
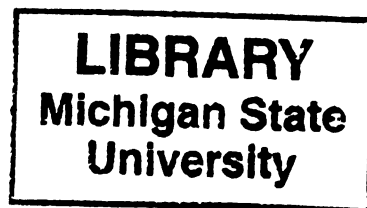




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**AN EVALUATION OF EDUCATORS' PARTICIPATION IN THE
GREAT LAKES EDUCATION PROGRAM**

By

Amy Elizabeth Nevala

A THESIS

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

MASTER OF SCIENCE

Department of Fisheries and Wildlife

1997

ABSTRACT

AN EVALUATION OF EDUCATORS' PARTICIPATION IN THE GREAT LAKES EDUCATION PROGRAM

By

Amy Elizabeth Nevala

The focus of this research was to gain evaluative information from educators (fourth grade teachers and local volunteers) participating with the Great Lakes Education Program (GLEP), a vessel-based, environmental education program developed in 1989 in Macomb County, Michigan. Surveys were designed and administered to the GLEP educators (106 teachers, 40 volunteers) by telephone, mail, and in-person during 1996 and 1997. Over 86% of educators surveyed indicated that they would like to continue participating in the GLEP. Prior to GLEP training, more than 50% of educators indicated that their knowledge level was low in most Great Lakes topics. Educators' self-assessment of post-cruise comfort levels in teaching these topics was also relatively low, indicating the need for additional educator training. Evaluation is the first step toward strengthening the GLEP and for the sound development of similar programs in the Great Lakes region.

To all teachers, especially my mom,
Susan Nevala,
who made a difference in young people's lives.

"It's all about attitude."

ACKNOWLEDGMENTS

This publication is a result of work sponsored by the Michigan Sea Grant College Program, project number R/VBE-1, under grant number DOC-G-NA36RG056-A, from the Office of Sea Grant, National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, and funds from the State of Michigan. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation appearing hereon.

Much appreciation goes to my major professor, Dr. Shari L. Dann, whose enthusiasm and ideas helped not only with this research but also with my development as a writer. My thanks to the other members of my guidance committee, Dr. Kirk Heinze and Dr. James Bence, for their time and insights into the project.

Past and present members of the Michigan State University (MSU) Department of Fisheries and Wildlife deserve special recognition, especially Michelle Haggerty, Heidi Prather, Brandon Schroeder, Jeff Rupert, Mary Jamieson, Kelly Carter, Michaela Zint, Melissa Middleton, and Anne Williamson, who cheerfully gave their assistance during various phases of the project.

The Great Lakes Education Program (GLEP) staff – Steve Stewart, Patrick Livingston, and Terry Gibb – patiently provided project information and support. Thanks

especially to the GLEP task force members, teachers, and volunteer cruise leaders for their time with the surveys and during the 1997 writing retreats.

For their support during my seven year MSU and Michigan Sea Grant Extension career, I gratefully acknowledge the Michigan Sea Grant Extension staff, especially Carol Swinehart.

My thanks to Jim Detjen, MSU Knight Professor in Journalism, and Dr. William Taylor, MSU Chair of the Department of Fisheries and Wildlife, for various career-related opportunities.

My appreciation to the Poynter Institute for Media Studies, the Michigan Outdoor Writers Association (MOWA), the Association for Great Lakes Outdoor Writers (AGLOW), and Trout Unlimited for their fellowship and scholarship support.

Finally, my love and thanks to my friends and family, especially Dad, Dave, and Mike, for sharing laughter and travel adventures during my graduate program.

TABLE OF CONTENTS

LIST OF TABLES	ix
LIST OF FIGURES	xi
Chapter 1	
INTRODUCTION	1
Background and Problem Area	1
Problem Statement	2
Research Questions	3
Significance of Research	4
Chapter 2	
THE GREAT LAKES EDUCATION PROGRAM (GLEP) DESCRIPTION	5
The Great Lakes Education Program (GLEP) Model	5
Summary of GLEP Educator Programming	9
GLEP Participation by Educators	9
Educator Recruitment	10
Educator Orientation	11
Educator Training	14
Volunteer Retention through Recognition	15
Chapter 3	
LITERATURE REVIEW	16
Brief History of Environmental Education in Michigan	16
Experiential Education	17
Why are EE Program Evaluations Important?	18
EE Program Evaluations: Project WILD and Vessel-based EE	20
Teacher Awareness of Project WILD	20
What Teachers Hope to Learn at Project WILD Workshops	22
Attendance at Project WILD Workshops	22
Use of Project WILD Materials After Workshop Training	24
The Project WILD Volunteer Facilitators	25
Vessel-based EE Research	26
Retaining Educators in EE	27
Obstacles Impacting Teachers' EE Participation	27
Volunteers' Obstacles with Participation	30



Who Volunteers?	34
Michigan Volunteerism	35
Summary.....	37

Chapter 4

METHODS	38
Overall Research Design and the Development of Evaluation Instruments	38
Evaluation Protocol.....	40
Survey Administration to Non-respondents	42
Data Analysis	44
Additional Qualitative Information	45
Limitations of Research.....	45

Chapter 5

RESULTS	48
Results of Survey Administration	48
Response Rates	48
Analysis of Potential Non-response Bias	49
Addressing Teacher Non-response Bias	49
Addressing Volunteer Cruise Leader Non-response Bias	50
Analysis of Potential Response Bias Due to Survey Methodologies.....	51
GLEP Educator Background.....	53
Teachers' Background.....	53
Volunteers Cruise Leaders' Background.....	55
Recruitment, Retention, and Training of Educators.....	56
Educators' Past Participation in the GLEP.....	56
Advertising and Recruiting Strategies to Attract GLEP Educators	57
Influencing Other Teachers to Participate in the Program.....	59
Educators' Use of GLEP Training Materials.....	59
GLEP Educators' Experiences, Knowledge, and Comfort in Teaching about the Great Lakes	61
Educators' Outdoor Activities Related to the Great Lakes	61
Educators' Questions Prior to GLEP Training	62
Teachers' Pre-GLEP Questions.....	62
Volunteer Cruise Leaders' Pre-GLEP Questions	64
Educators' Concerns Prior to GLEP Training	64
Educators' Self-Assessed Knowledge of Great Lakes Topics Prior to GLEP Training	65
Teachers' Knowledge	65
Volunteer Cruise Leaders' Knowledge.....	67
Educators' Post-cruise Comfort with Teaching Great Lakes Topics.....	67
Teachers' Comfort in Teaching	67
Volunteer Cruise Leaders' Comfort in Teaching.....	70
GLEP Educators' Program Participation and Perceptions.....	71
Lessons Taught Pre-cruise and Intentions to Teach Post-cruise.....	71

