



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

Year 2: December 15, 2006 – November 15, 2007

Final Report

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

Implementation of Year 2 Project Objectives is described below each of the objectives.

1) Conducted one 6-day Summer Teacher Institute in Duluth, MN from July 29-August 3, 2007.

- ◆ 17 participants attended from the states of OH (2), MI (8), WI (6), MD (1)
- ◆ Tim Downey from the St. Lawrence Seaway Corporation attended and encouraged the offering of a similar experience/program for those in government agencies who work with the shipping industry.
- ◆ Participants visited a variety of sites (many typically inaccessible to the general public) and had the opportunity to interact directly with ship captains, industry personnel, and port managers.
- ◆ Teachers earned two graduate credits from Michigan Technological University.
- ◆ Teachers were required to develop one classroom lesson or outreach program. Teachers' lessons are posted on the *K-12 Great Lakes Maritime Transportation Education* website (http://wupcenter.mtu.edu/education/great_lakes_maritime/index.htm) and will become part of the *Great Lakes Maritime Transportation Educators Guide*.
- ◆ Institute participants paid \$450 this year, up from \$250 in 2006. The higher cost included lodging (at a hotel in Canal Park rather than at UM Duluth residence halls), plus most meals, field trip transportation, two MTU graduate credits, and classroom materials.

See 2007 summer institute agenda. (Attachment 1)

See 2007 Evaluation Summary. (Attachment 2).

Mark your calendars: July 20-25, 2008 for next summer's Teacher Institute.

2) 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. added throughout the year.

3. Developing *Great Lakes Shipping Curriculum & Activity Guide for K-12 Educators* for publication that will include lessons developed by 2006 and 2007 teacher institute participants.

See list of lessons developed by 2007 participants. (Attachment 3)

4. Provided financial incentives for Institute participants to engage in educational outreach.

- a. Lisa Bircher (2006 participant) presented her lessons at the annual conference of the Science Education Council of Ohio (SECO) annual conference.
- b. Lisa Bircher (2006 participant) submitted an article on her lessons to the National Science Teachers Association *Science Teacher* journal.
- c. Article "Teaching Teachers" by Joan Chadde published in *Great Lakes Seaway Review*
- d. Article submitted by Joan Chadde to Maggie Blum, US Maritime Administration, for U.S. Dept of Transportation newsletter
- e. Six-part monthly presentation series on Great Lakes Shipping at the Portage Lake District Library in Houghton, MI by Joan Chadde. This included several presentations by ship captains (Capt. Bill Hanrahan and Capt. Dave Laban) on Great Lakes shipping from November 2006 to May 2007.
- f. Two presentations by Joan Chadde on Great Lakes shipping for the Keweenaw County Historical Society. Capt. Bill Hanrahan participated in one of these.

5. Developed and disseminated 12 Great Lakes Shipping education “chests” for schools and museums.

2007 Great Lakes Shipping Education “Chests” have been distributed to:

<p>MI Berrien County Intermediate School District Marquette Maritime Museum Thunder Bay Marine Sanctuary Saginaw Valley Math & Science Center Western UP Center for Science, Math & Environ. Education OH Lake County Soil & Water Conservation District</p>	<p>IN Indiana Dunes National Lakeshore WI Wisconsin Maritime Museum (Manitowoc, WI) Whitefish Dunes State Park (Sturgeon Bay, WI) MN Lake Superior Maritime Museum & Visitor Center</p>
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(NOTE: Recipients have agreed to conduct a training workshop in their local area after receiving the chest.)

Great Lakes Shipping Education “Chest” contains:

