. Touring an active freighter was an unexpected thrill.
- Boarding the American Integrity was the best part for me
- I liked that we had so many field experiences. It really helped me to learn by doing.

13. What did you like *LEAST* about the Great Lakes Maritime Transportation Teacher Institute?

- **There was not one single thing that I didn't like about the Maritime Transportation Teacher Institute.**
- The grain dock tour presenter seemed less than enthusiastic about our group
- The grain elevator—not interactive; it would have been neat to see a train unloaded

D-4

- The tour of the grain elevators
- Stairs
- Getting off to such a late start Sunday night, made being ready for Monday difficult. Otherwise it is hard to say what I liked the least... each experience was related, authentic and interrelated. One experience reinforced the others.
- The grain terminal was the least interesting to me.
- It was all good. Would have liked a little decompress time to digest info
- **Nothing... lack of time...so much to do...wonderful**
- **Nothing, I had a great time and enjoyed all aspects of the institute!**
- The Coast Guard boat tour

14. Suggest ways to improve the content or schedule of the Great Lakes Maritime Transportation Teacher Institute for next year.

- I thought the first night (Sunday) was too long. I enjoyed the introductions and an overview of the week, but thought the activities could have waited until the next day
- I thought every part of the institute was great!
- Ending by 1:00 for those making plane connections or driving long distances. Box lunch to go...ends it all.
- Continue time to meet with captains/presenters in hospitality room before sitting at table for dinner
- Continue with same experiences (felt all were valuable)
- More hands on demonstrations of how to use these in lesson plans. Similar to Maritime Museum presentations
- Content was very accurate and well aligned with what we actually did. My expectations, based on the context of the schedule were certainly satisfied by what we actually experienced!
- More time to digest information and finish assignments. Less late schedules
- Provide better ways of hearing presenters. Hearing at mine or at the restaurants allowed other things to interfere with attention and rudeness to presenters. And missing the information, therefore it couldn't be used.
- More time to process
- Maybe shorter institute or choose a different port along the Great Lakes
- Perhaps one block of free time during the week (afternoon or evening) for some down time.
- We had a pretty tight schedule. However, it was incredibly awesome to be able to experience all that we experienced in one week. Totally awesome.
- The quality of the presenters makes a big difference
- All in all, this was an amazing amount of information and real life learning experiences all of which was well linked and integrated. The depth of the information shared and the amount of time-days resulting in an absolutely fantastic immersion experience that could never be duplicated by simply reading books or watching movies.

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Appendix D

Great Lakes Maritime Transportation Teacher Institute ~ July 20-25, 2008 PARTICIPANT RESPONSES

List the **TOP FIVE EDUCATIONAL** activities which most enhanced your understanding of Great Lakes Maritime Transportation:

1. Dr. Stewart's overview presentation on Transportation: the Hidden Empire (6)
2. Midwest Energy loading facility (5)
3. Ron Johnson's presentation & Harbor Tour (4)
4. Iron Ore mine & mill tour (4)
5. Fraser Shipyard & Alder in dry dock (4)
6. BNSF Taconite loading facility (3)
7. Katie Ferguson – Great Lakes Fleet (2)
8. Mary Balcer research lab (2)
9. Dale Bergeron & Doug Jensen's presentations on Invasive Species & ballast water (2)
10. Murphy Oil (1)
11. Irvin Tour (1)
12. Dinner with Captains (1)
13. Split Rock Lighthouse (1)
14. Maritime Museum Tour & activities (1)

List the **TOP FIVE** activities which you **MOST ENJOYED** as part of the Great Lakes Maritime Transportation Teacher Institute (feel free to repeat items listed above):

1. Guided Harbor Tour aboard Vista Queen (6)
2. Iron Ore mine & mill tour (5)
3. Tour of American Integrity 1000-footer (4)
4. Tour aboard Coast Guard rescue boat (4)
5. The participants! (3)
6. Dinner with Captains (2)
7. Great dinners! (2)
8. BNSF Taconite loading facility (2)
9. Irvin Tour (1)
10. Fraser Shipyard (1)
11. Maritime Museum Tour & activities (1)
12. Dr. Stewart's & Ron Johnson's presentations (1)

Great Lakes Maritime Transportation Teacher Institute ~ July 20-25, 2008 ~
EVALUATION SUMMARY

Your opinions and suggestions are important to us. Please respond thoughtfully to the following questions so that we can make necessary improvements to next year's teacher institute.

Please provide feedback on the individual sessions. How could each session be improved?

MONDAY

Topic: <i>Overview of Shipping presentation</i> Presenter: Ron Johnson, Duluth Seaway Port Authority	Poor	Fair	Average	Good 4	Excellent 6
Comments: <ul style="list-style-type: none"> • Ron provided a good overview • Very good info/overview • Much background • The timing and placement of Ron's presentation was perfect. He did a great job of sharing information that very quickly made us more alert to the many great things we were exposed to throughout the week • Great background discussion to prepare for so many first hand experiences later in the day—understanding of transportation is in flux, explanation or new terms (intermodal, multimodal). • Very informative • Felt a little rushed—would have enjoyed to hear more about the port. • Very nice to get an overview of the week 					
Topic: <i>Transportation Logistics & Great Lakes Shipping</i> Presenter: Dr. Richard Stewart	Poor	Fair	Average	Good 2	Excellent 8
Comments: <ul style="list-style-type: none"> • Wonderful beginning to the week • Dr. Stewart was very knowledgeable in the field of maritime transportation. He also gave me wonderful advice and ideas that should help me in creating lesson plans • 2 thoughts to remember <ul style="list-style-type: none"> ○ 1. freight like water follows the path of least resistance ○ 2. transportation is in flux • I gained so much information about transportation of goods and raw materials • The timing and placement of Dr. Stewart's presentation was perfect. He did a great job of sharing information that very quickly made us more alert to the many great things we were exposed to throughout the week • This set the stage to show the interrelationships of economics • Great overview; good intro to rest of events • Great information • An excellent person to start the week. Provided a useful knowledge base. • Richard's presentation to the economics and interrelations of transportation systems gave me a good base of knowledge to set the stage for the week. 					
Topic: <i>Duluth-Superior Harbor Tour</i> Presenter: Ron Johnson, Duluth Seaway Port Authority	Poor	Fair	Average	Good 1	Excellent 9

Comments:

- Both Ron and Dr. Stewart were a great team of narrators
- A handout that outlines the tour would be helpful
- I loved the explanations of what I was seeing. The information as well as digital pictures will become part of a new “snap book” to discuss a working port for my students before visiting the Wisconsin Maritime Museum.
- Great way to see the port
- Repeat?
- Very good info; good food
- I enjoyed the boat tour with narration by Ron. He was very knowledgeable and did a good job of sharing.

