

PROCEEDINGS

Great Lakes Fisheries and Ecosystems Education Networking Conference



As chairman of the Great Lakes Fishery Trust and on behalf of the Board of Directors of the Trust, I commend you for your commitment to 'create a collaborative vision for the future of Great Lakes fisheries and ecosystem education...'

- K. L. Cool, Chairman, Board of Directors of the Great Lakes Fishery Trust and Director of the Michigan Department of Natural Resources

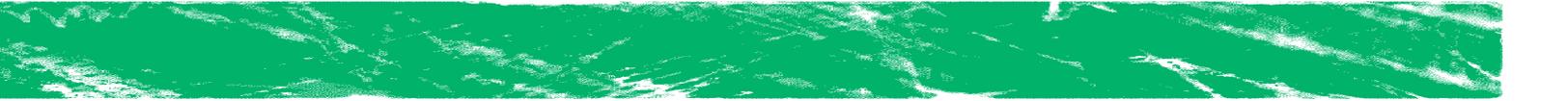
Acknowledgements

Thanks are due to Holly Madill of the Great Lakes Fishery Trust and to the entire Networking Conference Steering Committee and project staff for designing and carrying out this important meeting. Members of this team have continued to respond to share their time and expertise as we prepared these proceedings and worked with GLFT to chart the course for future work in Great Lakes fisheries and ecosystems education.

Special words of thanks are due to our workshop small group discussion facilitators Tom Kelly, Heather Van Den Berg, Brandon Schroeder, and Susan Holmes, and to our discussion recorders Carol Swinehart, Andrea Feldpausch, and Jennifer VanderLaan.

Finally, we thank the presenters and participants who shared their expertise, their whole-hearted enthusiasm, and their energies toward fisheries education. With their active engagement in this conference, and with the financial and programmatic leadership of the Great Lakes Fishery Trust, we have compiled a comprehensive view of fisheries and aquatic ecosystems education in the region.





PROCEEDINGS

**Great Lakes Fisheries and Ecosystems
Education Networking Conference**

**May 5-6, 2003
East Lansing, MI**

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Overview

Great Lakes Fisheries and Ecosystem Education Networking Conference

About the Conference

The Great Lakes Fishery Trust sponsored the Great Lakes Fisheries and Ecosystem Education Networking Conference from May 5-6, 2003 in East Lansing, Michigan. The overall purpose of the networking conference was to assist the GLFT Board in developing and focusing its efforts in support of Great Lakes fisheries and ecosystem education throughout the region.

In order to conduct the meeting, the trust worked with the Department of Fisheries and Wildlife at Michigan State University to convene a conference steering committee composed of diverse fisheries education and Great Lakes stakeholders, such as tribal fisheries biologists, non-governmental conservation organizations, educational organizations, universities, and others. This steering committee worked together from December 2002 through August 2003 to:

- Define specific conference objectives;
- Define the geographic scope of the conference as representing the Great Lakes basin;
- Develop a list of invitees representative of the broadest possible array of fisheries and Great Lakes education stakeholders;
- Develop the conference agenda and identify speakers;
- Decide upon critical questions and discussion processes for small group dialogue at the conference;
- Identify or serve as facilitators for the discussion groups; and
- Review conference findings and prepare the conference proceedings.

Conference Objectives

The steering committee identified the following objectives as important to achieve during the face-to-face learning and dialogue at the conference:

- Create a collaborative vision for the future of Great Lakes fisheries and ecosystem education.
- Identify and prioritize recommendations for sustaining, modifying and creating needed networks, educational efforts and educational research for Great Lakes fisheries and ecosystem education.
- To provide guidance to funders for sustaining fisheries and ecosystem education into the future.



Spearheading the conference, from left to right: Shari Dann, Michaela Zint and Rosanne Fortner.

Conference Participants

The committee developed an invitee list that included more than 177 education stakeholders from throughout the Great Lakes basin. Sixty-two conference participants attended during the two days. Among these attendees,

- 15 represented formal K-12 education systems,
- 24 were from nonformal education programs (e.g., youth groups, scouts, after-school programs, etc.),
- 13 were from state and federal resource management agencies,
- 26 were from non-governmental organizations (private, non-profit; e.g., MUCC, National Wildlife Federation, Inland Seas Education Association, Clinton River Watershed Council, Wege Foundation, National Fish and Wildlife Foundation, etc.),
- 5 were from tribal/treaty fisheries organizations,
- 4 were from private (for-profit) retail organizations or consulting groups,
- 22 were affiliated with various universities (EMU, CMU, MSU, U of M, OSU, University of Wisconsin - Madison, University of Windsor, and Michigan Sea Grant College Program), and
- 11 were from out-of-state (whereas 51 were from Michigan).

Program Organization

Committee members designed a conference format that included presentations on the status of Great Lakes fisheries, as well as the GLFT-sponsored needs assessment regarding fisheries education. Panelists discussed aiming for excellence in education with examples of existing GLFT-funded and other model programs, and panel presentations from varied fisheries education stakeholders described perspectives regarding needs, gaps and opportunities. After these presentations, attendees participated in small group discussions focused around the three conference objectives. (See Appendix A for the conference agenda.)

Programs and diverse educational content should be accessible to all, and thus should "Leave No Child on Shore!"

Conference Results

These small group discussions started by examining indicators of fisheries education excellence, based on the series of conference presentations. Participants coined these phrases to represent their understanding of program excellence:

- Programs should focus on experiential (hands-on), or “feet-in,” “real-water” learning (similar to “real-world” learning).
- Programs should be comprehensive in terms of relating not only to science, but to all subjects and life skills, potentially calling such efforts “marinated education.”
- Programs should not “reinvent the keel.” Instead, programs that are well-evaluated and well-designed should be sustained, and local programs should be flexible in nature to draw from other programs’ existing successes.
- Programs for youth should result in “motivated kidizens,” with the aim of empowering learners with the skills and motivation needed to foster sustainability of fisheries for future generations.

Small group facilitators invited the participants to discuss and create a vision for Great Lakes fisheries and ecosystem education into the future. Participants decided whether they wished to discuss education for K-12 youth at various levels (elementary, middle and high school), adults, or mixed-age community groups. A summary of the group visions for each set of learners is as follows:

Elementary:

The development of life skills for long-term responsible citizenship is important, as well as fostering an awareness and lifelong appreciation and interest in learning. Elementary youth can develop attitudes of ownership as stakeholders playing important roles in Great Lakes ecosystem stewardship. Positive, outdoor (and in-class) experiential learning is essential for this age. Educators need the opportunity for multidisciplinary networking and to obtain practical, cost-effective, accessible, and easy-to use teaching tools.

Middle and high school:

For these learners, fisheries sustainability as a concept is important. For educators working with this age group, the sustainability of education programs and an infrastructure connecting these programs are essential to foster their continued involvement in Great Lakes fisheries and ecosystem education. Many of the same visions for elementary education apply to middle and high school levels, but older youth are capable developmentally of more complex reasoning and involvement in fisheries issues.



Adults:

The vision is that every adult in the region will become Great Lakes aware and literate, will understand his/her relationships with the Great Lakes, and will actively take part in some way.

Communities and mixed age groups:
The educational vision for diverse learners from mixed-age and community groups is that their learning will lead them “to protect, preserve, promote and present a healthy and sustainable ecosystem within the Great Lakes for future generations.” Great Lakes fisheries and ecosystem education should view communities as inclusive of groups – with varied ages, nations and stakeholders coming together as stewards. To achieve this vision, the education community needs organizational leadership with a regional scope, but yet an infrastructure that offers local flexibility in program design and delivery.



Networking conference participants



Holly Madill, GLFT, responds to conference recommendations.

In general this conference was well-received and achieved essential goals in creating opportunities for future excellence in Great Lakes fisheries and ecosystem education. Clearly, the most important outcome of this conference and of the steering committee’s work was the recognition that tremendous individual and organizational assets exist to achieve this excellence. And, most importantly, participants in this process agreed that these organizational assets are beyond, but catalyzed in meaningful ways, by the Great Lakes Fishery Trust.

In Closing

Conference evaluation results were favorable. Conference objectives were met, and participants showed high levels of satisfaction with discussion processes and having their opinions heard. In addition, attendees reported that the conference impacted positively on their knowledge and attitudes, and they expressed strong intentions to remain involved in future Great Lakes fisheries and ecosystem education networking initiatives. (See Appendix C for conference evaluation details.)

Conference Recommendations

Needed Work in Great Lakes Fisheries and Ecosystem Education

- *An organizational infrastructure is needed, providing stronger networks, opportunities for partnerships, and communications. This network should broadly include both formal (K-12) and nonformal educators, representing various regions, states and local areas. In addition, this network should foster greater access to human resources and agency personnel for educators.*
- *Education regarding specific topics is needed, especially in the areas of treaty fisheries, risk, and biodiversity.*
- *Programs are needed that are developed with state and national standards in mind.*
- *Education programs (even if only a part of other GLFT-funded projects) should be research-based and include evaluation.*
- *Enhanced education program delivery systems and educator training networks are needed.*

Finally, conference participants considered priorities and “next steps” for funding, collaborating and achieving a vision of excellence for Great Lakes fisheries and ecosystem education.

Short-term Priorities:

- *Continue communications among conference participants.*
- *Develop and maintain a clearinghouse (e.g., Web site) for Great Lakes fisheries and ecosystem education throughout the region.*
- *Continue networking through sponsorship of another conference within one year.*
- *Sustain and build on existing programs and foster/grow/recognize model programs using an education research base; foster efforts to fill needed Great Lakes fisheries education gaps: treaty fisheries education, careers, specific topics.*
- *Foster internships to facilitate program development, marketing and training, as well as career development.*

Longer-term Priorities:

- *Foster partnerships, organizational capacity and stable funding for Great Lakes fisheries and ecosystem education.*
- *Ensure all projects/programs funded have a significant evaluation component.*
- *Ensure alignment with state and national curriculum standards in those programs working with K-12 audiences.*
- *Increase commitment to education programs outside of K-12 (nonformal education systems, riparians, and other adult audiences).*

To address these priorities, the conference steering committee recommends that the GLFT:

- 1) *Develop an Education Advisory Team (EAT) composed of teachers, ISD representatives, Department of Education, scientists, researchers, nonformal and adult education community members. Charge the EAT:*
 - A) *to plan and implement a longer-term RFP process for education projects;*
 - B) *to plan and conduct networking workshops and to assist potential grantees in project development and collaboration; and*
 - C) *to explore options for longer-term organizational capacity-building for Great Lakes fisheries and ecosystem education (including exploring the formation of a new organization and/or affiliation with existing organizations, such as the National Marine Educators’ Association).*
- 2) *Develop an RFP for projects directed at two short-term priority needs:*
 - A) *Establish a Web-based clearinghouse for Great Lakes fisheries and ecosystem education. The clearinghouse should be developed in clear relationship with existing Web sites that have broad Great Lakes, marine or aquatic education emphases (e.g., www.great-lakes.net/teach, www.greatlakesed.org, www.rbff.org, and www.vims.edu/bridge).*
 - B) *Sustain model programs. Projects selected for funding should meet these criteria: project has a long-term vision related to the findings of this conference and of the GLFT Education Needs Assessment; projects are sustainable, and clearly feature coordination/collaboration of stakeholders; projects demonstrate a synergistic relationship between teachers and scientists; and projects clearly use research-based delivery and evaluation strategies.*

Presentations

Introduction to the Great Lakes Fishery Trust and Education Networking Conference Goals

K.L. Cool, Chair, Great Lakes Fishery Trust, & Director, Michigan Department of Natural Resources

As chairman of the Great Lakes Fishery Trust and director of the Michigan Department of Natural Resources, welcome to East Lansing – home of the Michigan State Spartans!

On behalf of the Board of Directors of the Great Lakes Fishery Trust, I commend you for your commitment to “create a collaborative vision for the future of Great Lakes fisheries and ecosystem education.”

The Great Lakes Fishery Trust was created in 1996 as a result of a court settlement associated with fish losses at the Ludington Pumped Storage Hydroelectric Facility on the shore of Lake Michigan.

The settlement involved a number of mitigation measures, including improved fish barrier nets at the hydroelectric site, recreational property transfers to the state, and fishing access improvements along the Great Lakes shoreline on properties owned by Consumers Energy and Detroit Edison. However, the most unique aspect of the settlement agreement was the creation and funding of the Great Lakes Fishery Trust.

The Trust has over \$25 million dollars in assets and receives over \$2 ½ million dollars a year in fish damage payments from utilities operating the Ludington facility. The Trust has awarded over \$21 million dollars in grants since its inception to non-profit organizations, universities, and state, federal and tribal agencies.