Teaching Topics and Sources: Pre-cruise and Post-cruise	72
Educators' Perceptions of the GLEP	74
GLEP Educators' Future Participation.....	77
Teachers Who Do Not Intend to Participate in Future.....	77
 Chapter 6	
DISCUSSION	80
Recruitment, Retention, and Training of Educators.....	80
GLEP Educators' Great Lakes Experiences, Knowledge, and Comfort Levels..	86
GLEP Educators' Program Participation and Perceptions.....	92
Implications for GLEP Dissemination.....	93
Future Research	94
 APPENDICES	
Appendix A: GLEP Teacher Information and Registration Packets.....	96
Appendix B: 1996 and 1997 GLEP Educator Surveys	104
Appendix C: GLEP Survey Cover Sheets	124
Appendix D: Project Approval by the Michigan State University Committee on Research Involving Human Subjects (UCRIHS).....	126
Appendix E: GLEP Educator Survey Cover Letters	128
Appendix F: March 1997 GLEP Writing Retreat	133
Appendix G: GLEP Teachers' Colleges Majors	154
Appendix H: GLEP Teachers' Membership in Organizations.....	157
Appendix I: Teachers' Reasons for Not Participating with the GLEP in the Future	159
BIBLIOGRAPHY	160

LIST OF TABLES

Table 2-1. Overview of 1996 and 1997 GLEP activities and objectives for educators. .	12
Table 4-1. Timetable and methods of educators survey administration.....	41
Table 5-1. Teacher response rates	48
Table 5-2. Volunteer cruise leader response rates.....	49
Table 5-3. Number of useable surveys by the three survey administration methods	52
Table 5-4. Teacher background, experience, and demographic information	54
Table 5-5. Volunteer cruise leader background, experience, and demographic information	56
Table 5-6. Percent of total GLEP educators by season who participated with the GLEP in the past.....	56
Table 5-7. How teachers and volunteer cruise leaders became aware of the GLEP	58
Table 5-8. Situations that GLEP teachers indicated would influence other teachers to participate with the GLEP	59
Table 5-9. Volunteer cruise leaders' perceptions of training	61
Table 5-10. Teachers' and volunteer cruise leaders' experiences with outdoor activities.....	62
Table 5-11. Teacher and volunteer cruise leader questions about participating with the GLEP prior to orientation and training.....	63
Table 5-12. Teacher and volunteer cruise leader concerns about participating with the GLEP prior to orientation and training.....	65
Table 5-13. Teacher self-assessed knowledge of topics before training	66

Table 5-14. Volunteer knowledge about Great Lakes topics before the cruise	69
Table 5-15. Teachers' post-cruise comfort levels with teaching the GLEP stations	70
Table 5-16. Volunteers' post-cruise comfort levels with teaching the GLEP stations ...	71
Table 5-17. Percent of GLEP teachers who taught about Great Lakes topics pre-cruise and post-cruise.....	72
Table 5-18. Topics taught pre-cruise and intentions to teach post-cruise topics	73
Table 5-19. Sources GLEP teachers used when teaching about Great Lakes topics pre-cruise and post-cruise.....	74
Table 5-20. Aspects of the GLEP educators enjoyed the most.....	75
Table 5-21. Aspects of the GLEP educators enjoyed the least	76

LIST OF FIGURES

Figure 2-1. The Great Lakes Education Program (GLEP) Model	7
Figure 5-1. GLEP Volunteer Recruitment and Retention.....	57



Chapter 1

INTRODUCTION

Background and Problem Area

The Great Lakes Education Program (GLEP) was collaboratively developed by Michigan State University Extension and the Michigan Sea Grant College Program to provide a vessel-based, multidisciplinary environmental education (EE) experience for fourth grade elementary school students in Macomb County, Michigan. Since its implementation in 1989, the GLEP has grown from a pilot season of four classes to a program that has involved more than 13,200 students, teachers, parents, and community volunteers from southeast Michigan. Despite its popularity, the GLEP lacks an important component that may prevent it from achieving its goals for EE: an in-depth program evaluation (Bethel and Hord 1982).

The GLEP has three parts: classroom based pre-cruise education activities, the experiential learning trip aboard a modified Great Lakes fishing vessel on the local watershed (the Clinton River and Lake St. Clair), and post-cruise activities in the classroom. To meet the need for additional multidisciplinary EE programs, GLEP coordinators plan to establish similar vessel-based programs in other Great Lake communities, and eventually in marine coastal areas. However, outside of collecting basic feedback from program participants, the educators' involvement in the GLEP has not been

formally evaluated. I developed an evaluation to describe the GLEP, to evaluate training strategies, and to assess the program impacts on the two main groups of participating GLEP educators. The first group of educators is the fourth grade teachers who accompany the classes and who provide the pre-cruise and post-cruise classroom instruction. The second group of educators is the volunteer cruise leaders. Volunteer cruise leaders are members of the local community who donate their time to be trained and to lead student learning activities during the GLEP cruise.

This evaluation was conducted concurrently with research by Anne Williamson (1996), a Michigan State University Department of Fisheries and Wildlife Master of Science graduate student. Williamson researched the impacts of the GLEP on participating fourth grade students' knowledge, attitudes, and behavioral intentions.

Problem Statement

Coordinators of the GLEP seek to improve and expand the program to other areas of the Great Lakes and beyond. However, there has been no evaluation to assess the GLEP, specifically the program processes, training techniques, and the impacts of the program on its participants. The purpose of this research is to gain evaluative information about the program from the two main groups of GLEP educators: the teachers and the volunteer cruise leaders. The study is primarily a descriptive evaluation of the GLEP.