Topic: <i>Lake Superior Maritime Visitor Center</i>	Poor	Fair	Average	Good	Excellent
Presenter: Thom Holden & staff			1	2	6
<p>Comments:</p> <ul style="list-style-type: none"> • A little long about the Edmund Fitzgerald. Perhaps a video would serve better here. Very good educational ideas for my students • The Edmund Fitzgerald talk went too long, but the 1st demo was great • The actual activity of being a lock is a hands on activity to help promote understanding • The student based lesson approach was an excellent way to share information with educators. You gave me immediate, terrific lessons that were engaging—to share with elementary students • Good job showing how they teach lessons • The experiences to understand how locks work as well as displacement activity were great ways to discuss topics and to form better understanding for students—loved the active learning and quick tour around the facility that are able to go back and explore independently. • I enjoyed the interactive techniques used to explain the different topics covered • Really enjoyed the hands on activities especially how a boat floats. Didn't have time to tour the facility though. • Excellent enthusiasm. Great to hear and see the story of the Fitzgerald. Excellent demonstration of a ship sinking. 					

TUESDAY

Topic: <i>Tour of Hibbing Taconite Iron Ore Mine</i>	Poor	Fair	Average	Good	Excellent
				2	8
<p>Comments:</p> <ul style="list-style-type: none"> • Very educational • Great little baggy; good hosts • Would be cool to see it on a day they blast • Excellent tour. Great at answering questions. The tour really expanded my knowledge of the complex process of iron ore pelletization. • These guys were very good and personable presenters • Get a guide in each vehicle. Great to see size and seeing sequence of product movement. It shows the need for reclamation of the original non-mine set. Note: See what the lignite miners do in the Dakotas • These guys were so enthusiastic • Great tour • Some of my misconceptions of mining have been dispelled. • Excellent chance to see all the workings of the mine and to have questions answered. Great lunch • Appreciated the video of mining and samples!! • This was one of my favorite tours of the week • Great tour—it was nice to have tour guides in both vehicles, unlike the tour at the Taconite facility 					
Topic: <i>Tour of S.S. William A. Irvin</i>	Poor	Fair	Average	Good	Excellent
			1	4	5

Comments:						
<ul style="list-style-type: none"> • This tour provided a great opportunity to see the inside of a ship • Great opportunities to take pictures of the dock—I have a much better understanding of hatches, tunnels, and ballast • Life on ship would be nice to compare to current day life on a ship (quarters, hatches, guests) • I was able to take several pictures that will allow my students time to discuss how used on ship—tube to call captain, swing, and stove with braces to keep pots on stove. • Fantastic! I collect books with photos of interiors of fancy passenger ships and ferries from years past. This is the first time I've actually toured one. I really didn't even know there were any restored or preserved ships with passenger quarters to view. It was a rare treat! • This tour gave good information of life about a freighter in an earlier era. • Good info. Good connection to shipbuilding/history • Very historical perspective but doesn't fit with topics/issues of the day. • Really interesting and very informative. What an incredible tour. 						
Topic: <i>Great Lakes Aquarium</i>		Poor	Fair	Average 1	Good 1	Excellent 3
Comments:						
<ul style="list-style-type: none"> • N/A (5) • Some good exhibits • I liked the attention given to the historic social change and influence in relations to the local geography. The contributions of the local arrowhead hobbyist/geologist was very interesting • A very nice aquarium! The aquarium should be the first stop on Wednesday morning. This activity would be great to start a day. Specifically the interactive Great Lakes model. • Really interesting. What a nice addition to the class! Very cool to see the large fish that live in our Great Lakes. • Great to have the director interact with us at various times. • Great displays—especially review of lock system 						

WEDNESDAY-THURSDAY

Topic: <i>Shipping Logistics (in Two Harbors)</i>		Poor	Fair	Average	Good 2	Excellent 7
Presenter: Katie Ferguson						
Comments:						
<ul style="list-style-type: none"> • Excellent, but too short • Katie provided energy to a topic that would have been dry without her enthusiasm • Katie did a wonderful presentation and the handouts are so useful • Great to watch the cars unloading and to learn the ways ships are loaded from the two docks • This is one awesome, tough, intelligent lady! More young students need to see someone like her in action! They will soon shed the image that a career in shipping is only for men or that women lack the tenacity to work in this kind of environment. • She was very vivacious and fun to be around. Some of her info was repetitive • Katie was a very enthusiastic presenter with good information about the Great Lakes fleet • What a presenter! She kept me interested! • Highly knowledgeable and enthusiastic speaker • Very spirited individual. Great presentation. Great at answering questions. 						
Topic: <i>Tour of Split Rock Lighthouse</i>		Poor	Fair	Average	Good 1	Excellent 9
Comments:						
<ul style="list-style-type: none"> • Excellent historical perspective • The film was very creative. The guide was also helpful and it was just a beautiful place • Jenny was an excellent tour guide who added lots of interesting personal comments. I could tell she really loved the lighthouses. So did I. What a beautiful spot! 						

<ul style="list-style-type: none"> • This is a place people could go to independently but it tells such an important part. The presenter was very enthusiastic with lots of on hand information. • An excellent example of historic preservation. What a beautiful place! • Tour guides very helpful. Really great to learn the history behind the light house. Gorgeous view. • Maybe more about other aids to navigation—why, what they represent • Impressed that Jenny was busy but arranged her schedule so that she could accompany us on part of the tour. • The film was so helpful in learning the history • Spot was so scenic and took some wonderful pictures • I liked the more historic focus of the Split Rock tour. It was a good change of pace from the rest • Excellent tour guide, nice diversion 						
Topic: <i>Coast Guard boat tour of harbor & Responsibilities related to Shipping</i>		Poor	Fair	Average	Good 1	Excellent 5
Comments: <ul style="list-style-type: none"> • Could be skipped—the Vista Queen with Dr. Stewart gave us info • Young men offered good information about their responsibilities in Duluth • The officers were very helpful. The trip out was exciting • The boat was great, however, a more structured presentation would be more informative • A great experience to be on a Coast Guard vessel • Patient in answering so many questions • Awesome to learn more about the coast guard and the different ranks and their duties. Excellent to actually get to go for a cruise on the boat. 						