As currently envisioned in our strategic management plan the Trust will manage its grant program such that all its assets will be depleted by 2020 – one year after the current operating license for the Ludington hydroelectric facility expires in 2019.

Grant projects are screened by the Trust’s Scientific Advisory Team, then reviewed and voted upon by the board. Grants are then awarded by the Trust Board of Directors, which is composed of the director of the Michigan DNR, and representatives from the Michigan Attorney General’s Office, Department of the Interior, Michigan United Conservation Clubs, National Wildlife Federation, and Grand Traverse Band of Ottawa and



GLFT Chair and DNR Director K. L. Cool addresses participants.

Chippewa Indians. The Little Traverse Bay Bands of Odawa Indians and the Little River Band of Ottawa Indians are participating non-voting board members.

The legal settlement creating the Trust limits our grant making to projects that mitigate for fish damages in five categories related to Great Lakes fisheries: fisheries research; fish population rehabilitation; habitat enhancement and protection; fishing access, and public education.

Nearly \$3.6 million dollars have been granted for educational projects, including:

- A \$30,000 grant to MSU to conduct this conference;
- A \$30,000 grant to Michigan United Conservation Clubs to educate the public on the Great Lakes Fishery Trust;
- A \$46,000 grant to MSU to extend Great Lakes fisheries education and Project F.I.S.H, a targeted program in the Muskegon River Watershed;
- A \$200,000 grant to Western Michigan University for its “Fish for All” program;
- An \$80,000 grant to the University of Michigan for a Great Lakes Fisheries Education Assessment and Summary of Needs;
- Another \$210,000 grant to MSU for design of Project F.I.S.H. and,
- A \$3 million grant to MSU for development of a statewide Great Lakes ecological information system at Michigan’s fish hatcheries;



As a member of the Great Lakes Fishery Trust and as an organization deeply committed to maintaining healthy fisheries and enhancing education, the MDNR has directly experienced evidence of the tremendous need for and interest in Great Lakes education, as we rolled out our new Great Lakes unit as a component of our Michigan-specific history conservation curriculum for 4th graders called “LAPs.” LAPs is an acronym for Learn from the past, Appreciate the present, and Preserve Michigan’s outdoor heritage.

Within 60 days of the Great Lakes curriculum unit being rolled out, the DNR received some 4,000 orders from Michigan’s 5,400 fourth grade teachers for these materials. Independent surveys show that LAPs materials are being used in 64% of Michigan fourth grade classrooms an average of one day a week. Many of these are what are called “LAPs days” in which all lessons taught on that day – math, social studies, language arts and science – have an outdoor theme imbedded into the lesson content.

We all know the vital importance of reaching out to future conservationists with innovative youth education initiatives, which is why I’m so pleased that “education” is the common theme in each of the three goals for this conference:

- To create a collaborative vision for the future of Great Lakes fisheries and ecosystem education,
- To identify and prioritize recommendations for sustaining, modifying and creating needed networks, educational efforts and educational research for Great Lakes fisheries and ecosystem education, and,
- To provide guidance to funders for sustaining fisheries and ecosystem education into the future.

It is the challenge and charge of everyone here to determine how these goals will be accomplished and how to proceed from here. I want to challenge you to identify critical areas where the Trust can help achieve Great Lakes educational goals – and I leave you with this verbal image of Michigan:

A state where Great Lakes, forests and rivers...

Nurture fish, wildlife and parks...

Conserved by generations of peninsula dwellers.

Where white pines whisper in the wind...

Where white-tails flag in shadowed timber, and,

Where lake trout cruise our abundant, fresh waters,

Because people like you care.

Great Lakes Fisheries Education Assessment and Summary of Needs

Michaela Zint, Ph.D., University of Michigan School of Natural Resources and Environment and Rosanne Fortner, Ph.D., The Ohio State University School of Natural Resources and Ohio Sea Grant

In 2000, the Great Lakes Fishery Trust board began an effort to identify Great Lakes fisheries and ecosystem education needs and opportunities. From 2000 through 2001, we worked to carry out needs assessment work aimed at four objectives:

- Development of Great Lakes ecosystem and fisheries education literacy goals;
- Literature review of opinion surveys relevant to the Great Lakes fisheries;
- Review of leading Great lakes ecosystem and fisheries education materials and other education/communication efforts; and
- Identification, validation and prioritization of gaps and identification of potential funding partners.

We developed a set of Great Lakes ecosystem and fisheries education literacy goals, validated by the Great Lakes Fishery Trust. These goals consist of 11 issues and 143 related concepts, including the topics of: habitat, pollution, ecosystem, biodiversity, treaty rights, stewardship, non-native nuisance species, building fisheries, managing fisheries, fishing, and careers. These literacy goals then provided guidance for our literature review of opinion surveys and our examination of education resources and efforts.



Michaela Zint presents the results of the comprehensive needs assessment for Great Lakes ecosystem and fisheries education she conducted with Rosanne Fortner.

Our literature review of opinion surveys was designed to address the question “What do people believe about the Great Lakes and its fisheries?” We identified over 70 surveys of individuals’ cognitive, affective and behavioral status with implications for Great Lakes fisheries. To the best of our knowledge, no single comprehensive survey has focused on the Great Lakes or its fisheries. Instead, surveys have focused mostly on aquatic resource opinions and knowledge, and not on other aspects (such as motivations, empowerment) needed to promote stewardship.

Some overall results of existing surveys include the following:

- Residents are concerned about the Great Lakes, but know little about them.
- Anglers tend to know more than other audiences about the Great Lakes.
- Great Lakes fish consumers vary in awareness/knowledge of, and responses to fish consumption advisories. Much is known in this area.
- Adults get most Great Lakes information from mass media; youth get most information from their teachers. Educators receive much of their information through training workshops.
- Education efforts are able to change individuals’ knowledge, attitudes and behaviors.
- Teachers have different knowledge of, and preferences for, the various Great Lakes topics they could be including in their instruction.

When we conducted our review of leading K-12 Great Lakes ecosystem and fisheries education materials, we wanted to address this question: “What resources and opportunities are available for reaching the Great Lakes fisheries education literacy goals?” We conducted a review of 30 materials for both content and pedagogical approaches used.

In reviewing the content of existing education materials, we observed the following:

- Pollution and exotic species have good coverage in materials available.
- The topics of habitat, ecosystems, building fisheries, and stewardship have adequate coverage.

- Managing fisheries and biodiversity are subjects covered to mixed degrees across materials.
- Treaty rights, fishing and careers have little coverage among existing materials.

In terms of pedagogy, existing materials scored moderately well across the six characteristics recommended by the North American Association for Environmental Education's Environmental Education Materials: Guidelines for Excellence. We found that:

- Materials were strongest in terms of their depth of coverage of information.
- Materials were weakest in terms of providing an action orientation for learners.
- Existing materials were mixed in regards to their fairness/accuracy, skill building, instructional soundness, and usability.



Results of this review were compiled into an Internet-based guide to Great Lakes fisheries education resources (see References).

To learn about Great Lakes fishery education efforts in addition to the leading K-12 education materials, we conducted an examination of other Great Lakes ecosystem and fisheries education efforts. We consulted with GLFT education representatives and members of the Michigan Alliance for Environmental and Outdoor Education for this analysis. These education community representatives corroborated our list of existing materials and programs throughout the Great Lakes region. In particular, many of these representatives were aware of the GLFT-sponsored Project F.I.S.H. program. Finally, individuals generally agreed on gaps and needs for future educational efforts to address in relation to Great Lakes ecosystems and fisheries.

Another of our tasks was to review the education projects funded by the GLFT since its inception. The GLFT had funded (prior to this needs assessment) three education efforts: *Fish for All*, *Project F.I.S.H.*, and the *Great Lakes Ecological Information System* – a fish hatcheries interpretation project. Each project has some significant strengths. *Fish for All* has a strong and unique focus on Great Lakes fisheries stakeholders and conflicts. *Project F.I.S.H.* focuses on Michigan fishing education, and the *Great Lakes Ecological Information System* has the ability to address issues related to stocking. Each of these projects has the potential to fill identified fisheries education gaps and needs (in the topics of stakeholders/conflicts, fishing, and stocking/management of Great Lakes fisheries). All have the potential to raise individuals' awareness of Great Lakes fisheries issues, and, if enhanced, to promote stewardship behavior.

We identified a variety of potential partners to provide funding and/or other resources to support education efforts. From the government sector, examples of potential funders include Great Lakes region Sea Grant programs. Foundations such as the National Fish and Wildlife Foundation and the Charles Stewart Mott Foundation, as well as the Recreational Boating and Fishing Foundation (RBFF) all might be potential future funders for Great Lakes fisheries education efforts in partnership with GLFT. Finally, corporate sponsors exist from industry groups such as the American Sportfishing Association.

As a result of our needs assessment, we provided several recommendations, the first of which was to host this networking conference.

Recommendations:

Fund networking opportunities, since individuals do not know about existing resources.

- Fund an annual conference on Great Lakes ecosystem and fisheries education.
- Support meeting of interested funding organizations to develop a joint funding strategy and/or opportunities for collaboration.
- Provide on-going support for the public Web page created as part of this project.

Fund relevant education research, since few funding sources currently support work in this area to inform and thus, improve education efforts.

- Contribute to funding a regional survey related to Great Lakes fisheries.
- Fund outcome evaluations of existing education efforts.
- Fund research that can lead to increased involvement of individuals in the protection of Great Lakes fisheries resources.
- We do NOT recommend funding research related to fish consumption advisories.

Sustain existing quality efforts and support efforts to fill gaps, since many existing resources are in need of improvements and/or revisions as well as increased promotion.

- Fund revisions/improvements and fill identified gaps in: fisheries and biodiversity; fisheries and critical habitats; ecosystem (including fisheries) management, treaty fishing rights, and fisheries and sustainability.
- Fund the dissemination of resources through various means, for various audiences.
- Fund education efforts involving and assisting tribes.
- Fund collaborative efforts between the three GLFT-funded projects.

Implement these recommendations through a variety of innovative measures.

- Fund internships and fellowships for Native American and other minority students.
- Fund an endowed chair to conduct Great Lakes education research
- Fund a consortium of universities and organizations to work toward implementing the overall recommendations.

Establish and use guidelines for the funding of future education projects.

- Establish an Education Advisory Group
- Fund efforts explicitly focusing on literacy goals.
- Require “best practices” based on professional guidelines established by the NAAEE and RBFF, and require programs to conduct thorough, sound evaluation.
- Consider requiring projects to have an education component, in addition to the practice of funding education projects separately.



References

Guide to Great Lakes Fisheries Education Resources can be found at <http://www.glft.org/EdAssessment/index.html> This Guide was prepared by Zint and Fortner as a result of this GLFT-funded Needs Assessment project.

North American Association for Environmental Education. Guidelines for Excellence project publications can be found at <http://www.naaee.org>

Recreational Boating and Fishing Foundation’s publication *Defining Best Practices in Boating, Fishing and Stewardship Education* can be found at <http://www.rbff.org> (in the Education and Research sections of the RBFF Web site). In addition, RBFF maintains a comprehensive, searchable database of aquatic resource education materials from across the U.S.

Great Lakes Fisheries Diversity and Sustainability

William W. Taylor, Ph.D., Chair, and Patricia L. Stewart, Director of Communications,
Department of Fisheries and Wildlife, Michigan State University

Sustaining, protecting and improving the Great Lakes are huge responsibilities. These lakes are international treasures that we hold close to our hearts, and our children—and our children’s children—are depending on us to ensure their natural heritage. This conference is a springboard to do just that.



It’s important to understand not only the traditional and aesthetic values our Great Lakes offer, it is also important to understand what they contribute to our economy. According to the 2001 National Survey of Hunting, Fishing and Wildlife-Related Recreation, completed by the U.S. Fish and Wildlife Service, 34 million anglers spent \$35.6 billion and supported 1.1 million jobs over the last 10 years. A report from the Great Lakes Environmental Research Laboratory states that the commercial and sport fishery on the Great Lakes is valued at about \$5 billion annually.

We also need to understand the threats to the Great Lakes fishery, which are many—overfishing, global warming, pollution, invasive species, water security—to name a few. We live in a globalized and evolving society amidst shifting demographic patterns, competing land use agendas, changing family and community structures and an ever-increasing presence of technology. To be effective in our approach to education and communication, we must therefore understand that learning communities are grounded in sometimes conflicting and diverse belief systems. We must remain cognizant that our education and communication strategies need to be collaborative, inclusive and understanding of individual experiences, language, culture and community values.