<p>HANDS-ON TEACHING SUPPLIES 9’x12’ Great Lakes Canvas Floor Map Shipping & Receiving Port labels Country, State, River labels Purple and red yarn Bagged samples of: iron ore/taconite pellets (5), coal (3), limestone (3), grain (5), salt (3), general cargo (LEGOs) (3) Great Lakes Ships playing cards Ship captain’s hat & foam freighter Model of Great Lakes ore carrier (TBA)</p> <p>CHILDREN’S LITERATURE A True Book: St. Lawrence Seaway</p> <p>The Day the Great Lakes Drained Mail by the Pail</p> <p>The Great St. Lawrence Seaway</p> <p>The Edmund Fitzgerald: Lost With All Hands</p> <p>Paddle to the Sea The Edmund Fitzgerald: The Song of the Bell</p> <p>REFERENCES U.S. Flag Shipping on the Great Lakes brochure</p> <p>Great Lakes Facts Map Set (Michigan Sea Grant) Great Lakes Environmental Atlas Lake Superior Circle Tour Map U.S. Army Corps Soo Locks brochure</p>	<p>VIDEOS / CDs / DVDs Steel Starts Here DVD A Vital Waterway: Grt Lakes St. Lawrence Seaway System video (10 min) Perspective of a Vital Waterway video (21 min) Living on the Edge: Grt Lakes-St. Lawrence River Shoreline DVD (25 min) Top Ten Threats to the Great Lakes CD Tragedies in the Mist DVD Shipwreck: The Mystery of the Edmund Fitzgerald DVD Great Lakes Shipwreck Museum at Whitefish Point DVD Great Lakes Shipping Overview PowerPoint Presentation CD (in notebook)</p> <p>CURRICULUM MATERIALS Notebook of Great Lakes Maritime Transportation Lessons Exploring the Great Lakes: A Logbook of Adventures Lake Effects: The Lake Superior Curriculum Guide for Grades K-8 (See activities: <i>More Than Just A Lake, Geography Concentration</i>, and <i>Cooperative Clean Up</i>) Lake Rhymes – Folk Songs of the Great Lakes Region CD & Book Paddle to the Sea Curriculum Activity Guide</p> <p>Posters NOAA Map of Great Lakes (#14500) USDA Water Cycle Diagram of Parts of a Ship</p>
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6. Attend state and national conferences to recruit institute participants and disseminate Great Lakes Maritime Transportation teaching tools:

- ◆ Presentation at Wisconsin Association for Environmental Education, Manitowoc, WI
- ◆ Presentation at Michigan Science Teachers Association, Grand Rapids, MI
- ◆ Presentation at Michigan Council of Social Studies, Lansing, MI
- ◆ Poster session at International Association for Great Lakes Research (w/ Dr. Richard Stewart) at Penn State, PA
- ◆ Two presentations at Northern Michigan University (NMU) Seaborg Center annual conference in Marquette, MI
- ◆ Poster session at Making A Great Lake Superior conference in Duluth, MN

7. Developing “*F is for Freighter*” children’s book on Great Lakes shipping.

Dale Bergeron and Marie Zuikov from Minnesota Sea Grant have provided comments on the first draft. More work will take place in Year 3.

(Attachment 1)

Sponsored by Great Lakes Maritime Research Institute and Michigan Technological University

Great Lakes Maritime Transportation Summer Institute Agenda

~ Sunday, July 29 to Friday, August 3, 2007 ~

Sunday, July 29

- Noon EST Vans depart Michigan Tech in Houghton for Duluth. Stop at Northern Great Lakes Visitor Center.
- 6 pm CST Check into Canal Park Lodge
- 8 pm CST Course overview & introductions in Hospitality Room.
- Great Lakes Maritime Transportation Education Resources, activities, and discussion.

Monday, July 30

- 7:00 am Group breakfast & discussion in Hospitality Room
- 8:00 am Depart for Duluth Seaway Port Authority.
- 8:30 am *Overview of Shipping* by Duluth Seaway Port Authority (Adolph Ojard, Lisa Marciniak, Ron Johnson)
- 10 am *Exotics & Ballast Water* by Dale Bergeron and Doug Jensen, Minnesota Sea Grant
- 11:30 am Lunch & Harbor Tour aboard *Vista Queen* at Barker's Island w/ Ron Johnson
- 3 pm *Harbor Dredging & Impacts of Changing Lake Levels on Great Lakes Shipping* by Gene Clark, P.E., Coastal Engineering Specialist, UW Sea Grant Institute
- 4-6 pm *Lake Superior Maritime Visitor Center Programs* by Thom Holden, Army Corps of Engineers