Research Questions

To meet the needs for program evaluation, I investigated the following research questions:

1. What are the educators' demographic backgrounds?
2. What programming strategies are currently used to recruit, train, and retain the GLEP educators?

Subquestions

- 2a. Educators will identify specific program-related barriers to their participation. Participating teachers will also identify barriers related to the involvement of other teachers.
 - 2b. Based on trends recorded by GLEP staff, teachers will show consistent participation from year-to-year, while volunteer turn-over is more pronounced.
 - 2c. Educators will record specific methods that indicate how they became aware of the program. The highest proportion of teachers will report that they learned about the program from other teachers, colleagues, and from mailings to the school. Volunteers, however, will indicate that the media made them aware of the GLEP opportunity.
3. What are the GLEP educators' life experiences, knowledge, and comfort levels in teaching about the Great Lakes?

Subquestions

- 3a. Using self-assessments, educators will show a low knowledge of specified Great Lakes topics before GLEP training, and a higher comfort levels with teaching Great Lakes topics after training.
 - 3b. High proportions of educators will report a background of participation in Great Lakes activities and experiences.
 - 3c. Educators will have pre-cruise and post-cruise questions and concerns about their participation with the GLEP.
4. What are the educators' perceptions of the program?



Subquestions

- 4a. Most participating educators will have positive perceptions of the program.
- 4b. Most teachers will indicate that they teach pre-cruise and post-cruise GLEP activities in their classrooms.
- 4c. The majority of GLEP educators will indicate that they are interested in participating with the GLEP during another season.

The first question addresses the programming strategies used to recruit, train, and retain educators in order to identify strengths and weaknesses in the programming techniques, as well as to make recommendations to strengthen the program. In the second question, I seek to identify educators' life experiences (including education, interests, and skills), knowledge, and comfort levels with teaching a variety of Great Lakes related topics. I also assess the impacts of the program on the educators. In the third question I look at educators' perceptions of the GLEP following their participation to determine what aspects of the program they liked and disliked, what program training strategies they found useful and/or not helpful, and what materials they utilized or disregarded. I also gather their opinions of various training strategies. This information helps to provide specific recommendations for improving the existing program and for future vessel-based, EE programs.

Significance of Research

The current GLEP staff, educators, future GLEP personnel, and program participants are the beneficiaries of the research. Other beneficiaries include Sea Grant



and Extension educators and volunteers (at local, state, and national levels), and coordinators of EE curricula who may collaborate to develop programs similar to GLEP in their watersheds.

Rigorous evaluation reveals strengths and weaknesses in a program. The findings of evaluations are used to revise and improve the program (Stout and Peyton 1988). A comprehensive model for designing evaluations (adapted from Brinkerhoff et al. 1983) suggests the following steps, which I have applied to this evaluation: focusing the evaluation, designing the evaluation, collecting information, and analyzing and interpreting the evaluation results (Stout and Peyton 1988: 553).

Ultimately, the purpose of this program evaluation is to improve and expand the GLEP so that it will yield greater returns for students learning about the environment.

Chapter 2

THE GREAT LAKES EDUCATION PROGRAM (GLEP) DESCRIPTION

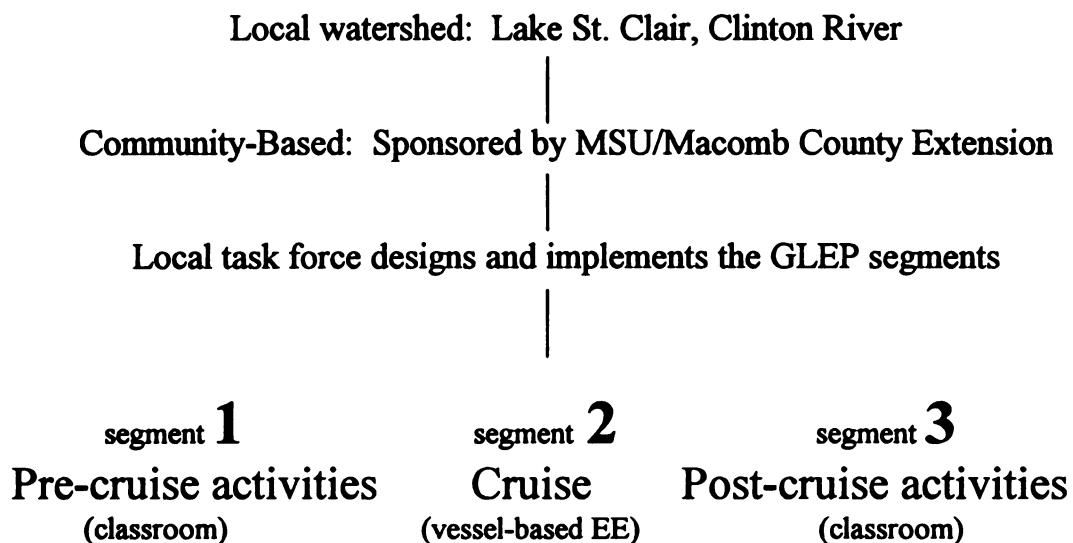
The Great Lakes Education Program (GLEP) Model

The GLEP consists of three complementary teaching segments: the pre-cruise activities, the cruise experience, and the post-cruise activities. Together, these segments form the core of the GLEP Model (Figure 2-1). The GLEP Model was developed by a local (Macomb County, Michigan) task force composed of teachers, volunteers, the three GLEP directors (Extension staff members), resource people, and agency representatives.

To address topics such as the water cycle, water quality, Great Lakes geology and geography, wetlands, food chains, aquatic life forms and groundwater, the task force produced a GLEP Learning Activities Manual (GLEP 1993). These elements and their related activities are introduced in the **pre-cruise** segment of the GLEP, during which teachers select and teach classroom-based activities to familiarize students with Great Lakes ecosystems.