Given these challenges, how do we ensure and promote sustainability, which is the maintenance of social and economic benefits or ecosystem services indefinitely? In other words, how do we sustain the balance between the productive capacity of the environment and our use of this production? Essentially, what we are really talking about is a business—the business of ecosystem goods and services—and nature’s ROI (return on investment), which, as with many investments, may result in a profit. To ensure sustainability and to foster a climate for “profit”—that being a legacy of clean air, clean water, productive land and a high quality of life — we must:

- Expand public education and dialogue.
- Continue working with our partners and stakeholders in developing a strategic “business plan” to protect and improve our ROI.
- Recognize the interconnectedness of social, sometimes conflicting, belief systems.
- Encourage inclusive, adaptive and transparent decision-making at all levels of governance.
- Seek and receive grants for research in environmental education.
- Incorporate technology in planning and implementing environmental educational programs.

The dialogue and networking we develop at this conference are a move forward in creating a vision for the future of Great Lakes ecosystem education. I would like to close quoting that great British philosopher, logician and social essayist, Bertrand Russell,

“The central problem of our age is how to act decisively in the absence of certainty.”

These are, indeed, uncertain times, but out of chaos comes order and great accomplishments. I know we are ready for the challenge, and I trust that the networking at this conference and in future collaborations will advance our Great Lakes fisheries and ecosystems understanding and education in providing for tomorrow’s stewards of these great aquatic resources.

The Inland Seas Education Program: Excellence in Community-Based Shipboard Great Lakes Education

Tom Kelly, Executive Director
Inland Seas Education Association

The *Inland Seas Education Association (ISEA)* is a Michigan non-profit organization founded in 1989 to teach young people about the science and heritage of the Great Lakes. ISEA's award-winning shipboard educational programs are designed for students in grades 5 – 12 and can be modified for learners of all ages. ISEA holds steadfast to its dual mission: to encourage young people to pursue academic interests related to the Great Lakes, particularly the sciences; and, to provide enhanced public understanding and stewardship of the Great Lakes ecosystem.

In its early years, instruction was carried out on chartered sailing vessels operating out of Suttons Bay and Traverse City, Michigan. In 1994, ISEA raised \$750,000 to build the schooner *Inland Seas*, a custom-designed 77 foot sailing vessel equipped with the latest technology to conduct hands-on educational programs for learners of all ages.

Since 1989, more than 54,000 learners have experienced ISEA's programs taught aboard *Inland Seas* and the chartered 77 foot schooner *Manitou*. Students from more than 140 Michigan communities – from inner city neighborhoods to rural farm districts – have participated in the "schoolship" experience. They have raised the sails, steered and navigated the ship, learned of the history of the Great Lakes, and studied weather, water chemistry, plankton, benthos, fish, and their interrelations within the aquatic ecosystem.



For many of these young citizens, this is their first experience on the water, and through this experience they have begun to understand the complexity and importance of the Great Lakes ecosystem. The schoolship experience was captured best by a teacher from Grand Blanc Michigan who said: "The excitement that Inland Seas creates for my students is more powerful by far than any of our classroom work or technology."



The heart of the schoolship program is the work of more than 200 dedicated volunteers. Many volunteers are retired educators or other professionals, each with a wealth of experience and education. When combined with the rigorous training program provided by ISEA, the result is a remarkable instructional staff. Volunteer instructors donate some 8,000 hours annually. Volunteers in various other capacities provide an additional 1,000 hours each year.

In 2001 ISEA's Great Lakes Schoolship Program was named "Sea Education Program of the Year" by the American Sail Training Association among 50 such programs in the United States and Canada. In 2003, ISEA began renovation of a former waterfront lumber yard that will soon become the Inland Seas Education Center. The Center will provide year-around Great Lakes educational programs and exhibits beginning in 2004. For more information, see <http://www.schoolship.org>

Aiming for Excellence in Great Lakes Fisheries Education through Project F.I.S.H. (Friends Involved in Sportfishing Heritage): An Example of a GLFT-Funded Project

***Mark Stephens, Education Program Coordinator
Department of Fisheries and Wildlife, Michigan State University***

Project F.I.S.H. (*Friends Involved in Sportfishing Heritage*) is an aquatic resource education program designed to enhance the quality of life of kids. Fishing is a great tool to attract children to the water, watersheds, and the Great Lakes and all of their complexities. In order to get someone to care for something passionately, they must have direct experience with it. Project F.I.S.H. is a program designed to accomplish just this.

Based on the 4-H National Sportfishing Program, Project F.I.S.H. was established after 10 volunteers attended the very first national workshop. Project F.I.S.H. is coordinated through MSU's Department of Fisheries and Wildlife, in collaboration with MSU Extension, Michigan 4-H Youth Development Programs, and a multitude of state-level partners.



Project F.I.S.H. has been very successful utilizing the model of creating community partnerships with anyone who could help start a successful aquatic education program. Local level partners include schools, after-school and non-formal programs, sportfishing groups, other outdoor-related

organizations, local businesses and civic organizations from bait shops and restaurants to Lions and Elks clubs. The goal of creating these partnerships is to facilitate long-term fishing participation and appreciation of our aquatic resources in these local communities where these partners have a share of the effort.

Local volunteers are trained in five subject areas that include aquatic ecology, tackle crafting, people and fish management, angling skills and coordination. With skills and relationships gained in a 12-15 hour workshop, these mentors feel more confident taking on the challenge of starting a long-term program in their community.



For example, a Muskegon watershed community partnership started with five teachers and administrators from Muskegon schools attending a workshop in Lowell, Michigan. This team then coordinated with Muskegon County MSU Extension to host its own workshop a few months later. This team identified community partners from various schools, the Annis Water Resources Center of Grand Valley State University, the Muskegon Conservation Association, the Muskegon Conservation District and many others. Since this workshop, the Muskegon area volunteers have partnered in fisheries education programming as well as the enhancement of aquatic habitats in local Great Lakes tributaries.

With nearly 520 trained mentors now found in 58 of Michigan's 83 counties, many partnerships like these are popping up across the state. Since 1997, approximately 30,000 kids have been involved in short-term, on-going mentor-based, and intensive Great Lakes fisheries education programming. Evaluation of impacts on mentors and of mentors' activities in youth education is achieved through a pre- and post-workshop survey and three month/one year follow-up phone surveys. Mentors believe the community-based program model works, and say that it is very helpful to have additional resources available to them after their training.

Project F.I.S.H. taps into a unique variety of resources that are willing to provide support for statewide coordination of the program and for local, on-going fishing and aquatic resource education programs. Research and development funding came from the Great Lakes Fishery Trust and the Hal and Jean Glassen Memorial Foundation, and numerous other funding sources. For more information go to www.projectfish.org

Making Great Lakes Aquatic Education Work: A School-Based Perspective

Rosanne W. Fortner, Ph.D.

The Ohio State University and Ohio Sea Grant

The goal for aquatic education is to assist learners of all ages in becoming motivated citizens, motivated to protect aquatic resources and the watersheds that surround them, motivated to use the resources in sustainable ways. School education can assist in reaching that goal.

Imagine a bridge that consists of the knowledge it will take to move the learner to the role of the motivated citizen. Education research tells us that the underpinnings of school education required to support knowledge building are:

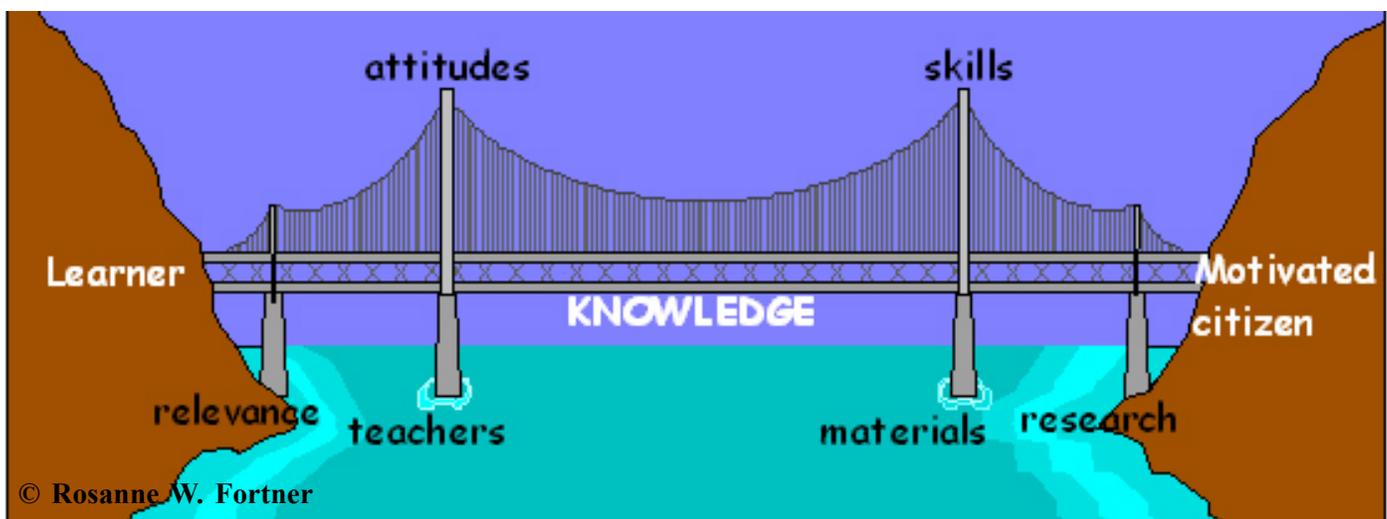
- Relevance to the learner. If a person believes the information will be useful, it can be incorporated into the conceptual base of knowledge and used as needed. If only global examples are used, and the learner has no local point of reference, the information may appear useless. People learn in different ways, so teaching should accommodate those styles.
- Teachers must be well trained and highly motivated to provide guidance for the learning. Sustained teacher education programs are needed, as is involvement in the best teaching practices. The teachers must be convinced that the information is within their subject matter and meets standards that are in place for the curriculum. The aquatic education must fit.
- Materials for teaching and learning must be prepared with both content and pedagogy in mind, and must be attractive and diverse enough for learning in a media-rich age. They should be constructed with active

involvement of teachers, and tested in classrooms. Most importantly, they should demonstrate a systems approach to thinking, to demonstrate the important connections between people and environment.

- Aquatic education should be grounded in research, both in the accuracy of the science subject matter and in the educational processes for delivery of learning experiences. There is a rich body of research upon which to base effective teaching, yet few practitioners encounter it.

The bridge needs superstructure as well if we are to apply models of how motivation and behavior are generated. We must assist learners with the development of positive attitudes, and feelings of personal effectiveness, if we are to hope for behavioral outcomes from learning. This can be done through close encounters with the environment, or with classroom simulations of environmental processes and interactions. The experiences should offer opportunities for learners to see that their own actions have an effect.

Finally, there must be deliberate instruction in what courses of action are available. The types of environmental behavior recognized in the literature of the field include persuasion, legal action, consumer behavior, political action, ecomanagement and education (of self and/or others). Simply giving the list to learners will not be the



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motivation needed to act. There must be opportunities to do the actions and take the responsibilities. It is important to consider how much of aquatic education belongs in classrooms and what aspects are best left to nonformal education. Many would argue that it is not the place of the school to teach values, but to help students learn how to find information upon which values can be based. We also need to recognize that even if we provide information and students add that to their knowledge base, the translation of knowledge into positive attitudes and appropriate behavior is not guaranteed. Educators need to work on all parts of the knowledge – attitude – behavior sequence that they wish to impact.

So how are we doing on reaching the goal, getting the bridge built? Research indicates that students in the Great Lakes region know more about the oceans than about the Great Lakes, so knowledge about the local (relevant) ecosystem is the reasonable place to start. Research among teachers shows that they identify many water topics as priorities for their students to know, but they themselves report low levels of knowledge on the topics. Strong teacher education programs are needed, first to assist with knowledge gain and then to immerse the teachers in how the best teaching is done. Materials are available in abundance from many sources in the region, particularly from the Sea Grant colleges in each state and the many NGOs of the area. Teachers often are unaware of these resources. Each state has educational researchers who can assist with the development and evaluation of education programs, so they should be involved in implementing any aquatic education effort.

There is much to do, and those who have been involved with Great Lakes education over the years are very willing to contribute to new efforts. We all see the need, and the need includes more involvement by more people.



The job of building Great Lakes education bridges is much too large to be accomplished alone.