Tuesday, July 31

- 7:00 am Group breakfast & discussion in Hospitality Room
- 7:30 am Depart Duluth for Hibbing
- 9-Noon Tour Cleveland Cliffs iron ore mine & taconite processing plant in Hibbing, MN
- Noon -2 pm Lunch & drive back to Duluth
- 2:00-4:45 pm *Coast Guard responsibilities for security, aids to navigation, control of invasive species*
- 5-6 pm Tour S.S. William A. Irvin

Wednesday, August 1

- 7:00 am Group breakfast & discussion in Hospitality Room
- 8:00 am Depart for Two Harbors.
- 8:30 am *Shipping Logistics* by Katie Ferguson (Great Lakes Fleet) at Canadian National Ore Dock in Two Harbors
- 10:00 am *Edna G. Tugboat* tour
- Noon Picnic lunch at Split Rock Lighthouse
- 1-3 pm Tour Split Rock Lighthouse
- 4:00-6:00 pm Great Lakes Aquarium (optional)

Thursday, August 2

- 7:00 am Group breakfast & discussion in Hospitality Room
- 8:00 am Depart for Midwest Energy.
- 9 am Tour Midwest Energy Coal transition point (Superior, WI)
- 11:30 am Lunch at The Anchor in Superior
- 1:00 pm Burlington Northern Taconite Facility & Ore Docks
- 4-6 pm *Balancing Social, Economical & Environmental Aspects of Great Lakes Shipping*
- by Dr. Richard Stewart, GLMRI co-director, UW-Superior

Friday, August 3

- 7 am Group breakfast & discussion in Hospitality Room
- 8:30 am Depart for Lake Superior Warehousing
- 9 am Tour of Lake Superior Warehousing by Jonathan Lamb
- 10:30 am Tour of Murphy Oil by Joe Cuseo
- Noon Lunch
- 1-3 pm Wrap-up discussion & course evaluations

(Attachment 2)

**Great Lakes Maritime Transportation Teacher Institute
~ July 29 - Aug 3, 2007 ~**

EVALUATION SUMMARY (17 responses)

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.

	Poor	Fair	Average	Good	Excellent	NA
Logistics:						
1. How well did the registration process keep you informed? -Liked the updating emails	0	0	4-24%	5-29%	8-47%	0
2. How did you find the accommodations at Canal Park Lodge? -Hotel was wonderful! -Wow!	0	0	0	0	17-100%	0
3. How was the food throughout the week?	0	0	1-6%	3-18%	13-76%	0
Educational Usefulness:						
4. How useful are the educational materials that you received?	0	0	1-6%	8-47%	8-47%	0
5. Overall, how well did the variety of activities meet your curriculum needs?	0	0	3-18%	7-41%	6-35%	1-6%
6. How well did the course meet your personal learning objectives? -Very satisfied	0	0	1-6%	5-29%	11-65%	0
7. Would you recommend attending this same institute to your peers? Please explain: <u>Yes Explanations:</u> -Well worth it to HS science teachers -It's a good way to do a summer class -Hands on, interesting experience -I learned more in 1 week than I've learned living in the area for 20 years. -So interesting <u>Maybe Explanations:</u> slow down pace!	YES – 14-82%	NO – 0	MAYBE – 3-18%			
8. How did you hear about the Institute? E-Mail Source: school Websites: COSEE, MTU, Google, Joan, Conference	Flyer at school 0	Newspaper 0	Friend 3-18%	Email List Source: 4-23%	Website List: 8-47%	Other (be specific): 2-12%

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.

- Science Education Council of Ohio ~ Feb. 2008 (Akron, OH).
- National Science Teachers Association regional and national conferences
- Possibly sending flyers, etc to those who took course to place at their schools.
- Wisconsin Teachers Association
- CESA – Cooperative Education Service Agency in Wisconsin
- WAEE – Wisconsin Association for Environmental Educators
- National Assoc for Interpretation

- Michigan math/science center network.
- Send email to past attendees and ask them to encourage a coworker to attend the institute.
- I can't believe every teacher wouldn't want to participate! It's been an amazing week! Joan does a fantastic job coordinating it all!
- Email me with info and I can distribute to my district.
- Have the institute in Wisconsin.
- Advertise in large school districts.
- The class should be in July so teachers aren't going here right after schools let out and before school resumes.
- Advertise more online and set up areas at teacher conferences/workshops.
- Offer more incentives to attend.
- Boatnerd.com
- Great Lakes Information Network –GLIN list-serve
- Contact teacher organizations to disseminate materials, especially in Port Cities.
- Send special mailings to WI, MN, IN, IL, OH, NY, Canada, PA (these states under-represented at institute).
- This course can also benefit business teachers and school career counselors.