FRIDAY

Topic: <i>Invasive Species & Ballast Water</i>		Poor	Fair	Average	Good 4	Excellent 6
Presenters: Dale Bergeron & Doug Jensen						
Comments: <ul style="list-style-type: none"> • Looking forward to getting the information from Dale and Doug which were presentations that extended my knowledge base. I am appreciative of the information on experimental projects. • Dale was a wonderful asset to the program. His presence brought the institution to a new level. • Good host • Other than the technical difficulties, Dale has a wealth of knowledge. Between Doug and Dale is a lot to digest in a limited amount of time. • Excellent speaker, knows his stuff • Dale's info had to be too rushed and it was hot and dark making it hard to attend. That's hard on him. He led info all week. • Good combination • Too short • Very interesting. They were both very helpful and great presenters 						
Topic: <i>Murphy Oil</i>		Poor	Fair	Average	Good 1	Excellent 8
Presenter: Joe Cuseo						
Comments: <ul style="list-style-type: none"> • Very interesting tour • Very personable doing an excellent job for the lakes preventing spills for future generation. I like that you are so vigilant. • Mr. Cuseo's presentation was thorough and well explained • This was fascinating to learn that there is only one fueling station for ships on the entire lake. 80,000 gallons of fuel at \$4.50/gal is mind boggling. • Very personable and knowledgeable • I enjoyed the tour a lot • It was another opportunity to see technology at work. It was so interesting to learn about how the fueling of a vessel really work 						

- Really great facility. Interesting to learn about such a huge fueling station for the ships. What a well organized and clean station. Joe was very kind and answered questions well.

<i>Topic: Exotics & Ballast Water</i>	<i>Poor</i>	<i>Fair</i>	<i>Average</i>	<i>Good</i>	<i>Excellent</i>
<i>Presenter: Dr. Mary Balcer, UW-S</i>				4	6
Comments: <ul style="list-style-type: none"> • Really good to see the hard “science” aspects • It was a special opportunity to get inside your labs • I enjoyed listening to the scientists explain the problem vendors are trying to solve and the data collection process that is going on at UWS and out at the tank site. Good to know about all the project sponsors. • Dr. Balcer’s energy for her work was obvious. Her passion for an important issue is inspiring • Great to see their labs • Great PowerPoint presentation • Helps show how academia and industry work together to share information and develops solutions for problems based on the research not knee jerk NIMBY comments • Very genuine and enthusiastic. Very interesting. 					

Other comments

- Amazing overnight accommodations! Wow!
- Joan and Dale and the rest of the group put together an excellent week of activities. Your skill at grant writing and planning are wonderful examples for students (like us) to see. I was very impressed with how well coordinated and informative the entire week was for all of us. Thank you!! -- Tim Sweet
- Overall experience was excellent! Wonderful program planning and logistics
- More time with the presenters would have been appreciated. The sequence of product to market makes very interesting hands-on experiences to pass onto young minds. I would go again in an instant. I have plans to share many of the projects with Mary George at the Lake Superior Maritime Museum and present the materials to teachers. I also plan to be active at the museums as a tour guide!
- This is by far the best continuing education activity I've ever been involved with. Fred Kramer, Gr. 4 teacher, Luxembourg-Casco Intermediate School, Luxembourg, WI.
- Thanks again for a thoroughly amazing experience. I have already shared it with a number of educators in our district. It would be a thrill to know that some of them sign on for next summer! Thanks also for the great feedback you have shared from participants, such as Ken Gerassimo. It really was a special treat sharing social time with the two captains. This was truly one of the most well rounded educational experiences an educator could hope for! Angela Janda, Gr. 2 teacher, Manitowoc, WI

Midwest Energy Coal Terminal

- I'll look differently at the large pile of coal at the beginning of our port—know more about process to get there.
- Loved going on the vessel (2)

Taconite Facility

- Excellent
- Great chance to see movement of taconite to port (2)
- Fun watching the great machines at work!

Harvest States Grain

- It would have been helpful to see a train unload or a ship loaded.
- Good
- Learned about curve in chute in self loaders of grain
- Interesting to see quality control in operation

Fraser Shipyards

- Loved walking in and experiencing the dry dock
- Excellent

Shipping on the Great Lakes Teacher Workshop

6-9 pm, Thursday, Oct. 2 and 8:30 am – 4:00 pm, Friday, Oct. 3, 2008

Great Lakes Maritime Heritage Center & Thunder Bay National Marine Sanctuary in Alpena, MI

For: Grades 1-8 Social Studies, Language Arts, Math and Science teachers

Location: Thunder Bay National Marine Sanctuary, 500 West Fletcher St. in Alpena

Credit: 1.0 SB-CEUs (Free) or one MTU graduate credit (scholarship) or 1 NMU ED 989 credit (additional cost)

To Register: Contact Joan Chadde, Western U.P. Math/Science Center (Tel: 906-487-3341 or jchadde@mtu.edu)

Information: Cathy Green, Thunder Bay Marine Sanctuary (Cathy.Green@noaa.gov or Tel: 989-356-8805)

Thursday, October 2, 2008

6:00 Sign-in & Dinner

6:30 pm Introductions, workshop overview, pre-test

7:00 pm ***Overview of Great Lakes Maritime Transportation & Shipping Logistics***
by Katie Ferguson, Sales, Marketing & Traffic Analyst, Great Lakes Fleet and Alpena HS grad (2001)!