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Tribal, Treaty and Commercial Fisheries Educational Needs

Jennifer Dale, Bay Mills Indian Community and CORA

The Chippewa Ottawa Resource Authority (CORA) has its roots in the Chippewa Ottawa Treaty Fishery Management Authority (COFTMA) that was established in 1984 to regulate the 1836 Treaty Fishery. Founding member tribes were Bay Mills Indian Community, Grand Traverse Band of Ottawa and Chippewa Indians, and the Sault Ste. Marie Tribe of Chippewa Indians. The Little River Band of Ottawa Indians and the Little Traverse Bay Bands of Odawa Indians were federally recognized in 1994, and Little River Band joined COTFMA a few years later.

Recently, the tribes, Michigan and the United States signed an allocation agreement for fish in the 1836 Treaty-Ceded Territory; this agreement is called the Consent Decree of 2000. COTFMA became CORA, and the Little Traverse Bay Bands joined the new CORA. CORA oversees the tribal commercial, subsistence and recreational fishery in the 1836 Treaty-Ceded area, a large chunk of northern Michigan and lakes Superior, Huron and Michigan.

The commercial market for our fishers is not in good shape. Prices are in the “basement,” and although retail prices have risen right along with other food products, the price fishers can obtain from wholesalers has steadily declined. Three major reasons for the decline are (in no particular order):

- 1 competition from subsidized Canadian fish markets;
- 2 competition from fish farms, especially salmon; and,
- 3 the effort to clean up the Great Lakes, though a noble and necessary effort, has had the unfortunate byproduct of giving the impression that Great Lakes fishes are full of contaminants.

The fishes do contain contaminants, all foods do now, but without a contextual framework to assess that risk, consumers can't make the best choice for the healthiest food. Actually, much of the tribe's catch is very low in contaminants, a fact we have trouble getting to the public, for some reason.

This leads to why we are here today. The most outstanding need in treaty fishery education is information. There is simply a lack of educational materials about the tribes as modern stakeholders, and the regulation, management, enhancement and products of the Great Lakes 1836 Treaty Fishery. Educational materials are needed for every level

of citizen, from schoolchildren to members of Congress. Professionals are in need of treaty fishery educational materials, from educators writing curricula, to nutritionists advising pregnant women, to corporate buyers looking for fish — they all need more information.



Jennifer Dale from the Bay Mills Indian Community describes the tribal communities' commitment to fisheries education and management throughout the Great Lakes region.

I agree with the assessment by Drs. Zint and Fortner. This lack of treaty fishery education materials has consequences. To name a few:

- We have professionals and elected officials unaware of matters under their purview.
- We have future stewards without complete information under which to participate or help make decisions.
- We have stakeholders who do not understand one another's nature or contributions.

The Michigan Sea Grant publication, *The Life of the Lakes* does deal with the treaty fishery but only generally, as it should, considering the amount of material it covers. There is so much more to know. But it's a good starting point for schoolchildren.

More treaty fishery-specific materials need to be generated for our use. Two examples of essential topics for education materials are understanding treaty rights and treaty resource management. What exists needs to be pulled together and made accessible. For example, there are GLIFWC materials, CORA materials, Web sites, projects

like Fish for All, Protectors of the Earth Youth Camp, library collections, studies, and other materials that could make a good starting point.

One of the reasons for the lack of materials is a lack of funding for treaty fishery public information and education. There is only one part-time position to cover this need and it is funded at only \$29,000 per year. Even if funds were granted, someone would have to write the grants, implement the grants, and administer the grants, and generate the products funded by the grants.

What It's Really Like in Education: A Teacher's Perspective *Susan Bloom, Teacher Consultant, Ypsilanti High School*

I've chosen my attire to make important points about today's learner. I represent all of the multiple influences on students today – influences which teachers must encounter and cope with in order to be effective in fostering the learning we so need to resolve society's dilemmas.



Ypsilanti Public School Teacher Sue Bloom gives her insights about social influences on today's students and what it's really like to teach in the K-12 arena.

Influences on students are many. The mass media pumps our youth full of many negative images. MTV, rap music, movies and television promote violence against humankind, property and our resources. Young peoples' homes may be chaotic, violent or immersed in poverty. Peers emphasize with each other immediate gratification, and many of today's youth experience low self-esteem and high frustration. Finally, as I show with my attire, teens are fascinated with and tethered to their technology — cell phones, CD and MP3 players, pagers and hand-held computer games.

Another reason, that is beginning to change for the better, is distrust. The tribes and individual tribal fishers have had negative experiences that have led them to distrust the efforts of others. Even I, in my tribal position and tribal background, have had to work to gain their trust.

In general, I also agree that awareness and knowledge do not necessarily lead to stewardship behavior. I would like to suggest, from my own upbringing, that individuals who realize that they are a part of the ecosystem are more likely to help care for it. And perhaps that is another contribution that the tribes could make through their connections with the Great Lakes fisheries resources we share.

So, how do we educate the student of today? I have several suggestions that are supported by the best minds in educational research and practice:

- Present curriculum that is relevant to learners' lives.
- Connect with youth, and create a "real" personal relationship.
- Offer instruction which utilizes the individual students' strengths.
- Make learning fun.

Sounds easy? Well, I must emphasize the importance of curriculum, curriculum, curriculum! Within the public education system, curriculum should meet these criteria:

- Any new program must have relevance to the existing curriculum.
- Curricula must fill a need in the accepted curriculum frameworks.
- A curriculum should be easy to integrate seamlessly, and should be supported by the state Department of Education.
- Any curriculum must be accompanied by professional staff development.
- The curriculum should be supported through partnerships with professional teachers' organizations.

In closing, let me share these thoughts about evaluating a curriculum to determine if it really meets the needs of today's educators and students.

- Why does the curriculum exist? Does it serve a purpose?
- How does it meet the students' needs?
- What is the cost?

- How much of my time is required?
- After I am trained, will I feel comfortable teaching the materials?
- What resources will I have available to me?
- Does it align with the state's content standards and benchmarks?

Great Lakes ecosystem and fisheries education sure holds the interest of and is relevant to students and educators, alike. What teachers need, however, in this age of socially distracted and unsupported youth, is more time – time to plan, develop, and implement quality education in the schools.

Educational Needs as Identified in the Private Sector

Chris Temple, Gander Mountain Stores



Chris Temple discusses the importance of partnerships and educational strategies.

I grew up hunting and fishing around the famed “Holy Waters” of the Au Sable River and on the St. Clair Flats of Lake St. Clair. My grandfather taught me very early the value of a solid work ethic and the importance of mentoring others and passing on the passion I have for the experiences and relationships I have developed through angling.

Through my business relationships, I have become an active member and supporter of most outdoor organizations.

As a store manager for Gander Mountain, I get to work directly with a wide variety of organizations that support the mentoring of young people into outdoor appreciation and recreation. From the perspective of a private retail industry, I have observed several critical trends and have some recommendations as we consider how to move forward with new initiatives in Great Lakes fisheries and ecosystem education.

First, it is notable that the median age of our outdoor enthusiasts – the ones who actively support the work we want to do for Great Lakes stewardship – is increasing; we

are not attracting enough youth and young adults into our stewardship populations. Yes, we in the retail industry are interested in attracting customers, but we view these customers as motivated citizens, vitally important in sustaining our region's work in conservation. We view these customers as vital partners with a vested interest in long term conservation of our aquatic resources.

The education community would do well to use this idea of developing stronger customer relationships as we work together to develop and sustain new programs. We need to avoid “one-shot” programs that do little to sustain the customer relationship. We need to identify programs that are self-perpetuating and that sustain on-going mentoring relationships that introduce our youth to the Great Lakes.

Finally, as the retail and non-profit organizations work with the education community, we need to strive to have our institutions act at the speed of business. In the business sector, we are always networking, pooling resources and developing a team approach, but we do so quickly. We are always positioned to move to meet our customers' needs rapidly and efficiently.

This networking conference is our first step in terms of starting to form our strategy together for Great Lakes fisheries and ecosystem education. Let's not let the energy of this conference stall – let's move forward at the speed of business with new partnerships and new opportunities to foster broader Great Lakes fisheries stewardship!

Facilitated Group Discussions

A Brief Description of the Process

The steering committee designed an in-depth discussion process asking conference participants for their responses to three questions. Each of these questions related directly to our three overarching conference goals.

- What is a desired future vision for Great Lakes fisheries and ecosystem education?
- What are the gaps and needs in Great Lakes fisheries and ecosystem education and our knowledge in this area?
- What are our priorities and next steps for funding, collaborating and achieving our vision of excellence?

The steering committee and conference staff worked to design discussion group processes that allowed for intense participant interactions and critical thinking about the future for fisheries and ecosystem education. For the question related to a desired future vision, the steering committee decided to have participants self-select one of four areas of education:

- Early childhood
- Middle and high school
- Adult education, and
- Mixed-age groups in out-of-school settings

When participants arrived at the conference they signed up for a discussion group of interest.

For questions two and three (gaps/needs, and priorities/next steps), the steering committee assigned participants to discussion groups, ensuring that each group had a mix of various education stakeholders.

The steering committee selected group facilitators and recorders from the committee and from Michigan State University's Department of Fisheries and Wildlife. The committee provided input to a common, detailed facilitators' outline describing steps to discuss each question. Then, facilitators and recorders received a background orientation and had additional input to the outline, via a two-hour conference call training session in the week prior to the conference.

Participants actively engaged in each discussion session. Participants heard summary reports of small group discussions at the end of both conference days, and they had the opportunity to comment on each small group's deliberations. Because of this high level of participant engagement in the discussion processes, energy remained high throughout the conference and participants indicated on their evaluation forms their strong desires to stay networked in working toward Great Lakes fisheries education in the future.



What is a desired future vision for Great Lakes fisheries and ecosystem education?

Group #1 – Focused on mixed-age groups, mainly in out-of-school settings

Facilitator: Heather Van Den Berg

Recorder: Shari Dann

“Final” Whole Group statement and main points:

- North Star Vision: To protect, preserve, promote and present a healthy and sustainable ecosystem within the Great Lakes basin for future generations.
- Organizational/communications mechanisms needed:
 - o Great Lakes watershed level to communities
 - o Clearinghouse
- Define specific roles and responsibilities such as manage a website, provide funding, target non-participants, and emphasize responsibility
- Great Lakes regional programming with the flexibility of a local touch
- Cross-jurisdictional collaboration (e.g., an overall lesson plan that can be used by all)



Small Group reports out:

Small Group A — Chris Temple reporting

Major theme: Communications Hub

1. Public programs with private industry
2. Develop general database for information hub (6-12 months) — all partners
3. Better connection to formal education (2 years)
4. Communication (right away)
5. Localization for curriculum and programming
6. Pre- and post-programming with educators
7. Retention (in angling population, in programs)

8. Public working at the speed of business (instead of on 2-3 year cycles, on 2-3 month cycles)
9. Inner city outreach (within 5 years)
10. Identifying career opportunities viable through EE
11. Better targeting of demographic/nonparticipants

Small Group B — Andrea Grix reporting

1. Local resources linked to education programs. (resources = people, natural resources) pre-service, businesses, n.r. personnel, teachers and educators, non-formal educators
2. Organizational leadership
Great Lakes watershed ... state... regions... local communities
3. Coordination of existing educational materials
4. Biennial conference on aquatic education research
5. Funding clearinghouse for supplies, habitat improvement, service projects, programs
6. Non-formal educators working with formal educators effectively

Small Group C — Bucko Teeple reporting

Vision: To protect, preserve, promote and present a healthy, sustainable indigenous ecosystem within the GL basin for future generations.

- Create mentor programs
- Creative community involvement
- Community = all groups, ages, nations, all stewards.
- Establish hands-on programs
- Equal access for all
- One lesson plan shared by all states by 5th grade

Whole Group Discussion:

Communication Hub

- Compile information, data
- Localize
- What's going right/wrong in various areas
- Assess
- Better targeting of demographics of nonparticipants
- Formal and nonformal, better integration
- Inner city outreach

Building Blocks for a Vision:

- Local resources
- Organizational leadership — regional to state to local
- Coordinate existing programs
- Biennial conference of aquatic education research
- Funding clearinghouse
- Nonformal and formal

Group C created a vision statement (see above)

- Key words: mentor, community = all groups, ages, nations, all stewards, hands-on, equal access for all

General discussion points made:

- Group likes the North Star statement of Group C
- Also like better targeting and demographics of nonparticipants. Done at every level? Done on state or regional basis and then assistance provided to local levels?

- Key is to have good leadership to build foundation, AND need flexibility at local level to use what's going on to touch people at local level.
- Statewide programming with local touch.
- Benefit for those from farther away is to see what others have done, and want to take that learning home. Needs to be a strong international connection. If each is doing their own thing in isolation, then we aren't taking advantage of collaborating. Cross-jurisdictional collaboration was mentioned in the morning. Great Lakes watershed includes Ontario! In organizational leadership, bring people together every other year, or every 3-5 years.
- Organizational leadership is important from Great lakes community down through local communities define specific roles and responsibilities.