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

- Good. (3)
- "Great Lakes, Great Ships" was pretty technical but good
- Maybe add GLIN website to next year's pre-course readings?
- Useful, informative but not covered much in class.
- Readings were OK. Most info could have just been covered in the websites however.
- Very good. Especially liked the 10-minute video online.
- Gave me an introduction to topics covered in the institute. Not sure the handbook was worth it. Maybe more info or outline of the programs we'll be seeing or hearing.
- Website was useful. Pre-course readings were too complicated and technical to hold interest.
- Excellent background information.
- Some I used. Others I didn't have time to find – but will follow up and check them out.
- Can't sit and read from a PC – need readings in hard copy well ahead of time. Couldn't get through reading Great Ships for the Great Lakes. I think that was too many pages to print in order to read. Other readings and outline ideas were good. Interesting.
- I had trouble getting the video up. "Great Ships for the Great Lakes" was most informative for me.
- Very good overview of broad topic.
- Readings were OK. A lot of paper to print out.
- Didn't have time to read them.
- The readings and websites were very helpful for prior knowledge. I like having background info so I understand info better.

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

- The Iron Mining DVD (a great visual for students)
- The Coast Guard Safety info.
- Personal experiences of seeing the coal, pellet, dock and other processes that GL shipping involves.
- Connections made within the group and presenters.
- Materials gathered from presenters.
- Buoyancy

- Invasive species.
- The information from the lectures and outings.
- Tours to mine, docks were very helpful.
- Talks opened up my attention to very interesting way of looking at our interdependence.
- My age group (K): Importance of equalized weight within a boat, importance of shipping and types of transportation
- All- Most especially with business or career classes.
- Most of it.
- Impact on the economy.
- Different aspects of water transportation.
- The tours and hands-on materials will enhance my curriculum.
- Interested in “green ships” and invasive species.
- Will provide useful background info for my point papers for Seaway Management.
- Everything will get put to use one way or another.
- I have such a new appreciation of the importance of the Great Lakes on the U.S. economy.
- Mapping skills of routes and economics of different modes.
- Career information for guidance of students.
- Connecting products like coal through their chemistry (i.e. high/low sulfur & different BTU's, etc.)
- Ballast water issues.
- I will be able to use all of the info I received this week at the institute.
- Info on invasive species, ballast water issues.
- Personal anecdotes for general discussion in class about tours we took, etc. – This is invaluable!

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

- Port Authority Introduction & their involvement throughout the Institute
- Coast Guard boat ride, presentation, and harbor tour. These guys were able to give us a little different of a spin on how they see the Great Lakes shipping industry. (5)
- Lunch cruise through harbor
- Midwest Energy tour and Great Lakes Fleet visit
- The field trips to places most people never see was awesome and very much appreciated. Very thorough (6)
- The location was fabulous
- Nice size group
- Good choice of topics to give us an overview
- Great materials provided
- Included all aspects! Can use for all content areas.
- I think it was awesome that all of the companies and the Coast Guard and visitor center and Corps. of Engineers (everywhere we went) took their time to spend with our group. I know how valuable their time is and feel I can't thank them enough. The same goes to Joan, Dale, Lisa & all.
- The ability to network with other excellent teachers from the Great Lakes region! Connections made that would never happen ordinarily. Several class participants whose background varied widely (engineers, chemists, biologists) made the experience especially interesting (4)
- All the tours and presenters that are so very knowledgeable about their sites and procedures (2)
- Dr. Stewart's lecture—it was key in bringing awareness and connection to the subject (3)
- The opportunity to be exposed to several key industries dependent upon water-borne transportation in a week-long course was extremely helpful to me.