8:15-9 pm ***Tour of new Great Lakes Maritime Heritage Museum*** by Cathy Green

Friday, October 3, 2008

8:30 am Great Lakes Maritime Transportation “Treasure Chest” Activities

- *Great Lakes Shipping & Receiving Ports* using the Great Lakes floor map
- *Great Lakes Ship Cargoes & Products*
- *Plot the Path: find safe passage into the harbor*
- *What Floats Your Boat: Why 1000-footers don't sink*
- *Great Lakes Shipping Education Resources in the “Treasure Chest”*

10:30 am BREAK

10:40 am *Tragedies in the Mist* film about Thunder Bay

11:00 Life Aboard Ship & Careers in Shipping - Ship Captain Gordie Burke

11:30 am LUNCH

12:30 Tour LaFarge quarry, cement plant & port terminal in Alpena - Craig Ryan

2:00 History of Alpena Harbor by Pat Labadie, Great Lakes Maritime Heritage Center

3:45 pm Wrap up & evaluations

Co-Sponsors include:

- ◆ Great Lakes Maritime Research Institute at University of WI-Superior and University of MN Duluth
- ◆ Western Upper Peninsula Center for Science, Mathematics and Environmental Education ◆ Michigan Technological University
- ◆ Thunder Bay Marine Sanctuary ◆ Alpena Regional Educational Services Agency ◆ Great Lakes Fleet

Whitefish Point Lighthouse & Great Lakes Shipwreck Museum

K-8 Lessons & Activities

- 1. Timeline of Shipwrecks**
Jill Schaeffer
Grade 2, Math and Social Studies
- 2. Life in a Great Lakes Lighthouse**
Vernon Schutter
Grade 2, English Language Arts, Science and Social Studies
- 3. Plot the Path**
Mary Anne Otten
Grade 2, Math, Science and Social Studies (can be adapted for older grades)
- 4. For Whom the Bell Tolls**
Janet Larson
Grade 4, English Language Arts and Social Studies
- 5. Great Lakes Great Graphing**
Cristi Cryderman Smith and Rebekah Meyers
Grade 4, Math and Social Studies
- 6. Surfmen of Shipwreck Coast**
Melinda Green
Grade 4, English Language Arts and Social Studies
- 7. Following the Light: Lighthouses Along the Great Lakes**
Marci Paulsen
Grade 4, English Language Arts and Social Studies
- 8. Passport to Paradise**
Sandi Longhini
Grade 4, English Language Arts and Social Studies
- 9. Where Are They Now?**
Carlton Bishop
Grade 5, English Language Arts, Science and Social Studies
- 10. Nose It All: The Whitefish Point Riddle Game of Fun and Mystery**
Craig Goff
Grades 5-8, English Language Arts and Social Studies
- 11. Great Lakes! Great Lives!**
Jean Dunstan
Grade 7, English Language Arts and Social Studies

12. Wrecks & Rescues

Carrie Miller

Grades 6-8, Math and Social Studies

Appendix Glossary of Nautical Terms

Project coordinator and editor:

Joan Chadde, Education Program Coordinator

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Developed with funding from the Great Lakes Maritime Research Institute

www.glmri.org with support from the Great Lakes Shipwreck Historical Society

<http://www.shipwreckmuseum.com/>

To order a notebook of 12 lessons (\$15 includes shipping/handling),

contact Sue Jones at Tel: 1-800-635-1742 or sue@shipwreckmuseum.com

Lesson posted online for download at:

http://wupcenter.mtu.edu/education/great_lakes_maritime/index.htm

Appendix G

Great Lakes Maritime Transportation K-8 Lesson & Activity Guide

BACKGROUND

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Great Lakes Maritime Transportation Web Module

<http://techalive.mtu.edu/glmri/index.htm>)

Developed by Joan Chadde, K-12 Education & Outreach Coordinator jchadde@mtu.edu
Lessons developed by the Western U.P. Center for Science, Mathematics and Environmental Education
(www.wupcenter.mtu.edu) at Michigan Technological University and teachers attending the 2006 Great Lakes
Maritime Transportation Institute. Funded by the Great Lakes Maritime Research Institute. www.glmri.org

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Appendix H

Great Lakes Maritime Transportation Education Chest ~ Recipients (as of 9/24/08)

	Contact Person	Email / Phone	Site	Great Lake
1	Beth Landers	blanders@lakecountyhoio.gov 440-3502730	Lake County Soil & Water Conservation District 125 E. Erie St. Painesville, OH 44077	Lake Erie
2	Wendy Lutzke Educator	wlutcke@wisconsinmaritime.org 866-724-2356 Ext.115	Wisconsin Maritime Museum 75 Maritime Dr. Manitowoc, WI 54220	Lake Michigan
3	Kelly Gaideski Social Studies Consultant	kgaidesk@remc11.k12.mi.us 269-471-7725 Ext.304	Berrien Co. Intermediate School District 711 St. Joseph Ave. Berrien Springs, MI 49103	Lake Michigan
4	Cathy Green Education Coordinator	Cathy.green@noaa.gov 989-356-8805 Ext. 10	Thunder Bay National Marine Sanctuary 500 W. Fletcher St. Alpena, MI 49707	Lake Huron
5	Sue Jones Museum outreach coordinator	Sue@shipwreckmuseum.com 906-492-3747	Great Lakes Shipwreck Historical Society 18335 N. Whitefish Pt. Rd. Paradise, MI 49768	Lake Superior
6	Kim Swift Educator	Kimberly_swift@nps.gov 219-926-7561 Ext.245	Indiana Dunes National Lakeshore 1100 N. Mineral Springs Rd. Porter, IN 46304	Lake Michigan
7	Walter Rathkamp Director	rathkamp@svsu.edu 989-964-4117	Saginaw Valley State University Regional Math/Science Center 7400 Bay Rd. University Center, MI 48710	Lake Huron
8	Thom Holden Mary George	Thomas.R.Holden@lre02.usace.army.mil Mary.T.George@usace.army.mil 218-720-5260 ext. 35272	Lake Superior Maritime Visitor Center 600 Lake Ave. South Duluth, MN 55802	Lake Superior
9	Carla Strome/Loret Roberts Social Studies Consultant	loret@copperisd.org 906-482-0331	Western UP Center for Science, Mathematics & Environmental Education PO Box 270, Hancock, MI 49930	Lake Superior
10	Carolyn Rock Park Interpreter	carolyn.rock@wisconsin.gov 920-823-2400	Whitefish Dunes State Park 3275 Clark Lake Rd. Sturgeon Bay, WI 54235	Lake Michigan
11	Carrie Fries	mgtmaritimemusum@yahoo.com 906-226-2006	Marquette Maritime Museum 300 Lakeshore Blvd. Marquette, MI 49855	Lake Superior
12	Louise Palermo Education Coordinator	palermol@glsc.org 216-696-2760	Great Lakes Science Center 601 Erieside Ave. Cleveland, OH 44114	Lake Erie
13	Art Sulzer Maritime Academy Charter School Ship Operations Cooperative Program (SOCP) www.socp.us	Sulzmarine@aol.com 202- 366-2625	Maritime Academy Charter School Ship Operations Cooperative Program (SOCP) 2 Peter Gamble Lane Glen Mills, Pa 19342	Lake Ontario
14	Phil Kwiatkowski Director	Kwiatkowskip@michigan.gov 517-373-0523	Michigan Historical Museum 702 W. Kalamazoo, Lansing, MI 48909-8240	Lake Huron Lake Michigan
15 16	Meaghan Black Social Studies Consultant	blackm@amaesd.k12.mi.us 989-354-3101	Alpena-Montmorency Area Educational Services Dist. 2118 US-23 Alpena, MI 49707	Lake Huron
17	David Hales Social Studies Consultant	halesd@resa.net 734-334-1311	Wayne Co. Regional Educational Service Agency 33500 Van Born Road, Box 807	Lake Erie & Detroit River