Group #2 – Focused on early childhood education

Facilitator: Brandon Schroeder

Recorder: Andrea Feldpausch

Conclusion List for Question #1:

- Motivated Kidizens (Responsible citizens and lifeskills)
- Awareness... something to build a lifelong learning process on (outdoors and/or in class)
- Outdoor experiences – positive experiences/successes/experiential
- Multidisciplinary/Networking
- Practical Tools/evaluation (cost effective, accessible, easy...)
- Ownership... kids as stakeholders/role in ecosystem (Stewardship/citizenship)



Personal Visions for Great Lakes Fisheries Education

- Hands-on, practical: local, close, affordable, repeat, ownership
- Kids as stakeholders: Kids will have the experiences, knowledge and willingness to take an active part in establishing and creating the type of environment that will enhance their quality of life for themselves and their children. “Motivated Kidizens”



Retired and current educators, along with representatives from sportsmen's groups, discuss future opportunities and challenges for Great Lakes fisheries education.

- Actual in-class curriculum (a multi-spanning environmental curriculum), use of outside sources that can be injected to any situation to help stimulate and encourage that curriculum, funding to make above possible, environmental curriculum that can take the place of or enhance current student curriculum.
- Change, collaborate, integrate, interconnectedness, relevance, intergenerational, multigenerational, lifelong, nurture, standards methods, hands-on, multidisciplinary
- Stewards, enjoyment in environment, intergenerational, Great Lakes Ecosystem Education integrated into standards, reinforce that we are part of the ecosystem, lifelong, start young, nurturing

Group Visions for Great Lakes Fisheries Education

- Kids as stakeholders
- Bring outdoors to classroom or classroom to outdoors
- Hands-on
- Repeated participation opportunities
- Ownership
- Stewardship and outdoor ethics
- Use the outdoors as a laboratory – make a connection between a subject and something in outdoors

- LAPs day (Learn, Appreciate, Preserve)
- Teachers need to network among each other – teachers shouldn't isolate themselves
 - o Share their strengths and attitudes
 - o Share themes among classes
- Relate ideas throughout the grades (re-enforcement)
- Every young person (all 4th graders)
 - o Participate in meaningful fisheries education experience
- Stewardship
- Enjoyment of the environment
- Intergenerational
- Great Lakes ecosystem ed. integrated into standards
- People = part of ecosystem
- Lifelong learning is starting young
- Nurturing
- Multidisciplinary
- Experiential
- In the field
- “Marinated Education”
- Long-term evaluation
- Treaty education – need to include messages on why people should care
- Relevance
- Personal experience – e.g., Protectors of the Earth Youth Camp

Key things to look at:

- Motivated “Kidizens” = “Responsible Citizens”
- Bring outdoors to classroom or classroom to outdoors
- Evaluation
- Every young person participates in Great Lakes experience(s)
- Practical tools
- Networking
- Multidisciplinary
- Kids as stewards/role in ecosystem
- Lifelong learning/introduce young and build
- Stewardship/ ethics and life-skills

Group #3 – Focused on Middle and High Schools

Facilitator: Tom Kelley

Recorder: Jennifer VanderLaan

The bottom line:

- Sustainability of programs and infrastructure is important for Great Lakes fisheries education. Sustainability as a concept also came up a great deal.
- Political support for Environmental Education and as a funding source is very important.
- Need to make reliable connections to resources (in terms of teaching resources, human resources and community resources).

Future vision for Great Lakes fisheries and ecosystem education:

- Money is needed
- Free supplies
- Promotion of materials and resources on a Web site
- Community resources available to educators
- Community needs linked to goals and objectives of education
- Pay attention to underserved people such as vulnerable youth
- Focus on sustainability of programs
- Let's get an environmental education course into high/middle schools
- Need to have positive reports in the news
- Education vs. advocacy (need to have opportunities to research both sides of the issue)
- Need resources for teachers to cover controversial topics
- Emphasis on the human experience
- Energy flows, matter cycles, life webs
- DEQ — DNR – MDE connection is necessary to be successful
- Need true evaluation (not just numbers)
- Need to be keyed into the political scene and get buy-in from the public

- Need to develop a state task force
- Need to have a clear purpose - How does fishing fit into formal education?
- Integrate sciences with art
- Provide positive role models for youth



-
- Emphasis on systems thinking such as the material cycle
 - Focus on the present and the future values and decisions that affect them.
 - Need to highlight success stories
 - Emphasis on environmental literacy
 - Need a clearinghouse of resources and training for how to use them
 - Permanent state-funded environmental education
 - State level curriculum at two different grade levels
 - Link knowledge to action
 - Contribute to the field of education
 - Provide outdoor experiences tied to student research
 - Get agency people into the classroom
 - Train the trainers (necessary for sustainability)

Group #4 – Focused on adult education

Facilitator: Susan Holmes

Recorder: Carol Swinehart

Desired vision for adult learning:

Every adult in region is Great Lakes aware/literate

- basic facts
- knows watershed they live in
- knows ‘their’ lake

Every adult in region understands their relationship to the Great Lakes

- career/occupation
- personal lifestyle
- volunteer
- political

Every adult in the Great Lakes region is actively taking responsibility in some way

- consumer
- work
- recreation
- teaching
- networking



Participants interact during the small group sessions with others from varied backgrounds and locations throughout the Great Lakes basin.

General Discussion Points:

- Educating adult population to understand ecosystems
- Using what’s already available
- Government and corporate participation
- Functional process to educate decision makers
- Integrate historical value of the Great Lakes to different cultures of this and other countries
- Conflict resolution between sport and commercial fishery
- Healthier fish/ecosystem
- Connecting people to resources – personal connection to lakes/rivers/local waters
- Broader watershed connections
- Larger population w/better understanding of Great Lakes ecosystem
- Identifying desired behaviors
- Identifying characteristics of ideal user population
- Accommodate regional differences – identify what constitutes a successful program (educational theory/ social science theory)
- Recognize that needs of audiences are variable
- More funds available for planning and evaluation
- Great Lakes curricula/resources can be used to achieve standards and science curricula objectives – not an “add on” to existing curricula
- Easier access/better dissemination of resources
- We need a Jacques Cousteau of the Great Lakes – social marketing
- Identify and fill gaps in information/education
- More funding is needed
- Greater recognition by agencies of importance of education to meet water management goals
- Efforts to educate future leaders in important aspects of the fishery and equip them with skills so that they can educate peers and others and interact with one another and with management agencies
- Facilitate communication of science to consumers

What are the gaps and needs in Great Lakes fisheries and ecosystem education and our knowledge in this area?

Group #1

Facilitator: Heather Van Den Berg

Recorder: Shari Dann

Core Values:

- money, diversity of membership and leadership
- draws critical mass and diverse audience (six votes)
- personalize, mentoring, small #, hands-on (five votes)
- cooperation that crosses traditional boundaries (business/education/age) (seven votes)
- experiential education, mentors (volunteers) (eight votes)
- volunteer monitors understand lake issues
- fun (one vote)
- “real water” classroom (two votes)
- what gets measured gets done (two votes)
- education matters (nine votes)
- meeting with common interest participants

What works best:

- acceptance of GL Fishery Trust to lead (one vote)
- hatchery education (one vote)
- Project F.I.S.H. (seven votes)
- curriculum content abounds
- passionate and creative people working on this project (five votes)
- combining adults and children together (mentors) (one vote)
- schooner/shipbased program with mentors (volunteers) (four votes)
- Envirothon and Lake Association programs (two votes)
- MI Lakes and Streams Association and lake association monitoring project (one vote)
- workshops like this one re: programs found out about (three votes)
- Active volunteers — collaborative, networking (three votes)

- encourage research (two votes)
- talent pool — education level, genuinely interested (four votes)
- maximizing experiential learning (five votes)
- peer outreach (one vote)
- encouragement of GLFT to support aquatic ed.
- literature review — took time to look backward and forward
- communication

What Needs Improvement:

- Infrastructure that supports good/effective communication (11 votes)
- Evaluation to demonstrate success (8 votes)
- Functional process for connecting curricula/information that has been developed to specific teacher disciplines, even identifying which unit to infuse the material into (8 votes)
- Better delivery: we have high content, but low use (3 votes)
- Better access to materials that are easy to obtain and free (2 votes)
- More after-school education (2 votes)
- Coordination of various projects (1 vote)
- Communication between networks (1 vote)
- Greater awareness of what curriculum projects exist (1 vote)
- Greater availability of peer reviewed materials (1 vote)
- Jacques Cousteau of the Great Lakes! (1 vote)
- Teachers don't know how to teach outdoors
- Connectivity: building block structure and grid of learning
- More environmental education, overall
- Expand definition of what constitutes EE
- More media coverage of environmental threats
- Career education information
- Need to make the case that our water = \$

Group #2

Facilitator: Brandon Schroeder

Recorder: Andrea Feldpausch

Group Ideas:

Strengths:

- Great to share goals with so many people
- A number of positive projects with grant funding (Thank you, funding groups)
- Great variety of programs available for motivated educator
- Universities involved in research area great resource
- Web makes info more readily available
- We're a great place for place-based learning (The Great Lakes, the site/orgs. like Inland Seas, GVSU, Stone Lab, Pier Wisconsin, etc)
- GLIN (Great Lakes Info. Network)
- Teacher education responsive to professional (teacher) needs
- Systems based curriculum (Earth Systems Education)
- Scholarship programs (Class in field) working - creating hands-on experiences
- Bridge – website listing resources that are teacher/scientist reviewed
- Youth camps – hands-on on opportunities mixed with science messages
- Biologists/resource people – willingness to cooperate
- Using job fairs to promote NR careers
- Good, science based info to share (Sea Grant)
- Dedicated, enthusiastic people in NR education/outreach programs
- Multiple, diverse ideas – many ideas/opportunities/examples of quality ed. programs
- Generally, similar goals toward ed./youth/public

Gaps:

- Programs developed with state and national curriculum standards in mind
- DNR, DEQ, MDE, educators to address common approaches
- Need professional development plan
- Education of general public about invasive species
- Education of general public about water security
- Awareness of loss and/or degradation of habitat
- Need shared information mechanisms within this group/ email list/Web site
- Broaden network of educators
- Increase profile at national level with funding
- Don't reinvent the "wheel"

- Willingness to adopt/incorporate info./resources into school curriculum, tribal programs, sport/commercial programs
- Adequate delivery systems
- Stronger career messages
- Stronger networks/partnerships



Overall Values:

- Science-based programming/resources (both science: biology and teaching)
- Strong education network
- Contact with environment (hands-on, feet-in)
- Healthy G.L. ecosystems
- Ind./Learner Growth/Benefits
- Based in national/state standards
- Education: sharing of info, culture, etc.
- Partnership/collaborative efforts
- Lifelong opportunities
- Broad, equitable access
- Appreciation and connection to Great Lakes
- Access to info and services for "have nots" – teachers, clubs, place-based learning experiences
- True evaluation plans, not based on how many kids go through the class or what their test scores are, but a change in attitude!! (Random sampling)

Overall Strengths:

- Great to share goals with so many people (similar, general, broad goals toward aquatic ed.) (one vote)
- A number of positive projects with grant funding (great variety of programs/ideas/ opportunities/programs (nine votes)
- System based education

- Youth camps
- Curriculum
- Great variety of programs available for the motivated educator (teacher ed. responsive to professional teacher needs) (three votes)
- Web makes info more readily available (GLIN, BRIDGE) (three votes)
- We're a great place for place-based learning (the Great Lakes, scholarship programs, etc.) (six votes)
- Biologist/resource people – willingness to cooperate (three votes)
- Using job fairs to promote Natural Resources careers
- Good science based info to share (Sea Grant) – University involved in research and sharing (seven votes)
- Dedicated, enthusiastic people in NR education/ outreach programs (three votes)

Overall Needs:

- Broaden network of non-formal and formal educators (four votes)
- Increase profile at national level \$\$
- Don't reinvent the wheel (two votes)
- Willingness to adopt/incorporate (two votes)
- Adequate delivery systems (three votes)
- Stronger career messages (one vote)



- Stronger networks/partnerships (agencies, educators, non-profits around a common goal) (six votes)
- Programs developed with state and national curriculum standards in mind (four votes)
- Need professional development (two votes)
- Ed. of general public about invasive species, water security, awareness of loss and/or degradation of habitat (two votes)
- Need shared information mechanisms within this group/ email list/Web site (three votes)
- Access to info and services for “have nots” – teachers, clubs, place-based learning experiences, youth based (two votes)

Group #3

Facilitator: Tom Kelly

Recorder: Jennifer VanderLaan

What is working best?