The second segment, **the cruise**, is the one-time, shipboard experience designed to engage students and teachers in an exploration of the physical, cultural, chemical, and biological dimensions of the Clinton River and Lake St. Clair. It involves experiential activities at eight teaching stations, each taught by a volunteer cruise leader or by the participating fourth grade teacher. The hands-on study of navigation, plankton,

The Great Lakes Education Program (GLEP) Model



THE PROGRAM INVOLVES:

Extension Staff
Parents
Community members and local volunteers
Teachers

Ultimate beneficiaries of program:
Fourth grade, Macomb County Students

Figure 2-1. Great Lakes Education Program (GLEP) Model.

dissolved oxygen, marlinspike (maritime knot-tying), water sample collection, weather observation, carbon dioxide, calcium hardness, and pH allows students to expand upon the concepts introduced in their classrooms during the pre-cruise segment. Classrooms may also elect to visit the Metropolitan Beach Metropark Nature Center in Macomb County as part of their GLEP experience. The Metropark Nature Center hosts experiential, EE programs, usually focused on Great Lakes coastal wetland ecosystems.

In the post-cruise segment of the GLEP, participating teachers select from a variety of classroom activities designed to reinforce the pre-cruise and cruise learning experiences. Elements of the field experience are reviewed, and some activities are carried over from the field to the classroom.

The GLEP is among three established vessel-based, EE programs existing in Michigan. Similar programs also exist nationwide. The American Sail Training Association (ASTA) (1995) lists over 130 vessel-based education programs that provide scholarship training in the United States. The GLEP offers components that are similar to and unique from aspects of these other programs. More specifically, the GLEP Model has offers six specific components:

1. The GLEP is not designed to be a one-time learning experience. The program, with its three complementary segments, is designed for fourth grade teachers to include as part of their overall, academic-year teaching curriculum.
2. The GLEP was developed by a Macomb County task force for the local community. While other programs advertise for participants from various regions, the GLEP was designed specifically to teach Macomb County fourth graders about issues in their "backyard," or within their own watershed.
3. Fourth graders are the deliberate target of the program. The GLEP complements Michigan science and social studies emphases on state resources

beginning at this grade level and students are most likely to incorporate the program concepts into their lives and future academic endeavors at this age level (GLEP 1992).

4. The local community focus creates a unique need for local volunteers, especially for volunteer cruise leaders who can be trained to teach learning stations during the cruise.

5. Parents of participating fourth grade students play an important role as volunteers with the program, although they were not included in this study. GLEP teachers bring at least three parent chaperones aboard the boat during the cruise. Their involvement is part of the GLEP goals for EE: to influence family members' knowledge, attitudes and consumerism behaviors with regard to the Great Lakes and aquatic sciences (Dann and Kozma 1994).

6. The GLEP does not own or operate the vessels used with the program. Program staff charter two vessels from a local captain, thereby helping to support a local business person and utilizing a community resource person to aid in the instruction of maritime topics, such as navigation and marlinspike.

Making the GLEP Model work requires the development of effective programming strategies to recruit, train, and retain educators. "Effective" is defined as "capable of producing a desired effect or outcome" (Merriam-Webster 1996: 368). One desired outcome is to prepare educators to teach students about the Great Lakes.

Summary of GLEP Educator Programming

GLEP Participation by Educators

The GLEP is offered to all 276 Macomb County fourth grade teachers in both the fall (September through October) and the spring (April through June) (GLEP 1992).

Seasonal Michigan weather normally allows for a slightly longer spring cruise season (approximately 6 to 7 weeks in length) than the fall cruise season. In 1996 and 1997, cruises were held Tuesdays through Fridays. Typically, there is one morning cruise and

one afternoon cruise per day, each about 3 ½ hours in length. (Classes may then participate at the Metropark Nature Center the other half of the day). When the program officially began in 1991, four teachers participated with the program. In 1996, 88 teachers participated with the program (this includes 71 spring and fall 1996 fourth grade teachers, as well as 16 teachers from other grade levels). In the spring 1997 season alone, 77 teachers participated.

The number of GLEP volunteer cruise leaders has gradually increased over the last seven years. In 1991, two volunteer cruise leaders participated with the program. In spring and fall 1996, 31 volunteer cruise leaders actively participated, and in the spring 1997 season alone, 38 people showed interest in the program, with 21 volunteers involved.

Educator Recruitment

Educator recruitment – seeking to gather or enroll new GLEP educators – occurs throughout the year, but teachers are more heavily targeted in the late summer and fall due to the approaching cruise seasons. The GLEP staff mails information and registration packets to fourth grade private school teachers. The Macomb County Intermediate School District (ISD) mails the packets to fourth grade public school teachers within Macomb County. Packets for fall cruises are sent by the end of April, and packets for the spring season are mailed right after Labor Day in early September. The packets include the following: a GLEP brochure that describes the program, a registration information sheet, a reservation/commitment sheet, a calendar of available cruise dates, a list of fund

raising sources (the cruise costs \$400.00 per classroom), and a Metro Beach Nature Center program listing (Appendix A).

The GLEP staff attempts to recruit volunteer cruise leaders – teenagers through retired adults – with public service announcements (PSAs), newspaper articles, word-of-mouth advertising from participating volunteer cruise leaders, high school magnet programs (math and science centers), ISD workshops, and community service clubs, such as Kiwanis. In spring 1997, the staff began promoting the GLEP volunteer positions in the Master Gardener program, an Extension horticulture program that trains interested people in basic horticultural techniques. In exchange for volunteering with the GLEP, Master Gardener volunteers receive points toward their Master Gardener certification.

Educator Orientation

Once educators are recruited to the program, they are strongly encouraged to attend one orientation and one to four training sessions before the cruise season to become familiar with GLEP objectives, and operations (Table 2-1). The goal is to have educators lead specific learning activities under the supervision of one of the program directors. A one to two hour teacher orientation meeting was designed with the purpose of helping teachers develop awareness and realistic expectations of the program goals as well as to receive and review the “Great Lakes Education Program Teacher and Cruise Leader Information Packet,” a 35-page packet that is intended to familiarize educators with each of the learning activities aboard the vessel. The packet includes a cruise agenda,

Table 2-1. Overview of 1996 and 1997 GLEP activities and objectives for educators.