			Wayne, MI 48184-2497	
18	Patti Eaton, teacher Rene Marrazon, director	pmaritime@sbcglobal.net 419-244-9999	Maritime Academy of Toledo 1000 Monroe St., Toledo, OH 43604	Lake Erie
19	Kimberly Meade Social Studies Consultant (Carol Kubert, admin support ckubert@misd.net)	kmeade@misd.net 585-228-3465	44001 Garfield Rd. Clinton Township, MI 48038	Lakes Erie Lake Huron
20	Tim Sweet Pre-K Library Media Specialist	tsweet@clintonville.k12.wi.us 715-823-7215 ext.3233	Clintonville Public School District 105 S. Clinton Ave. Clintonville, WI 54929	Lake Michigan
21	Heather Thompson	htompson@castlemuseum.org 989-752-2861 Ext. 311	Castle Museum of Saginaw Co. 500 Federal Ave. Saginaw, MI 48607	Lake Huron
22	David Boughton Maritime Educ. Specialist (Martii Martz)	dbboughton@zoominternet.net 814-217-9015	Pennsylvania Sea Grant c/o Tom Ridge Environmental Ctr 301 Peninsula Drive, Suite 3 Erie, PA 16505	Lake Ontario
23	Rachel Maki NLCS Science Advisor	rachelmariehawley@hotmail.com 218- 492-4400 ext. 19	Northern Lights Community School (NLCS)	Lake Superior
24	Lee Radzak, Historic Site Manager	Lee.Radzak@MNHS.ORG 218-226-6372 www.mnhs.org/splitrock	Split Rock Lighthouse Minnesota Historical Society 3713 Split Rock Lighthouse Rd. Two Harbors, MN 55616	Lake Superior
	TOTAL			6-Superior 6-Michigan 6-Huron 5- Erie; 2-Ontario

H-2

Appendix I

F is for Freighter:

An Introduction to Great Lakes Shipping

By Bob VandeVusse

Edited by Dale Bergeron and Sharon Moen, MN Sea Grant, and Joan Chadde, MTU.
Produced by Joan Chadde
Photos provided by Harry Bircher, GLSHS (1)
Graphic design by Susan Sanders

A is for anchor

[Photo of an anchor]

Anchors are a metal hook attached to a ship by a chain, and designed to grip the bottom under the body of water, and prevent or slow the drift of a ship. Sailors are assigned **'anchor watch'** to make sure that the anchor is holding and the vessel is not drifting. Important during rough weather and at night, most marine GPS units have an Anchor Watch alarm capability.

B is for Badger

Badger]

The SS. Badger is the largest car ferry ever to sail Lake Michigan, carrying passengers and cars between Ludington, Michigan and Manitowoc, Wisconsin since 1953. The 410-foot S.S. Badger is the only coal-fired steamship in operation in North America and has been designated a national mechanical engineering landmark.

C is for coal

[Midwest Energy coal terminal in Superior, WI]

Coal from the western states is shipped through Superior, Wisconsin. Coal from eastern states is shipped through Toledo, Ohio. Coal is used to generate electricity at power plants throughout the Great Lakes to run steel mills and factories, light and heat homes and businesses, and even power electric cars! Coal is the #3 cargo shipped on the Great Lakes.

I-1

D is for Duluth

[Duluth Aerial Lift Bridge here]

Duluth, Minnesota, is located at the “head” of the Great Lakes on Lake Superior. Duluth-Superior is the busiest port on the Great Lakes. Ships enter the Duluth harbor by passing under the Aerial Lift Bridge, which has been there for more than a hundred years. Ships can also enter the harbor from Superior, Wisconsin.

E is for Edmund Fitzgerald

[Edmund Fitzgerald]

The Edmund Fitzgerald was the last freighter to sink on the Great Lakes. It went down in a huge snowstorm with 40-foot waves on Lake Superior on the night of November 10, 1975. All twenty-nine crew members lost their lives.

F is for freighter

[Paul Tregurtha]

Freighters are very large ships used to carry bulk cargo and products from across the ocean and throughout the Great Lakes. Freighters that stay in the Great Lakes are called “lakers.” Freighters that come in from the oceans are called “salties.”

At 1013 feet, the Paul R. Tregurtha is the longest ship on the Great Lakes! The Paul R. Tregurtha stretches the length of three soccer fields!

G is for grain

[Grain elevator or port terminal]

Each fall, millions of tons of grain from Midwestern states and provinces are loaded onto ships in Thunder Bay, Ontario and Duluth, Minnesota, to be shipped to factories that make cereal, bread, rolls, and other products.

H is for harbor

[Harbor]

Harbors are places where ships load and unload cargo. Harbors provide shelter to ships during storms.