- Real experiences
- Using the best practices for EE and fisheries education
- Transportable programs (are they age specific?)
- Having a Great Lakes focus
- The interest level among stakeholders
- Immediate goals and future goals (need to find a balance)
- Consider economics and the special spaces
- Democratic values such as environmental stewardship
- Strong, diverse disciplines and programs
- We have data that suggests that we have a problem, a needs assessment isn't necessary

What needs most improvement?

- Knowledge of how decisions are made
- Understanding biodiversity as a concept
- Access to human resources, particularly agency personnel

Group #4

Facilitator: Susan Holmes

Recorder: Carol Swinehart

What is working best at this point in time? (individual responses)

- Programs w/\$\$\$
- Lots of good materials; don't need to develop much more
- Some good online sources – separate, but scattered, not connected
- Some sources for real time data
- Many professionals that care about GL fisheries and ecosystems
- Current networking is good
- Willingness of formal educators to work with nonformal
- Good experiential programs exist
- A number of the important groups are involved
- Strength in the number of grassroots community-based 'on the water' programs
- MUCC's Michigan Out of Doors

- Quality treaty fishery education
- Risk assessment, a fish is not a fish is not a fish (i.e. bottom feeders, old fish)
- Geographic areas – loss of wild places to fish
- Connection to MDE and state curriculum
- Political pressure
- Teacher training
- Formal to nonformal education connection
- Attracting and keeping nontraditional groups involved
- We have no game plan
- Developing working groups for action
- We don't have enough risk-takers
- Teaching to the MEAP, no flexibility

And what values guide our work?

- Stewardship as a guiding value
- The diversity and strength of our educators and stakeholders
- Having a game plan

- Lots of organizations dedicated to GL fisheries and ecosystems education
- Lots of good materials
- Call in outdoor radio shows to share info and perspectives



- Some very good experiential education programs
- Lots of dedicated people
- NPR GL Radio Consortium
- GLF&E materials in programs that target ages 6-12
- Early education efforts are making inroads
- Definite beginning to linking the materials to state standards
- Information on exotics education
- DEQ citizen monitoring program
- Boat based programs – Inland Seas
- Some excellent educational video presentations
- Networking
- Business-educational partnerships
- Hands on-experiential learning and experiences

What is working best at this point in time? (Group summary responses)

- Hands on experiential learning and experiences
- Networking
- Strong grass roots, community-based (on the water) programs
- Dedicated people

Values related to what is working best (individual responses)

- People with a passion or an agenda ... are involved
- Education should focus on what is really needed; adapted or targeted for needs of specific audience(s)
- Educators need to be lifelong learners
- Inquiry is important in the education process, having the data important to inquiry-based learning
- Best work comes from passionate people
- Good integration between formal and informal education reinforces learning
- Good communication is essential to building good relationships
- Good materials and programs will help educators do their jobs better
- Experiential education is particularly effective
- Begin with 'place based' local efforts before thinking globally
- Environment-based hands on activities do engage learners' and impact acquisition of new knowledge, skills and attitudes
- Informed citizens lead to better decisions and improves credibility of those researching various issues
- Sustained education efforts encourage long-term solutions and adaptive management solutions

GROUP VALUES related to things that are working best

- To protect, preserve, promote and present and healthy, sustainable ecosystem within the GL Basin
- Environment-based, hands-on activities engage learners and impact acquisition of new knowledge, skills and attitudes
- Informed citizens lead to better decisions and improves credibility of those researching various issues
- Sustained education efforts encourage long-term solutions and adaptive management solutions
- Need diverse involvement
- Need to use inquiry-based approach to learning



GAPS – What is in need of greatest improvement? (Individual responses)

- Education of young people about career opportunities within GL fisheries and ecosystems
- Awareness about traditional values as they relate to fisheries and ecosystems
- Adapting existing materials/programs to individual needs
- Lack of central clearinghouse for resources (programs, materials and data)
- Some groups may not be well represented
- \$\$\$ for integration of nonformal education w/formal education
- Communication among partners at all levels
- Research on non-participating populations (in education)
- Consensus on issues to be addressed
- Consensus on priorities

- Understanding what works best w/which audiences
- Not all key groups are at the table
- Improving mentoring
- Regional focus for education
- Quality of hands-on experience
- Successful programs connected
- Targeted focus on certain demographics
- Understanding of historical aspect of the fishery focusing on sustainable activities
- Impact of short-term practices
- Need an action component
- Secure stable \$\$\$ for exemplary GLF&EE programs

What is a gap or in greatest need of improvement (group responses)

- Instilling values
- Evaluation – research on non-participation
- Mentoring - More train the trainers
- Career education
- Quantity of hands-on experiences
- Central clearinghouse
- Reach broader audience and segment of citizens
- Stable \$\$\$
- More dependable mechanism to communicate, coordinate and disseminate GLF&E resources
- Instilling the fire

Values related to gaps and needs (individual and group responses)

- It's important to have role models
- Ethnic minorities have been alienated from most successful career areas
- Time is a major factor in whether resources will be used or not
- It's important to invest resources in priorities to get the most 'bang' for the buck
- Methods aren't one size fits all; need to tailor methods to audiences
- This will work best if all participate



What are our priorities and next steps for funding, collaborating, and achieving our vision of excellence?

Group #1

Facilitator: Brandon Schroeder

Recorder: Andrea Feldpausch

Grouped Action Statements:

Formal Education Opportunities

- Expand existing curriculums to include assessment materials (rubrics) possibly performance-based

Curriculum Standards (Building Programs Around Standards, Tweaking Standards to Aquatic Education)

Long Term

- Align existing curriculums to national and state standards
- Action item: Getting “Environmental Stewardship” listed as a “democratic value” for curriculum standards - formal process?
- Greater emphasis on Great Lakes literacy in our state standards. Only through this will all schools take note.

Teacher Training/Support Networks (Preservice, Inservice, Out-of-School Support of In-School Programs) **Short Term**

- Train the teachers to be able to teach their students about the Great Lakes Ecosystem. Do NOT just send a teacher manual.
- If we are to affect an overall change in behavior relating to protection of the ecosystem and we focus on youth to make changes we must go beyond programs like Project F.I.S.H..
- Core curriculum standards - use ISDs, M/S centers to emphasize fisheries education materials, get materials to ISDs and M/S centers, list of PF facilities.

Nonformal Education Opportunities/Out-of-School

Short Term

- Target volunteers with passion and NR professionals, consider offering/providing more after school and summer programs for youth and families, Non formal outreach.
- Experience vs. spreadsheets, focus on experience for teachers and students

Mentors

- Funding, support for young peoples’ education programs, camps, hands-on experience and role modeling.

G.L. Regional Clearinghouse (Education Advisory Team, Web site/list serve) **Short Term**

- Integration with community resources (SNR centers, stores, community centers, enhancement programs, clubs, after school programs, 4-H)
- Action Items: Biodiversity, Web site or other visual product for species of the Great Lakes region.
- Sustain key information/training/networking “hubs” (i.e. Project F.I.S.H.)
- Expand/advertise website to inform educators of existing curriculums.
- Establish a communications network and clearing house for information to flow.
- Create a clearinghouse of information programs and trainers for fisheries and ecosystems education staffed by permanent fulltime people who will market and promote existing and new programs.
- A jointly funded information hub (clearinghouse) run through the Web. Possibly administered by the GLFT or DNR.



Legislative

- Create a lobby group/org. that coordinates activities within the state to help highlight and sustain our issues and concerns at our legislative assembly. This group would lobby on ecosystem/environmental, fisheries education needs.
- We need to go beyond private environmental, educational, experimental, groups and get environmental education in the public school system.

Partnerships/Collaborations **Long Term**

- Put together a coordination unit to facilitate partnerships to accomplish objectives.
- G.L. Fisheries and Ecosystems Education Coalition Group. Establish organized leadership with roles and responsibilities from Great Lakes basin - local communities.
- Identify/support community/regional models that promote diverse, broad partnerships/opportunities toward aquatic education (i.e. across formal, non-formal, in-school, out-of-school with diverse partners including agency, nonprofits, universities, business, etc.)
- Bringing together user groups (i.e. tribes, businesses, sportsfishers, commercial fishers, etc.) to provide a long term program to protect the fishery for future generations.



Program Development (Involve Fishery Stakeholders, Out of School, Teacher/School/ISD Involvement/Buy-In, Tribal Treaty, Science/Biology) **Long Term**

- Make a connection between different state agencies (education, DNR, informal and formal educators and universities)
- Funding: support for treaty education activities, integrate into existing study plans.
- Units developed synergistically with scientist, geographers and teachers working together.
- Rethink - write to standards, integrate lessons into math, science, language arts, social studies.
- Grants for school-based programs require design by teachers. If designed by teachers, greater potential of use, better integration opportunities for progressive lessons from K-5, 6-8, etc.

- Fund standards based programs for schools, that allow students to become both scientific and Great Lakes literate.
- Connect conference expertise directly to classrooms. Target specific grades at elementary, middle school and high school.

Learner Relevant

- Great Lakes Watershed “connection in your backyard,” habitat improvement service projects.

Multidisciplinary/Thematic Units and Projects

- Action Items: Inserting GL issues into math education. Create a worksheet series of story problems relating to Great Lakes which can be used as a portion of math curriculum at various levels.
- Task force to highlight fisheries/G.L. ecosystem concepts within Michigan curriculum framework with performance tasks/projects connect with MSTA building a presence points of contacts.

Grant \$\$ Opportunities (trade associations, agencies (trusts/funds)

- Make grant funds available for classroom projects related to G.L. ecosystems, strong connection with technical assistance.
- Generate funding incentives (and/or partnerships) for networked/coordinated/collaborative partnerships, particularly where they intergrate existing and quality programs/resources into community based efforts.
- Establish a plan for long-term funding that results in a stable set of sources in the future.

Adult/Public Education **Long Term**

- Education of the general public on issues facing the Great Lakes ecosystem (fisheries, habitat degradation, etc.). Huge public relations project.
- Funding for education materials (mixing, distribution, facilitation, correlation)



Build on Existing Programs **Short Term**

- Career development
- Short Term: 1. career development and 2. Internships designed to facilitate program development/training/marketing/lobbying



Recognize/Support/Grow Good Models

- Identify core programs/resources that are quality; work to improve, expand, intergrate to meet our needs (i.e. teachers, non-profit programs)
- Create a new collaborative organization under the Great Lakes Fishery Trust which brings all the stakeholders together to ensure continued development of programs and additional funding. A state organization of some type that will oversee all our efforts.
- Award a teacher of the year award in ecosystems/environmental education. Highlight successful programs.

Great Lakes Fishery Trust (Leadership and Direction through \$\$, Standards for Quality, Evaluations/Measures, Recipient of \$\$ from Outside Distribution, RFP Consideration)

- Do we have the right goal and objectives?, If so, sounds like we're talking about prioritizing the best tactics... preservice training, adapting state standards and tests, secure continued \$\$, short term: measure delivery and evaluation, strategy (impact and sustainability), create a clearinghouse.

- "He who has the gold makes the rules." GLFT grant funding... measure delivery strategies, evaluation strategies, coordination with others - building blocks, critical mass, sustainability completion vs. ongoing dependence, hands-on, etc., GLFT take leadership.

GL. Evaluation **Short Term**

- Survey public districts that border the Great Lakes to see that Great Lakes are infused within the district's curriculum.

Stewardship Goals (Responsible Citizens, Action Service Related, Tools to Affect Change) **Long Term**

- Action Items: How the system really works. Case studies, individual stories (aka the double helix) within civics?
- Community, volunteerism, youth through adult learned behavior
- Develop a way to instill a sense of belonging to the ecosystem at each age level (adopt a site, adopt an animal)
- Educate our young people (future leaders) in the enormous responsibility they will have in perpetuating the Great Lakes ecosystem and it's fisheries.

Community

- Uniform core curriculum for grade school age children throughout the region of state with flexibility at the local level. Need to get teachers and school staff and boards to buy info. Need be consistent with standardized test.