- Schedule worked pretty well considering all the events
- I really liked all the hands-on activities and how all forms of Great Lakes shipping was covered---from the methods of shipping to the major products
- Variety of speakers and presentations
- Midwest Energy tour
- Duluth Port Authority

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

- Personally, it was the Hibbing Taconite tour, but content-wise, I wouldn't want this eliminated because seeing iron ore in raw state and the bulk quantity and the process that takes it to next stages is critical to understanding the transportation issues. Tour could have been better. (2)
- Needed to provide more reflection time.
- Rearrange the sequence of programs.
- Too rushed—days start too early and end too late.
- I know some teachers might say the pace was too much. However, doing a class such as this, I'd rather be doing and seeing as many things as I can pertaining to the subject in the time allotted.
- Some of the places we went may have been considered optional or give more choices like we did when given the choice between Irvin or GL Aquarium. Choices are good for people
- Nothing I disliked. I would have liked more depth on the ballast water issues and other environmental concerns, but I realize my subject matter is more involved the K-12
- PowerPoint presentations

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

- Have maps to where we are going included in welcome packet with routes there highlighted (I like to put places in relationship with each other)
- Rearrange speakers so they build on each other. Like a general overview→history→etc. Best part was when we went to the mine and the next day to the ore docks. Better connection.
- Possibly have 2-way communication between vans along with written directions to sites (x 2)
- Allow time for reflection in the afternoon. We need time to process what we have seen, work on journals. More organized sharing.
- Possibly add a day to spread things out (x 5)
- More biology content (for me)... Could a biologist be invited to actually discuss invasive species because most people don't know about these. Ex. When I was talking to other participants about the ruffe, they didn't know what it was so what do they don't really know zebra mussels, gobies, etc.
- Do a tour of the GL Maritime Museum
- Ask someone to create a digital picture exchange after the event
- Have people arrive earlier on Sunday. It's so awesome here people definitely will appreciate more time.
- Present some information on the evolution of Great Lakes shipping
- The Irwin tour should be a must! (2)
- It would be great to see a freighter up close, and a tour of an active boat would be amazing. (2)
- Having more free time to explore some of the places that we visited would have been nice.
- Some presenters repeated almost verbatim what others had covered. Limit duplication.
- Talk to an actual Great Lakes sailor... (2)

(Attachment 3)

Great Lakes Maritime Transportation Lessons for Grades 3-12

by 2006 Great Lakes Maritime Transportation Summer Teacher Institute participants

Table of Contents

1. Promote Your Laker!! (Gr. 6 social studies)
By Kathy Trakul, Lincoln Northfield Middle School (MI)
2. Keep Your Boat Afloat? (Kindergarten science/math)
By Susan Katt, Pewaukee Lake Elementary School (WI)
3. To Dredge or Not to Dredge? (Gr. 7-8 science)
By Cindi Wallendal, Lombardi Middle School
4. What Can You Do With a Great Big Lake (Gr. K-2 social studies)
By Paul Zuiker, Crescent Elementary School (WI)
5. Edmund Fitzgerald (Gr. 6-10 science)
By Amy Rose, substitute teacher (MI)
6. Water Molecules of the Great Lakes (High school chemistry)
Bill Katt, Wauwatosa East High School (WI)
7. Invasive Species Moving INTO and OUT OF the Great Lakes (High school biology)
By Lisa Bircher, East Palestine High School (OH)
8. Comparing Transportation Choices: Shipping v. Rail v. Trucking? (Gr. 6-8 science)
By Kathy Keeney, Lombardi Middle School (WI)
9. Balance & Ballast Water (HS Special Education)
By Pat Murphy, Fraser High School (MI)
10. Cost Benefit Analysis of Transportation Alternatives in the Great Lakes (HS or college)
By Dr. Harry Bircher, Youngstown University (OH)
11. Ballast & Invasive Species on the Great Lakes (HS biology)
By Naomi Ojala, substitute teacher (MI)
12. Name That Invasive Species (HS biology)
By Mary Murphy, Stevenson High School (MI)

http://wupcenter.mtu.edu:80/education/great_lakes_maritime/index.htm