I is for iron ore

[Taconite]

Iron ore, in the form of taconite pellets about the size of marbles, is the #1 cargo transported on Great Lakes freighters.

J is for J.W. Westcott

[Westcott]

The J.W. Westcott delivers mail to freighters at Detroit, Michigan. A freighter will pull alongside the Westcott and lower a bucket. The Westcott will place the mail into the bucket and the sailors will pull up the bucket onto the ship. The Westcott is on call 24 hours a day during the shipping season. To send mail to a freighter, people use the special zip code "48222" and address their letters like this:

S.S. Whats-It
Marine RO
Detroit, MI 48222

K is for knot

[Knot]

'Knot' can mean several different things on a ship.

A **knot** is used to measure a ship's speed, or the number of nautical miles traveled in an hour. A knot is equal to 6,020 feet, while a mile is only 5,280 feet.

Knowing how to tie a secure **knot** is important in order to attach a boat to its anchor, or a boat to a pier.

L is for lighthouse

[Lighthouse]

Lighthouses help ships stay safe. They mark the entrances to harbors, and warn ship captains of shallow water or dangerous obstructions that could tear holes in a ship's hull. The Whitefish Point lighthouse that would have guided the Edmund Fitzgerald to the shelter of Whitefish Bay went out the night the Edmund Fitzgerald sank.

M is for maritime shipping

[Show map of Great Lakes with shipping lanes for coal, iron, grain, limestone from American Steamship Company]

Maritime shipping is the movement of cargo on the Great Lakes and oceans.

N is for navigation

[Navigational chart]

Modern-day ships have many tools, such as charts, GPS, radar, buoys, and more, to help them safely follow their course through the Great Lakes, and to hopefully avoid mishaps. Charts are maps showing water depth and obstructions. Buoys are used to mark the channel.

O is for overboard

[Lifeboat]

You don't want to end up overboard! But if you do, hope that you are wearing a life vest and a sailor throws a life ring to you. Sailors are careful to avoid accidents. It is very rare for a sailor to go overboard.

P is for pilothouse

[show pilot house]

The pilothouse is an enclosed structure on the deck of a ship from which the captain navigates the ship.

Q is for quarry

[Quarry art here]

Limestone used in construction and for making steel is mined from quarries and loaded into Great Lakes ships.

R is for radar

[Radar art here]

Radar helps ships find their way in the dark or in the fog. Radar saves many lives. The Edmund Fitzgerald lost its radar the night it sank in Lake Superior.

S is for Soo Locks

[Soo Locks aerial]

The Soo Locks allow ships to pass by the 21 foot rapids of the St. Mary's River. The Soo Locks allow ships from the lower Great Lakes to reach Lake Superior and the Port of Duluth-Superior. Before the Soo Locks, ships would have to unload all of their cargo on one side of the falls, and then reload it on the other side of the fall onto a different ship. Only ONE lock is large enough to allow the big freighters to pass through at the Soo.

T is for tugboat

[Tug boats – Duluth harbor]

Tugboats help ships move around the harbor and up rivers.

U is for United States Coast Guard

[Coast Guard art here]

The U.S. Coast Guard protects the Great Lakes. They prevent environmental impacts, provide security, and rescue ships and recreational boaters in distress.

V is for voyageur

[Voyageur]

The French explorers and fur traders, known as **voyageurs**, were the first Europeans to explore the Great Lakes, and use the Great Lakes for trade. "Voyageur" means "traveler" in French. As the fur trade became profitable in the 1700s, Native Americans, Frenchmen, and others became licensed voyageurs, trapping beaver and paddling the furs to Montreal. From Montreal, the fur pelts were loaded onto ships and taken to England and France where they were made into the stylish top hat. Smelly, unshaven voyageurs ate berries and bear fat for dinner.

W is for Welland Canal

[Welland Canal]

The Welland Canal connects Lake Ontario to Lake Erie. Built in 1957, the Welland Canal finally allowed ships coming from the Atlantic Ocean to bypass Niagara Falls and reach the upper four Great Lakes. Over a length of 27 miles, ships pass through a series of 12 locks which lift or lower ships a total of 327 feet!

X is for the extreme weather of November

[Ship in storm]

November is the month known for having the most storms and the severest storms. Waves can reach 40 feet in height. Howling winds can blow 40-60 miles per hour. Pelting sleet coats ships in ice. The most shipwrecks on the Great Lakes have occurred during November. Lake Erie, followed by Lakes Michigan and Huron are the Great Lakes with the most shipwrecks, followed by Lake Superior.

Y is for yard

[Ship yard]

A ship yard is where ships are constructed and repaired.

Z is for zebra mussel

[Invasive species photos]

Zebra mussels and other exotic species such as lamprey eel, ale wives, spiny water flea, and round-nosed goby have invaded the Great Lakes causing tremendous impacts to fish populations, shorelines, intake pipes, and shipping on the Great Lakes.

One way that exotic species enter the Great Lakes is in the ship's ballast water. Ships that are *not carrying cargo* fill with ballast water to keep the ship balanced and more stable in the water as it travels to a port to load cargo. Ships can carry ballast water and unwelcome exotic plant and animals from distant ports in Asia, Africa, and Europe.

**Great Lakes Maritime Transportation Education/Outreach Program:
Summary of Outcomes 2006-08**

Whitefish Point Activity Guide

Per Sue Jones 9/14/08 at Great Lakes Shipwreck Historical Society & Whitefish Lighthouse

Received 40 Whitefish Point K-8 Lesson & Activity Guides:

- 3 - given to school groups visiting this summer.
- 17 - sold in gift shop for price of \$15.99.
- 14 - will be distributed in Fall'08.
- 6 - for sale in museum's Gift Shop.

Great Lakes Shipping Education Trunk Summary

Mary George, Corps of Engineers, Lake Superior Maritime Visitor Center www.LSMMA.com

- Conducted workshop for Duluth teachers on April 22, 2008, and had six presenters, including 2 retired teachers.
- Trunk loaned to 5 Duluth teachers from May-August 2008.
- Received 3 requests to purchase a Great Lakes Shipping Education Trunk for their school that I referred to Great Lakes Maritime Research Institute website for information.
- The response has been very positive. We will likely hold another workshop this winter.
- We have augmented the trunk with additional materials and have added an evaluation page for teachers to respond to. We also added a folder for teachers to share their projects and lesson plans with other teachers.
- **You have done a marvelous job in designing this trunk and getting it out to all of us in the field. My congratulations to you, Joan!