Overall Summary of Group Discussion

Future GLFT RFP should include

- Some sense of sustainability or long-term vision
- Coordination/collaboration of all stakeholders
- Synergistic relationship between teachers and scientists
- Measurement of delivery strategies and evaluation design
- Education Advisory Team (EAT) - Teachers, ISD, MDE, Scientists, Researchers

Priorities for new GLFT RFPs

- Short-term
 - o Clearinghouse idea - website
 - o Existing programs (school, non-school, train teachers, Treaty issues)
 - o Award positive models
 - o Research Internships

Long-term

- o Partnerships (org., stable source of funding)
- o Curriculum
- o Standards
- o Educate general public (riparians, exotics)

Group #2

Facilitator: Tom Kelly

Recorder: Jennifer VanderLaan

Funding

- GL education and information publication
- Development of Great Lakes education network of aquariums, hatcheries, museums, camps, etc. – common map/brochure
- Develop a proposal to fund design and development of biennial conference – GLFT
- Develop a proposal to be fueled by multi-state grant – Fed. aid to pay for identified research or needs of organization (e.g. website)
- Funding: create a listing of present and potential funding sources friendly towards our “vision.”
- Category: funding – fund more diverse types of educational methods
- Add a funding requirement that funded products include an education component. (Even evaluation or research)
- Category: funding – fund research-based projects (i.e. needs assessment, prototype testing, remodel evaluation)
- Category: collaboration funding – fund team efforts, especially if cross-disciplinary, cross-border

Achieving the Vision

- Send GL Web sites to the BRIDGE for marine/aquatic education (www.marine-ed.org)
- Develop (revive) GLEAMS chapter (now headquartered at Shedd Aquarium) (Great Lakes Educators of Aquatic and Marine Science)
- Establish a singular “mission” for this group
- Develop environmental resource (G.L.) education objectives for GL basin states.
- Provide to GL agencies a list or guidelines of types of programming materials, curricula, activities that can easily be incorporated into the classroom.
- Work team assigned to develop next conference. Make sure all states are rep./invited (formal and informal, international).
- Develop strategies to inform political leadership of issues related to Great Lakes fisheries and aquatic ecosystems.
- Conference “proceedings” presented to Michigan Department of Education and appropriate legislative committees to advance the vision.

Evaluation

- Work Group: Rosanne, Michaela, Shari, Steve Stewart (Sea Grant)
- Conduct baseline research on student knowledge and attitudes about the G.L. (same test, all states)
- Develop a longitudinal study to assess impacts of experiential place-based education (2, 5, 10 years after experiences, or once for cohorts available now)
- Do core curriculum evaluation. Identify two or three middle school curriculum “collectors” and evaluate their effectiveness, this would help us show the strength or know more about what is needed.
- Emphasis on evaluation of programs – clearinghouse for results/findings of GL programs
- Fund long-term evaluation and evaluation research
- Teacher professional development targeted to the curriculum standards. Establish a teacher professional development program aimed at helping teachers use hands-on materials in fisheries and aquatic science to meet MEAP Michigan curriculum framework requirements (or other states, or multi-state)

Collaborating (Network and Curriculum Clearing-House)

- Research the needs for material – target specific age groups
- Research how similar groups are organized.
- Drop fisheries from the title to draw a wider audience
- Establish additional opportunities for biologists and teaching professionals to interact
- Advocate for establishment of a central clearinghouse for G.L. fishery-related education materials
 - o Web-based
 - o Maintained
- Use history to broaden the base of interest in the Great Lakes
- Develop materials on the history of the Great Lakes that draw on books and museum artifacts and long-term data and motivate students to visit place-based learning sites (boats, museums, other sites), to draw students into the history and cycle of development.
- Develop Web site that focuses on collecting project descriptions from region.

- Coordinate a program for schools to collaborate on GL learning projects (email or web uploads of school pages)
 - Invite teachers to get involved in the creating of hands on learning stations and other educational material.
 - Work towards one lesson plan for all the surrounding states to target a certain grade (5th)
 - Identify and organize education materials and get Web presence set up with Michigan environmental education org. Web site.
 - Curriculum alignment and prof. development for pre-service, in-service, and non-formal education.
 - Examine:
 - o GLEAMS (NMEA)
 - o Include Canadian Tribal
 - o GLIN Formal vs. Informal
 - o Work Group: GLEAMS, AREA (State DNRs)
 - Organize a Great Lakes Aquatic Education Association – Non-profit
 - Set up an education consortium group (under GLFT)
 - Annual or biennial conference for the Great Lakes region for GLF and EE
 - Develop a basin-wide program modeled after the GL Natural Resources Camp and GL Fisheries Leadership Institute to engage and train students from middle through high school as GL resource stewards and leaders
 - Using contacts from the meeting, develop partnerships for project proposals
 - Develop/ improve/ expand the network of GL educators – many, but not all were represented here
 - Utilizing participant evaluation data, combined with steering committee input, consider the creation of a standing committee to address a follow-up conference in 2004. (Do not want to slow momentum created those past two days.)
 - This collaboration should institute a biennial networking conference like this one.
 - Develop a Web site to communicate any needs, opportunities, etc., to keep groups informal and connected.
 - Develop a “professional” communication network on system for continued communication among interested organizations.
- Add groups to expand the network:
 - o Michigan Department of Education
 - o Wastewater Treatment?
 - Expand the linkage with Canada. e.g. Conversation Authority, Education, Fishing Organizations (both commercial and sports)
 - On-line discussion and information exchange. Establish an email discussion list for this group and others interested in these topics for the Great Lakes. Link with a place to share resources (documents, references, event information)
 - Resource Clearinghouse – Develop a clearinghouse of Web-based and paper/video based learning resources in all aspects of the Great Lakes ecosystem. Move resources to the Web where feasible. Target A) teachers B) students, see Michigan Teacher Network on the Web
 - Coordinate efforts with other EE entities in the state.
 - Link us with other EE groups so we don’t work in a vacuum. Network this group with others within the Great Lakes area who have similar visions. (Still missing “players” from MI, WI, MN, IL, OH, Canada)



Group #3

Facilitator: Susan Holmes

Recorder: Carol Swinehart

Notes:

Standards/Testing

- Develop consensus about the core issues that need to be included in GLFEE
- Develop – EE to relate to the MEAP
- Identify existing content standards and benchmarks which could be met with “fisheries/G.L. curricula” and promote those to ISD
- Require environmental education to be part of the MEAP/standardized testing process
- “What gets tested gets taught” – We need to develop with educational assessment groups “hand on” environment test procedure that measure skills our students need.

Curriculum Infusion

- Point organization/person creates pack of information to be given at colleges/universities to professors teaching, understand the pieces to the whole. Each program fills special needs. Don't try to do it all, do what you do best and link to others for further carry through and education.
- Increase links with tribal outreach and understanding of multiple uses on the Great Lakes (Careers)
- Encourage multi/transdisciplinary involvement with G.L. issues – lit, music, drama, history, journalism.
- Get a group of professionals to review textbooks, Web sites, resources, etc, for accuracy.
- Infiltrate development of textbooks
- Support periodic reviews/updates of existing materials
- Consolidate and highlight peer-reviewed resources. Flag free and easy to get resources curricula should include correlations to standards and a “how do I incorporate this program into my classroom work” section.
- Align existing and new curricula with national and state standards. Follow best practices.
- Partner with a home school group to help them value and appreciate world around them!
- Take students outside their classroom to explore more closely the world around them and how it relates to their everyday decisions.



- Actions:
 - o Choose one agency/person/group to administrate the collection of available ecology curriculum, appropriate to use in the Midwest by teachers, youth agencies, ecology education groups, home-school educations, teacher trainers, etc.
 - o Survey these curricula and form a structure to divide up what units within each curriculum/ materials should be taught by each teacher discipline (math, science, biology, etc.) and at what grade level.
 - o Repeat previous step for agencies working with youth and adults (In steps 2 and 3 use textbook adaptations for the state of Michigan to form these spread sheets or grids)
 - o Present the result of this work at the state meetings/conferences of:
 - Curriculum directors
 - Superintendents
 - Science teachers
 - o Send out “finished grid” to curriculum directory along with information on how to distribute the information to their teachers and how to infuse into five chosen disciplines of teaching.
 - o Fund a project site (a chosen school or schools within one district perhaps at three levels; elementary, junior high, and high school) to work with each level – their teachers and textbooks as to who will teach each specific unit.
 - o Export this “infusion model” of ecology education into 10 districts within the state.
 - o Evaluate the effectiveness of this strategy.

Evaluation

- Design a five-year evaluation study to track the efficacy of hands-on experiential GLF and E Education programs.
- Identify best education for specific Great Lakes audiences – boaters, anglers, commercial fisherman, etc.
- A need to: assess where teachers are at, personally, so we can design a vehicle to model with teachers “hands on activities” that are “do”able with kids.

Expand Funding Base

- Get seed funds to put together collaborative proposals, worth with funders interested in GL Environmental education to buy into common vision, develop “best practice” guidelines/vision and disseminate so it can be applied.
- Identify - \$\$\$ - for EE programs – for development and on going support of.
- Develop a money-maker to fund these activities.
- Develop a way to get EE dollars from manufacturers, retailers
- Promote grants/write grants which could be applied for by teachers to make science “experiential”
- Environmental literacy “Toolbox” – funders
- Funding for educators of all kind to continue their education of the natural sciences (training courses)
- Increase funding for planning and evaluation
- Create partnership website for needs/wants with a connection to state DOE

Expanding Programs

- Establish more GL natural resources camps to educate future leaders
- Expand GL vessel based experiential education programs – multi-generational involvement.

Scientific Information Conversion and Transfer to the populace

- Provide GLFT funding to develop inexpensive approaches to mass-market aquatic/GL environmental information to our citizens.
- Make an electronic GIS for Fisheries and Ecosystems (Global Information System) for real time DATA
- Make all resource agency data available online and make GIS education a required environmental education component.

- Require all federal and state grants for aquatic research to have an aquatic education component, develop and implement a functional process that converts the mass of scientific data into usable information for decision makers. Require resource agencies to use it.

Adult Education/involvement

- Develop programs for parents – so that they or voters can pressure EE programming for their communities.
- Work with adult education programs to establish GL classes
- Conduct train the trainer – Master Gardener type – GL classes through MSU Extension
- Conduct GL awareness literacy campaign with adults



Outreach Partnerships (formal, classrooms, teachers and school)

- Pre-service
 - o Environmental groups need to analyze textbooks for a comprehensive environmental focus, that can be shared with adoption committees.
 - o We need to assess “local” environmental issues that can be a focus of local educational institutions for experiences with kids.

- o Create links in college/university realm for getting information out to pre-certified teachers
- o Provide funding for resource agency mentorship programs (young scientist) in environmental fields (aquatic resource).
- o Outreach for students to teach them what natural resources positions are available to them
- o Pre-service environmental literacy “toolbox” – educators
- o Train the trainers of pre-service teachers! Work with university to make pre-service teachers aware of programs and resources
- o Target the pre-service teacher trainers in all the GL states with a “how and why should I incorporate GL fisheries and ecosystem education into my earth science curricula piece.”
- In-service (teachers, in-classroom)
 - o Continue annual networking conferences, create a guest speaker list to provide to DOE/other Web sites (Re: Fisheries education categorized by location/topics for teachers who are uncomfortable/inexperienced in this curriculum
 - o We need to solicit environmental classroom mentors that can be a resource for schools
 - o At in-service (required for teachers) have DNR/DEQ speak to science departments (others) – the topics/environmental issues within a district or area (i.e. watershed)
 - o Provide funding and organization for regional environmental education training opportunities for educators of all types. Include new materials, approaches and opportunities.
 - o Develop low-cost experiential opportunities in all areas of the state
 - o Utilize speakers in the classroom on relevant topics that children will accept as part of their world.
 - o Form a partnership with another classroom – older or younger to mentor youngsters for activities in the out-of-doors!
 - o We need to develop a comprehensive “speakers bureau” accessible to teachers to provide the support in their efforts to plan environmental experiences.



Partnerships

- Conduct conferences annually – between non-formal and formal educators statewide so we can all know who to reach out to – and what opportunities are there.
- Emphasize youth stewardship, citizenship opportunities.
- We need to link our public broadcasting programming with real life quality experiences to capture TV time.
- Foster long-term relations with the retail industry. Use promotional ideas to increase participation. (WaterWorksWonders.org, RBFF.com)
- Create buy-in at these meetings by including classroom teachers, youth-serving agencies, and the scientific community.
- Develop partnership opportunities with boat/sporting goods to promote ecosystem/aquatic education (i.e. with canoeing/kayaking facilities.)
- Facilitate partnerships between industry/business and schools with regard to G.L./fisheries education.
- Involve Girl Scouts and Boy Scouts in our activities, create a partnership with a nearby business to help students utilize what they learned in the classroom help make a positive decision when they shop for an item.
- Academic-service learning - Connect community’s needs with educational outcomes. (Example: water quality, monitoring for bodies of water and have schools do monitoring.)
 - o Partners
 - Trout Unlimited, DNR, DEQ, Tribal Fisheries, Fish Watchers, wetland monitoring. (come up with projects)
 - Local schools to help (make projects fundable. District pays half, partners other half.)