What	Educators	Begins	Methods	Objectives
Recruitment Phase	Teachers	Spring: September Fall: April-May	mailings to school; workshop presentations	<ul style="list-style-type: none"> to increase awareness of the program to register for GLEP cruise
	Volunteer Cruise Leaders	ongoing throughout the year	mass media; workshop presentations	<ul style="list-style-type: none"> to increase awareness of the program to encourage attendance at orientation session
Orientation Phase	Teachers	Spring: February Fall: combined with training due to time crunch	1 to 2 hour orientation meeting; receive training manual and review activities; video supplements available	<ul style="list-style-type: none"> to develop realistic expectations of program goals to watch the GLEP video to introduce and train parent chaperones
	Volunteer Cruise Leaders	Spring: March Fall: September	1 hour orientation meeting where potential volunteers receive an oral and written overview of the program	<ul style="list-style-type: none"> to learn more about the GLEP to have 50% continue on for training
Training Phase	Teachers	Spring: April and May Fall: September	1-hour of dockside training; video supplement	<ul style="list-style-type: none"> to learn how to teach stations to learn boat protocol
	Volunteer Cruise Leaders	Spring: April and May Fall: September	2 one-hour, on-shore training sessions at the boat dock; 3 training cruises (depending on teaching comfort and skill); video supplement	<ul style="list-style-type: none"> to learn how to teach station(s)

a 2-3 page description of each learning station, reference sheets such as macroinvertebrate taxa groups, Lake St. Clair/Clinton River test record sheets, and a map of Lake St. Clair.

At the beginning of the orientation session, which is held after school at the Macomb County Extension Office, teachers listen as GLEP staff members provide a detailed overview of the program. The GLEP staff also outline linkages between the GLEP curriculum and state educational objectives for science and social studies. The GLEP staff then show a 15 minute promotional video, which provides a visual overview of the GLEP cruise. (The video also can be used by the teachers to raise funds within their school and community to pay for their GLEP participation). Following the video, teachers have an opportunity to complete a field tour information sheet, which staff use to gather the teacher's name, school name, preferred cruise dates and times, number of students, chaperones and special guests, and special needs. Next, the GLEP staff provide strategies teachers may use for securing resources in their local community to meet their portion of participation costs. At the conclusion of the orientation, teachers learn about parent volunteer expectations as well as techniques for identification and recruitment of parent volunteers (GLEP 1992).

Volunteer cruise leaders also attend a one hour orientation session to learn about the GLEP (Table 2-1). Volunteers receive the "Great Lakes Education Program Teacher and Cruise Leader Information Packet." They are provided with an oral description of the program and the volunteers' teaching role, and are given the opportunity to ask questions. The primary goal of the orientation session is to encourage future volunteer participation and to provide details on the subsequent volunteer training sessions.

Educator Training

Teachers are strongly encouraged to attend one hour of dockside training to learn about boat protocol and more about the eight vessel teaching stations. The training is considered mandatory for teacher participation with the GLEP, yet there is no system which penalizes teachers for not attending training (e.g., penalties such as losing their cruise date or not receiving the GLEP teaching materials).

After introductions, teachers split into two groups for training: new teachers learn about the 'Beat the Teacher' Game station, as well as the pH test, water color, water temperature, and water clarity station. Veteran GLEP teachers learn more complex stations (dissolved oxygen test and navigation) in the event that a volunteer cruise leader is absent on the day of their cruise and the teacher must instruct at the station. During a 45 minute presentation, these stations are demonstrated to the teachers by GLEP staff, and teachers are given the opportunity to ask questions as they watch the demonstration. Teachers are given about 15 minutes to practice with vessel learning station teaching tools, such as a compass, maps, and charts. Teachers then regroup to learn about new additions to the curriculum, fill out the field training information sheet, and learn about parent training sessions (GLEP 1992). During the fall, teachers attend a one-day, combined orientation and training session due to the shortened cruise season.

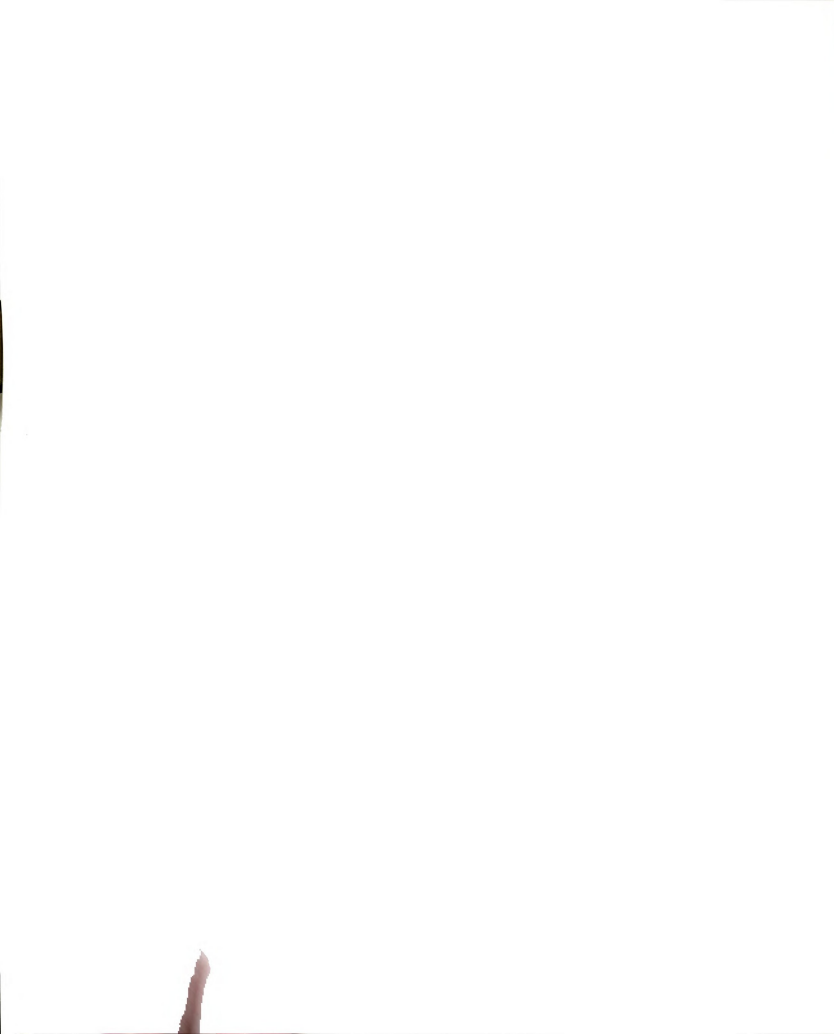
Training sessions are also held for the volunteer cruise leaders (Table 2-1). For the volunteers, the majority of time is spent working on the specific concepts and teaching strategies for each cruise station. Volunteers participate in 20 hours of training, including one to three apprentice cruises (depending on their teaching comfort levels and teaching