Wendy Lutzke, Museum Educator, Wisconsin Maritime Museum, Jan-Sept. 2008:

- We had a teacher workshop in winter of 2008 with four local teachers in attendance. They all were thrilled with the contents of the trunk as well as connections to our local lakeshore history.
- This summer we hosted 40 middle school students from the College of Menominee Nation in Keshena and the Career Awareness Summer Project in Milwaukee. I used the big floor map shipping activity and the cargo packets as activities with both groups. The students interacted well and the teachers really enjoyed the activities. The teacher from Milwaukee particularly commented on how well the activity fit with their summer curriculum.
- This fall I have four teachers already signed up to borrow the trunk, and I know that more will be using it.
- Two of our local teachers attended the Great Lakes Maritime Summer Institute as a direct result of having attended the half-day workshop here during the winter. They came home excited about what they learned and eager to use the trunk!
- Presented the trunk to 10 principals and staff from our local school district in December. It was also very well received there and was promoted to district teachers by our assistant director for student services.
- Carolyn and I presented at a workshop in March for people who teach at nature centers, wildlife centers, etc

Art Sulzer, SOCP, April –Sept 2008:

- Some of the material from this can be used with this course and I will include purchasing the chest on the materials list with this course.
- Of course you demonstrated the chest at April Maritime Conference.
- I am including its use in my doctoral research at Penn, I will have to get with you later this year for some data on its use.
- And I am using it to press other regions to develop a similar educational tool for their region.

Kimberly Meade, Social Studies Consultant, Macomb ISD kmeade@misd.net

- I plan to present some of it Wednesday at a workshop with elementary teachers and then again on Oct 1 with my third grade network. That group meets regularly and my hope is that they create ways to use the trunk that we can then distribute to other teachers.

Tami Averill, Curator of Education, Michigan Historical Museum, Lansing, MI.
averillt@michigan.gov

- We have been going through it, familiarizing ourselves with it and trying things out with staff and volunteers, so far. We plan to loan it to teachers to use in their classroom.
- We would also like to use it in-house in some of our programming for school groups, scout troops, etc.
- We are also planning to offer a teacher workshop about how to make the best use of the kit in the classroom. I will be getting with you in more detail as when we begin to put that together.

Marti Martz, PA Sea Grant

- I'll work with our Maritime Education Specialist David Boughton to conduct education/outreach, and plan to work with PA Dept. of Conservation and Natural Resources education staff on this.

Carolyn Rock, Whitefish Dunes, Sturgeon Bay, WI

- The lessons and materials I gained from the Great Lakes Maritime Transportation teacher institute has been very useful within my job as a natural resource educator with the Wisconsin State Park System. It has been used to develop new programming at the state parks (Potawatomi, Newport and Rock Island).
- In addition it has changed the way Great Lake shipping and water issues are communicated in exhibits, general information, and educational programs. We have used the information to develop a broader viewpoint of Great Lakes Issues.
- I have trained and educated park staff on many issues and resources that were presented at the institute along with working with local businesses that relate directly to Great Lakes Shipping.
- Living within the county that houses the largest maintenance facility for 1000-footers, the teacher institute allowed the State Parks to connect directly to shipping. These connections includes historical with lighthouses, shipping canal, and ship-building industries, as well as modern concerns and issues such as invasive species, lake levels, shipping infrastructure and lakeshore development.

TEACHER WORKSHOP – Whitefish Point Workshop October 27-28, 2007

Melinda Green, Newberry Middle School, MI:

- I really enjoyed the Whitefish Point Workshop and thought it was an excellent way to learn. I use the materials that we received. I love the books, maps, and videos. I make sure to use them in my class whenever I get the chance. The kids absolutely loved this unit. In addition, fourth grade standards and benchmarks for social studies have changed.

J-2

- I teach Michigan History. We are very directed in what we are expected to teach. We teach to the MEAP, so all the extra activities have gone out the door. Since the changes I'm just trying to learn the new material about the regions and create my new units. I plan to incorporate this lesson into the Midwest region.
- I feel like I have a lot of new ideas and new tools to add to my teacher toolbox when education becomes a priority to our government and our economy improves.
- Please keep me on your email list regarding any other classes because I think they are so valuable.

Sandy Longhini, Gwinn Elementary School, MI

- Yes, I am using the lessons that were created by the teachers at the Whitefish Point Lighthouse workshop in October 2007. It was a wonderful collaboration of multi-grade teachers. While I haven't been able to share any of the lessons at a workshop, I have made many teachers aware of the existence of these lessons for everyone to use in their classrooms. I was to formally present the lessons (in the binder form...thank you again) at a Social Studies Leadership workshop at MARESA this Thursday, but our district's superintendent won't let any of his staff attend any conferences/ workshops this school year! I have been part of this social studies group for the last four years. However, since the meeting is during school hours, I will not be there. Thus, I have sent along the information to Sharron Richards and Maxine Honkala, who are the workshop leaders. It's the best I can do.
- Meanwhile, I intend to check out the maritime trunk you have put together. Marci and I will be using these materials to supplement our Michigan history studies this school year. It is a fantastic resource to teach the students about our Great Lakes.
- Thank for all of your support and time in sharing information with all of us.

SUMMER TEACHER INSTITUTES

Lisa Bircher, High School teacher (attended Institutes Summers 2006 and 2007):

- Developed a lesson plan on the interaction of the Lake Erie watersnake and the round goby as introduced by transoceanic vessels into the Great Lakes.
- Utilized the lesson with Biology classes taught at East Palestine High School.
- Presented the lesson at the Science Education Council of Ohio conference in Feb. 2007. The session was well attended with standing room only!
- Wrote an article to be published in *The Science Teacher* (NSTA's high school science teacher journal), unfortunately the article was not published.
- Developed a lesson plan on the introduction of invasive species to Europe that are endemic to North America (crayfish plague), transported overseas by maritime vessels.
- Utilized the lesson with Biology classes taught at East Palestine High School.
- Presented the lesson at the Science Education Council of Ohio in Feb. 2008.