Political (Campaign to change)

- We need to work with statewide educational associations and get their support in valuing our environmental efforts.
- Lobby politicians for environmental education as mandatory part of curricula – Run for office yourself
- Council of GL governments lobby state boards of education or appropriate authorities to include GL literacy in basic requirements/objectives
- Create buy-in at the political level by inviting elected representatives and department of education officials to participate in the conference proceedings.
- Pressure elected officials to include EE into education systems.
- Environmental literacy toolbox for policy makers
- Make sure all elected public officials are GL literate
- Develop – 1 large advocate for EE to include representative from all areas.
- Develop relationship that presents EE with non-formal state and national teacher associations.



Promote (advertise) Great Lakes and fisheries education core values

- Promote (advertise, lobby, “everyone here buy into core belief”) the value of experience; Great Lakes users have a valuable asset, it’s worth paying for (clear water, abundant fisheries)

Communication

- Communication Hub
 - o Set up information super hub – based on Ford-GM-Daimler Chrysler model for communication which incorporates vendor partnerships and education.

- o Concerns into/under one umbrella. The hub would utilize existing data – had as well as E-file to “Mine” membership and communication opportunities to coordinate local formal and informal educational efforts as well as quantify.
- o Those efforts for future educational/event opportunities. The information super hub would be funded by partnerships – both government and industry – personal information protection applying
- o Industry has a vested interest in the trends/educational as well as demographic data available based on geographic breakdown by state.
- o Reduce/coordinate programs to have manageable, friendly educational programs consistent across the state.
- o Infrastructure/Implementation
 - Develop a partnership with Department of Education for increased links to teachers and their outcome needs.
 - Use existing infrastructure to fulfill needs (MSU Web site, Extension information/outreach, GLFT Web site, RBFF Web site, Water Works Wonders Web site)
 - Find an agency who can put together and manage a database of Great Lakes educators and resources
 - Develop – 1 document on site with all EE programs and curriculum description with contact person(s)
 - Have electronic database of conference outcomes and materials.
 - A database of all grants out there which public and private industry can apply to (without having to search the Web)
 - A list (database) of all the elementary schools, statewide (per county) (include location, # of children, # of teachers, etc.)
 - List serve
 - o Set up list serve for all interested in GLFEE
 - o Create email/listserve for teachers to provide information/web address for the product(s) of this conference.
- o Information
 - Curriculum Clearinghouse
 - o Put materials online (PDF files)
 - o Put addresses online for trainers and resources (Project FISH, Project WET, etc.)

- o Put links to individuals who can provide quality information for teachers/public (experts in field and guest speakers)
- Several mandatory outdoor educational classes for students of elementary age.
- Environmental literacy toolbox
- Develop and maintain a simple accessible database of all existing environmental education destinations and programs that provide hands-on experimental opportunities.
- Make an electronic clearinghouse for:
 - o Presenters' powerpoints
 - o List of organization
 - o All curricula material
- o Funding
 - Tie together private industry funds, organizational funds and public funds
 - Develop and provide financial support for a statewide environmental education center
 - Priorities for funding: mandatory state fieldtrips for all grammar school children by 4th grade and once again during 8th grade (mandatory experiences)
 - Governmental state budget should supply each grammar school – and home school statewide with funding for fieldtrips.

Research

- Summarize research findings to send to teachers in pamphlet form to highlight needs along with link to see how fisheries/environmental education would meet existing state standards.
- On GLFT Web site/or other promote environmental education research
- Look to social science research (social marketing) to learn more about changing behavior.



Electronic Communication Networks

- Develop a comprehensive plan – with goals and timetables.
- Must have an identified “go-to” person or organization to send things to.
- Set up on-going opportunities to network (e.g. another conference and/or workshop around specific ideas)
- Align more MUCC clubs with computers for interaction with other groups.
- Hook up a global Web site for students to research what their same age groups are doing somewhere in the world.
- Conduct periodic meeting networking sessions involving all sectors including students.
- Develop resources and relationships with those companies that schools and educational programming depend on to reduce the cost of services and equipment – to formulate the participation in EE (eg., companies)

Appendix A

Great Lakes Fisheries & Ecosystems Education Networking Conference May 5-6, 2003

Conference Agenda

Monday Morning, May 5

- 9:00 Conference check-in and informal networking
- 10:00 Welcome and introduction to workshop goals and objectives : *Shari Dann, MSU*
- 10:15 Introduction to the Great Lakes Fishery Trust (GLFT): *K.L.Cool, DNR Director*
- 10:30 Great Lakes Fisheries and Ecosystem Education: Needs and Opportunities
Michaela Zint, University of Michigan
Rosanne Fortner, The Ohio State University

11:00 BREAK

- 11:15 Panel discussion: Aiming for Excellence in Great Lakes Fisheries and Ecosystem Education
- Fisheries Diversity and Sustainability: *William W. Taylor, Michigan Sea Grant and MSU Fisheries and Wildlife*
 - Providing Quality Programs:
Mark Stephens (a GLFT-funded program)
Tom Kelly (a community-based program)
 - What We Know and Gaps in Our Understanding of Effective Fisheries and Great Lakes Education:
Rosanne Fortner
- 11:45 Table discussions: What are some of the features and characteristics we would like to see in future fisheries education?

12:30p.m. LUNCH

Monday Afternoon, May 5

- 1:00 Panel discussion continued: Aiming for Excellence in Great Lakes Fisheries and Ecosystem Education
- Tribal, Treaty and Commercial Fisheries Educational Needs: *Jennifer Dale, Bay Mills Indian Community*
 - What It's Really Like in Education! A Teacher's Perspective: *Susan Bloom, Ypsilanti Public Schools*
 - Educational Needs from the Sportfishing Community Perspective: *Chris Temple, Gander Mountain Stores*

Appendix A

- 1:30 Facilitated breakout/group discussion
Goal: What is a desired future vision for Great Lakes fisheries and ecosystem education?

Breakout groups:

- School-based: early childhood
- School-based: middle and high school
- Outside-of-school programs: youth of a variety of age groups
- Adult citizens

2:45 BREAK

- 3:00 Facilitated breakout/group discussion
Goal: What are the gaps/needs in Great Lakes fisheries and ecosystems education and our knowledge of this area?

- 4:30 Breakout session reports (whole group)

- 5:30 Social – hors d'oeuvres and beverages provided
Informal sharing, posters, handouts, materials by participants
Participants meet Great Lakes Fishery Trust Board members,
Scientific Advisory Team members, staff

Tuesday Morning, May 6

7:00 CONTINENTAL BREAKFAST

- 8:00 Introduction to the day (whole group) *Shari Dann*

- 8:15 Facilitated breakout/group discussion
Goal: What are our priorities and next steps for funding, collaborating and achieving our vision of excellence?

Breakout groups:

- Educators in K-12 and nonformal organizations
- Tribal fisheries organizations
- Recreational and commercial fisheries enthusiasts
- University/agency representatives and all other participants

- 10:15 – NOON Conference synopsis – Where do we go from here?
Shari Dann

If a child is to keep his inborn sense of wonder, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in.--Rachel Carson

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Appendix C

Evaluation Summary

About the Evaluation Process

About 60% of the 62 conference attendees completed an evaluation form. The evaluation survey response rate was fair, but could have been improved by offering incentive prizes to those participants who completed their surveys. Conference attendees represented K-12 education (15 individuals), nonformal education programs (24), state and federal resource agencies (13), non-governmental (non-profit) organizations (26), tribal fisheries organizations (5), private (for-profit) organizations (4), universities (22), and out-of-state agencies/organizations (11). (NOTE: Some individuals represented more than one category of organization.)

Conference Communications

Nearly all conference attendees reported either personal contacts or the email correspondence as essential in gaining their participation.

Did the conference achieve its goals?

Participants rated the conference very highly in meeting the three main conference objectives of creating a collaborative vision, identifying/prioritizing recommendations, and providing guidance to funders for future Great Lakes education. Of the three goals, participants were least sure whether they agreed that the conference resulted in guidance to funders, but their comments to these questions indicated participants are hopeful that post-conference follow-through will achieve this goal.

The Conference as a Learning and Dialogue Process

Nearly all (89-91%) stakeholders participating agreed that speakers were informative and that their comments and ideas were valued by other participants.

Impacts of the Conference on Knowledge and Attitudes of Stakeholders

Overall, 74% of attendees agreed that they learned a great deal of new information and perspectives at the conference. This is especially notable, since as one participant observed, there was a tremendous amount of expertise and knowledge among the attendees. Self-ratings of knowledge and positive attitude change were highest for the topics of K-12 education systems, research on Great Lakes education, status of Great Lakes fisheries, and overview of Great Lakes education needs.

Impacts of the Conference on Stakeholders' Intentions to Participate in Future Networking

Nearly all (89-91%) participants agreed that they will make use of information and contacts from the conference and would like to stay involved in future networking activities.

Overall Conference Outcomes and Comments

Participants' comments indicated that they believed the conference was well-organized, and they appreciated the facilitated break-out discussion sessions and the opportunity to network with diverse stakeholders sharing their interests in Great Lakes Fisheries and Ecosystem Education. Most attendees expressed specific interests in staying involved in this network in the future. Many offered suggestions on other stakeholders to include in future dialogue, including more teachers, more tribal fisheries stakeholders, state Departments of Education, public aquaria staff, and others. Several participants offered comments that they highly support holding a similar networking conference at least every two years.

Conference impacts on participants

Participants' ratings of conference learning qualities	% who..... agreed or strongly agreed	% who..... strongly agreed	Mean*	Standard deviation
Speakers were informative.	91%	57%	4.6	0.49
My comments and ideas were valued by the group.	89%	60%	4.6	0.56

*Where 5=strongly agree, and 1=strongly disagree.

Appendix C

Participants' ratings of extent to they believe the conference helped to achieve main goals

Conference goal	% who..... agreed or strongly agreed	% who..... strongly agreed	Mean*	Standard deviation
This conference created a collaborative vision for the future of Great Lakes fisheries and ecosystem education.	77%	34%	3.96	1.11
This conference identified and prioritized recommendations for sustaining, modifying and creating needed networks, educational efforts and research for Great Lakes fisheries and ecosystem education.	83%	34%	4.09	1.00
This conference provided guidance to funders for sustaining fisheries and ecosystem education into the future.	63%	31%	3.81	1.07

*Where 5=strongly agree, and 1=strongly disagree.

Conference impacts on participants

Participants' self-perceptions of knowledge and attitude change	% who..... agreed or strongly agreed	% who..... strongly agreed	Mean*	Standard deviation
I learned a great deal of new information and perspectives at this conference.	74%	54%	4.5	0.78
My knowledge and attitudes changed positively about Overview of needs in Great Lakes Education (Zint)**	77%	43%	4.1	1.12
My knowledge and attitudes changed positively about Status of Great Lakes fisheries (Taylor)	77%	46%	4.2	1.07
My knowledge and attitudes changed positively about Existing education programs (Kelly, Stephens)	74%	34%	4.1	1.05
My knowledge and attitudes changed positively about Research on Great Lakes education (Fortner)	77%	46%	4.1	1.17
My knowledge and attitudes changed positively about Tribal, treaty and commercial fisheries (Dale)	60%	29%	3.8	1.04
My knowledge and attitudes changed positively about K-12 education systems (Bloom)	74%	60%	4.3	1.06
My knowledge and attitudes changed positively about Recreational fisheries perspectives (Temple)	71%	46%	4.2	0.97

*Where 5=strongly agree, and 1=strongly disagree. **Conference session title (and presenter)

Appendix C

Participants' post-conference intentions

Participants' behavioral intentions post-conference	% who..... agreed or strongly agreed	% who..... strongly agreed	Mean*	Standard deviation
I intend to use information and contacts from this conference in the future	89%	63%	4.5	0.93
I would like to stay involved in any future network activities.	91%	77%	4.6	0.99

*Where 5=strongly agree, and 1=strongly disagree.



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The mission of the Great Lakes Fishery Trust is to provide funding to enhance, protect and rehabilitate Great Lakes fishery resources. The trust will manage its resources to compensate for lost use and enjoyment of the Lake Michigan fishery resulting from operation of the Ludington Pumped Storage Plant.



The Department of Fisheries and Wildlife was established in 1950 at Michigan State University. The mission of the department is to provide the education, research and outreach needed by society for the conservation and rehabilitation of fish and wildlife resources and their ecosystems.

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