adeptness). Volunteers receive in-depth training on fourth grade level teaching techniques. GLEP staff member Lynda Billato notes that the purpose of the teaching techniques are to train volunteers to "work with excited 10-year-olds."

In 1997, the GLEP staff produced cruise station training videos to supplement the 15 minute promotional tapes and the educators' training. Each of the videos demonstrate a different cruise station. New educators use the videos to become more familiar with the stations, and veteran educators use them for review.

Volunteer Retention through Recognition

In spring 1997, GLEP staff members allocated additional time and resources to volunteer recognition. Prior to this, there were few formal volunteer recognition events or efforts. In 1997, volunteers were invited to attend an appreciation dinner cruise. During the recognition cruise, GLEP staff members designated third year volunteers with significant ongoing GLEP participation as "Master Mariners." Any volunteer with two years of significant ongoing GLEP participation was deemed a "Mariner." Each volunteer received a certificate in recognition of his/her volunteer achievements. Additionally, GLEP sweatshirts, T-shirts, and hats were offered to volunteer cruise leaders at a reduced fee; this provides volunteers a "uniform." GLEP staff believe that this uniform will give the volunteer cruise leaders a sense of program ownership and pride.



Chapter 3

LITERATURE REVIEW

Brief History of Environmental Education in Michigan

Vessel-based, environmental education (EE) is relatively new to Michigan. In the last eleven years, three programs have been established in the state. However, Michigan EE now has a 40 year history. During the late 1960s and early 1970s, EE became a subject of great interest, echoing the national trend toward increased environmental awareness (Cox and Wilson 1993). Schools, seeing EE as distinct from courses in the traditional curriculum, began hiring teachers specifically to teach EE courses at the K-12 level. By the 1980s, this hiring practice proved too much for many school district budgets to bear, and schools took a new approach, one that integrated EE into science classes. Today, this method has expanded to a multidisciplinary approach to include EE in social science, English/language arts, music, art, and math classes (Cox and Wilson 1993).

EE covers a wide range of topics focusing on quality education about the environment. In the early 1980s, several goals for EE were developed to guide curriculum development and research. This set of goals included a superordinate goal, which states that:

“The superordinate goal of EE is to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic

equilibrium between quality of life and the quality of the environment” (Hungerford and Volk 1990: 32).

Related to the Great Lakes Education Program (GLEP) objectives, a more specific definition of marine and aquatic EE is:

“... that part of the total educational process that enables people to develop a sensitivity to and a general understanding of the role of the seas and fresh water in human affairs and the impact of society on the marine and aquatic environments” (Goodwin and Schaadt 1977 in Fortner 1991: 303).

Experiential Education

EE can include experiential learning, also known as hands-on education. Norman Evans (1994) wrote the working definition of experiential education as “the knowledge and skills acquired through life and work experience and study which are not formally attested through any educational or professional certification” (Evans 1994: 1). John Dewey (1938 in Evans 1994) originated the philosophy of experiential education. He did not, however, equate experience with education. This responsibility, he said, falls on the teacher, who must help the learner make the connection (Evans 1994). According to Dewey, unless the principles of interaction (making the student aware of his/her immediate environment by taking the learning outside the classroom) are carefully facilitated by teachers, an experience may be considered to be mis-educative (Evans 1994).

Experiential is tied to the word “experience,” derived from the Latin word “experientia,” meaning “to go through” (Knapp 1992). Learning, according to Knapp, is the process of acquiring knowledge (1992: 25). Together, the terms “experience” and

“learning” form experiential learning, or acquiring knowledge by thinking and acting

(Knapp 1992). Joseph Campbell offers this analogy to describe experiential learning:

“If you haven’t had the experience, how can you know what it is? Try to explain the joy of skiing to somebody living in the tropics who has never seen the snow. There has to be an experience to catch the message, some clue – otherwise you are not hearing what is being said” (1990: 1).

Learning through experiential education is the goal of the GLEP. This goal includes the development of scientific literacy and understanding of Great Lakes aquatic sciences, issues, and stewardship, particularly in young people. Dixon (1996) defines stewardship as the moral obligation to care for the environment, and the actions undertaken to provide that care.

Why are EE Program Evaluations Important?

In reference to educational evaluation, Tyler (1949) states that “educational objectives are essentially changes in human beings... evaluation is the process for determining the degree to which these changes in behavior are actually taking place” (Tyler 1949 in Malarney 1992: 19). Evaluation can be directed at several aspects of an educational program. Possible elements to be evaluated include educator workshop design and implementation, teaching and instructional resources, learner participation, learner satisfaction, learner knowledge, skills, and attitudes, application of learning after workshop, and impact of the application (Robinson 1979 in Malarney 1992: 21).