Harry Bircher, Youngstown University (attended Institutes Summers 2006 and 2007):

- Developed powerpoint presentations to post on website on Ships of the Great Lakes and a photographic tour of the Irwin museum ship.
- Incorporated the institute into his college level environmental studies course. One year, students were assigned to investigate comparisons between truck, rail and ship transportation as options for moving cargo. The second year, students were assigned to investigate options for controlling invasive species entering waterways via Great Lakes shipping.

Cindi Wallendal, Lombardi Middle School (attended Summer Institute 2007):

- Attending the class has certainly encouraged my interest in the Great Lakes. I had some interest in shipping prior to the class as my husband's aunt has lived on the Sault canal for many years. I enjoyed ships from that aspect from my visits there. But the course has led me to continue my education, my interests and my passion for the Great Lakes. On a personal level I have become very engaged in the conservation of the Great Lakes, which definitely carries over to my classroom. Many times in my classroom, discussions take place about the Great Lakes and this did not use to happen before taking this course.
- Since taking the class I have continued with other course work regarding the Great Lakes, the Watershed class and the COSEE Lake Michigan Exploration workshop and attending Making a Great Lake Superior Conference in Duluth in Fall 2007.
- I now have a Great Lakes Unit in my Environmental Curriculum. Shipping is part of that unit where we discuss the positive and negative aspects of shipping on the lakes and possible improvements. Students do a comprehensive project of their choice on the Great Lakes and Shipping and Maritime Transportation is one of the choices they can make. Topics they need to cover in this are: General Information, Economics, Local and State use of lake shipping, exotic species, dredging.
- One personal story in regards to student interest-- I teach a team taught science class where I team with a Special Education teacher to teach to a class of students with disabilities. A new student last year saw my foam toy ship replica that I received in Duluth during the course on my desk. He immediately became completely interested in ships and maritime topics. He became involved locally, following what ships were coming into port, when and what they were carrying. He follows the times on-line weekly. He now knows names of ships, engine sizes, etc. and is interested in pursuing a career in this area. I have shared information with him on a one to one basis that I received from the class.
- I have organized a container full of Great Lake Shipping information that I received at the institute, as well as other Great Lakes information. This is part of our science resource room where science teachers from our school can use these materials in their classrooms. I have provided teachers information about the Shipping Education Chests in my science department meetings.
- I have also contacted the Einstein Project here in Green Bay to purchase a Maritime Trunk. Einstein is a non-profit organization that distributes and maintains science units for North Eastern Wisconsin schools, (K-8). I am hoping that along with the Maritime Transportation trunk other Great Lake materials will be included that can be used. They are very interested in purchasing and creating curriculum materials and it is being presented to their board at the next meeting. They are presently looking for funding for purchase. I have volunteered to help train teachers using the trunk.

J-4

Deb Zolynsky, middle school teacher, Detroit, MI (2 summer institutes in 2006)

Incorporated the following topics from the summer institute into the science curriculum:

- The effect of ships vs. trucks on the environment
- The effect of ships vs. trucks on the infrastructure (economics)
- The effect of ships vs. trucks with respect to fossil fuel use and global warming
- The cost effectiveness of ships vs. trucks and manpower
- The momentum gained by a ship and stopping distance
- The sensibility of using ships and ports and therefore, why ports and ships are important modes of transportation
- Comparing and contrasting gentrification vs. ports
- Comparing and contrasting dredging and its effect on the ecosystems and the economy.
- How the Soo Locks work and the impact of not having them
- The use of the pilot house to determine who is on the water and where
- The use of navigation devices maintained by the Coast Guard and the weather and water data collected
- There are so many more instances of drawing upon my knowledge. I use what I learned in the institute regularly in class and in daily life. I spend 1/2 of my time in the UP and have an opportunity to share my knowledge gained in the class with whomever I'm traveling with. I have a deeper understanding and appreciation of the Great Lakes which I pass on. I also consult with COSEE and Michigan SeaGrant and am better able to speak to subjects.
- As for the summer teacher institute numbers not rising significantly, in my opinion, that is not necessarily a bad thing. Smaller groups have a better opportunity to bond and share. I made life-long friends in this institute that I am still sharing with, and we have attended other classes/workshops since yours. This institute opened windows and doors to other opportunities.
- I know that you advertise wherever you can, such as through MSTA, Building a Presence, and the ISDs, as well as presenting at conferences.
- Perhaps those that attend the summer teacher institute should be required to present to someone, be it school board, peers at school, write an article, or at state conferences, as one condition of being accepted (other institutes do this). That might backfire, and have no one apply, though. However, in my case, it got me started and I've been presenting every year since.

Robert Palmer, Gr. 3, Grosse Pte, MI (summer institute in 2006):

- I am using the lessons for the 3rd year...
- We are going on the Diamond Jack fieldtrip (Oct. 1) along the Detroit River with emphasis on Detroit as a port, and freighter traffic. We will again have the mail boat (J.W. Westcott) meet us in the river and deliver mail for each student with their special postmark on each envelope (see attached). We end the day at the Dossin Great Lakes Museum on Belle Isle.

Craig L. Croone, Northfield Middle School (2 summer institutes in 2006):

- I use some of the information. We talk of the need for shipping as cost effective movement of goods. We also discuss the problems with low lake levels and locks, antiquated lock systems, etc. We discuss how foreign shipping has brought in invasive species to the lakes and how they are dealing with the problems so that it does not continue. I have done outreach informally. My students have a new enhanced view of what the great lakes and transportation on those lakes means to us here in the Midwest.

Sara Pregitzer, Grant Middle School, Grant, MI (2 summer institutes in 2006):

- I use the ships and shipping stuff every year with my forces and machines unit. It really snatches the kids interest in things mechanical, and they LOVE the ships. I only wish I had some funding for getting them out where they could see/tour a ship. Many students are coming back the next year to tell me that they saw ships on the Lake, or traveled with their parents to see them during the summer, so it must be sparking interest and understanding with families as well. I would still love to use a trunk. Where can I find one?

J-6