At times, program planners overlook program evaluation for reasons, including: they have few opportunities to upgrade their competence in this area, the demands on programmers to conduct evaluation is usually minimal, there are few professional

evaluators, or there is no time or money to conduct an evaluation (Stufflebeam 1975). The information collected through an in-depth evaluation can achieve several objectives, including improvement of organizational operation and administration (including personnel, facilities and finances) and improvement of program objectives, methods and materials (Knowles 1980). Evaluation also helps an existing program focus on goals and gives a feeling of accomplishment (Boyle 1981). When a program is not evaluated, researchers have found that the program then begins to lack credibility (Brody 1995, Lemming et al. 1993, Flor 1991, Kolb 1991, Lisowski and Disinger 1991, Iozzi 1989, Brody and Koch 1989, Bennett 1989).

Bennett (1989: 14) found that in order to “convince the educational community that EE can improve the academic curricula and make traditional subjects relevant to students, we *must* evaluate our programs.” Bennett (1989) recognizes four readily apparent benefits from evaluating a program. First, the information obtained will help improve effectiveness of teaching methods, the learning environment, and the use of instructional resources. Second, increases in student learning will more likely occur through better diagnosis of students’ needs and measurement of student achievement (Williamson [1996] provided this research for the GLEP). Third, a better assessment of the impact of educational programs on environmental protection will then be possible. Finally, assessing program impacts will put EE programmers in a better position to gain support from students, parents, administrators, and the general public. This is especially important as the GLEP expands to additional Great Lakes regions.

EE Program Evaluations: Project WILD and Vessel-based EE

Since its beginning in 1983, Project WILD (1992), a wildlife-based EE program, has been committed to producing quality experiential EE materials and programs that meet the needs of students, EE sponsors, and classroom teachers across the United States (Pitman 1996: 1). To maintain a standard of excellence, to continue to be implemented in an increasing numbers of classrooms, and to effectively meet its goals and the goals of its sponsors, Project WILD has undergone regular evaluation and assessment. In 1983 through 1995, National Project WILD office, sponsors, and various other researchers conducted 28 studies on Project WILD materials, workshops, programs, outreach, implementation, and effectiveness. The results of 20 of these projects have implications related to the GLEP evaluation that may improve the current program – and may make the GLEP more easily implemented in other Great Lakes regions.

Teacher Awareness of Project WILD

Most Project WILD evaluative studies have been aimed at measuring quality and effectiveness of Project WILD workshops and materials. Therefore, most of the research focused on teachers who were already aware of the existence of Project WILD. Very few of these studies used an experimental design that assessed a general population of teachers to investigate awareness of the program (Pitman 1996: 1). To meet this need, Dunne (1992) conducted a survey of teachers who participated in a Project WILD workshop in New Jersey. These teachers indicated that they learned about Project WILD from environmental education centers, teachers' union magazines, their school or board of



education, and mailings from the New Jersey Division of Fish, Game, and Wildlife.

Several additional surveys of Project WILD users reported that teachers believed that there was a need for increased promotion of the program, which may show that these teachers had difficulty learning about the programs themselves (Young, Thompson, and Thompson 1995, Fleming 1991, Standage Accureach 1990, Farnsworth 1989).

Based on statistics reported by state sponsors and published by the National Project WILD office, it is clear that the number of classroom teachers exposed to Project WILD continues to grow each year. But based on the number of classroom teachers in the United States, it is also clear that there is a large untapped market of potential Project WILD educators (Pitman 1996: 2). To tap this participant pool, it is important to understand what motivates teachers to participate in Project WILD workshops. The primary motivation by teachers for attendance at a Project WILD workshop was a personal interest in wildlife and the environment (Shomo 1993, Gigar 1993, Dunne 1992, Bissell 1992, Greene 1992, Fleming 1991). Teachers also attended to receive natural resource materials and activity ideas (Greene 1992, Zosel 1988). Jackson (1994) found that 80% of teachers who attended Project WILD workshops had previously been to other EE workshops. Researchers listed marketing implications of these findings, including that Project WILD may want to focus a portion of its outreach efforts on those educators who have received training in other EE programs (Jackson 1994, Shaw 1993, Zosel 1988). As the GLEP expands to other geographic regions, identification of potential outreach and marketing strategies will ease program implementation, including its acceptance by participants if it is promoted by familiar and reliable sources. More information is needed

to determine whether GLEP teachers, like Project WILD teachers, are interested in learning environmental science and whether they learn about new EE programs through their participation in other similar programs.

What Teachers Hope to Learn at Project WILD Workshops

Project WILD researchers have found that participating teachers indicated that they want to learn a number of topics, including: concepts and strategies for instilling awareness, understanding, and an appreciation of wildlife, its habitat, and the environment to their students; methods for integrating Project WILD information, materials and techniques across the curriculum; new activity ideas; better teaching methods and instructionally sound programs that inspire students; and information on preparing students to make responsible decisions affecting people, wildlife, and the environment (Jackson 1994, Zosel 1988, Smith 1988, Cantrell 1987, Cantrell 1986, Charles 1986, Yannone 1985). These researchers recommended that outreach strategies aimed at attracting teachers to workshops focus on Project WILD's ability to fulfill these needs (Pitman 1996). Information on teachers' specific teaching concerns and needs prior to GLEP participation is needed so that GLEP training can be strengthened.

Attendance at Project WILD Workshops

There is much discussion about the need for teacher training with EE programs such as Project WILD. Project WILD leaders believe it is important that educators understand the goals of the program and use the materials appropriately. Typically,

teachers receive the Project WILD guides by attending a workshop, and the research supports this method of curriculum dissemination. According to Jensen's 1992 North Dakota survey, teachers trained at Project WILD workshops used the materials more than non-trained teachers, were more likely to include EE in their curricula and taught a longer unit than those teachers with little or no environmental training (Pitman 1996: 5). Also, in a study of users and non-users, Standage Accureach (1990) reported that there is a direct correlation between teacher use of Project WILD and attendance at Project WILD workshops. In their addendum, Standage Accureach reported that those teachers who received the Project WILD Aquatic Guides through the mail were much less likely to use the guides than those who attended Project WILD Aquatic workshop (Standage Accureach 1990).

Project WILD training workshops are unique. Teachers of kindergarten through high school students participate in a minimum of six hours training. During the workshop, materials within the Project WILD guide are reviewed in detail (such as how to use the book and the organization of materials, including each activity and the appendices that contain additional resources and contacts). Teachers learn Project WILD activities through demonstration and by teaching each other the activities during the training. Fleming (1983) found that 71% of teachers who attended these workshops agreed that the workshops were useful in helping them to implement Project WILD. In addition, the practice of having participants teach activities at workshops was found to be significantly associated with their later use of Project WILD (Zosel 1988, Cantrell 1987). Unlike

Project WILD, the GLEP training does not include a lengthy hands-on activities for familiarizing participating teachers with GLEP activities.

Use of Project WILD Materials After Workshop Training

After training, a strong measure of program success is whether or not teachers use the materials with their students (Pitman 1996). While figures vary, large proportions of Project WILD workshop participants – between 44% and 81% of teachers – use the Project WILD materials in their classrooms (Shomo 1993, Baldwin 1990, Zosel 1988, Smith 1988, Cantrell 1987, Cantrell 1986, Charles 1986).

In addition to the use of Project WILD materials in their classrooms, almost all teachers indicated that attending Project WILD workshops and receiving the materials lead to changes in their teaching practices, such as incorporating wildlife concepts into the curriculum, increasing the time they spent teaching students about wildlife and the environment, and using more “hands-on” activities. Project WILD-trained teachers reported that they began networking within schools, between school districts, and across the state to increase teacher awareness about wildlife and environmental issues.

In many studies, educators made suggestions for improving or adding to the Project WILD program (Pitman 1996: 10). Overwhelmingly, the most requests were for additional workshops and materials. Comments regarding workshops indicated a need for follow-up workshops (shorter in length than the initial workshop) that focus on the activity guides, as well as advanced workshops on specific topics, such as urban wildlife. Materials requested included activities with a focus on student action, correlations to

textbooks and state objectives, additional hands-on activities, and background information (Young, Thompson, and Thompson 1995, Shaw 1993, Tudor 1992, Bissell 1992, Greene 1992, Fleming 1991, Standage Accureach 1990, Gilchrist 1990, Farnsworth 1989, Zosel 1988, Smith 1988, Cantrell 1986, Charles 1986, Yannone 1985). By addressing the needs of GLEP teachers, GLEP staff can work to expand its educational programming.

The reasons most often given for not using Project WILD materials after workshop training were: teachers were planning to use them in the future (either they had just completed training or were planning a specific unit later in the year), lack of planning time, lack of time in the school day, difficulty incorporating the program into their curriculum (mainly at the secondary level), their jobs did not provide an opportunity to use Project WILD materials (due to principal or supervisor interference), and lack of administrative support (Greene 1992, Standage Accureach 1990, Baldwin 1990, Gilchrist 1990, Zosel 1988, Smith 1988, Cantrell 1987, Charles 1986, Fleming 1983 in Pitman 1996: 5). A strong measure of GLEP success is dependent upon teachers who, after trainings, will utilize EE materials during all segments of the GLEP curriculum.

The Project WILD Volunteer Facilitators

Two formal evaluation studies addressed the identification, motivations, and needs of volunteer facilitators who teach Project WILD activities to Project WILD instructors (using a "teach the teacher" approach) (Greene 1992 and Gomon 1991 in Pitman 1996: 10). Gomon and Greene found that a commitment to EE and a high personal level of environmental concern were identified as the most important motives for volunteering as

Project WILD facilitators. Once involved, volunteers indicated that during training pairing new facilitators with those with experience proves valuable. Research findings further indicated the need for a communication system with regular and formalized contact between the volunteer facilitators and the agency sponsoring Project WILD. Finally, monetary compensation for service and/or expenses was shown to have validity as a motivator. For the GLEP staff, who call their volunteers the “backbone” of the program, addressing their needs will help to encourage their longevity with the program.

Vessel-based EE Research

A number of informal evaluations exist on a program-by-program basis within vessel-based EE programs around the nation (such as pencil and paper questionnaires asking for basic reactions to the program, such as “did you like the program?”). However, only one formal research project related to the GLEP evaluation is currently underway. Matthew Witten, a graduate research assistant at the University of Vermont, is conducting a national survey of “open-water environmental education (EE)” programs. Witten defines “open-water EE” as school groups traveling aboard vessels on the open water to pursue one or more activities relating to water ecology and other subjects, such as regional history, seafaring, geology and physics (Witten 1997). He is examining a sample of existing open-water education programs and evaluating which program components are most successful and likely to be transferable to other locations in the United States. The focus of his research rests in the organizational aspects of the programs studied. Witten is

currently analyzing the results of his research, which may have implications for the expansion of the GLEP to other Great Lakes regions.

Retaining Educators in EE

Researchers and program administrators have observed that teachers and volunteers may or may not become involved with EE programs such as the GLEP for a variety of reasons, which relate to their comfort levels with the topics, their knowledge of science and the environment, their background experiences with science and the environment, and their motivations to become involved.

Obstacles Impacting Teachers' EE Participation

Many elementary teachers indicate that they are uncomfortable with teaching science because often they do not have sufficient knowledge of science content or an understanding of the discipline's concepts and teaching methodologies (Bethel 1982, Simmons 1995). Furthermore, much of the reluctance of individual teachers to incorporate EE programs into their classroom is a perceived low level of their own competency (Peyton 1977, Ritz 1977, Bozardt 1976, Cummings 1976, Hungerford 1975, Howie 1974). Teachers give the highest priority in their curricula to those topics of which they are most knowledgeable (Rakow 1984, Fortner 1991, Kennedy 1990). When a teacher does not teach topics because he or she is not knowledgeable or comfortable, their students lose when they are not exposed to the science topics.

It has been found, however, that teachers generally have positive attitudes and interest in EE, although little is known about what influences them to participate with this type of education (Lane et al. 1994). Studies show that many teachers appear to be willing to incorporate EE into their curriculum, and a number of authors have documented that teachers generally believe that teaching about the environment is important, especially after participation in an EE workshop (Kunz 1989, Van Koevering and Sell 1983, Gifford et al. 1983, Wilke et al. 1980). This substantiates the need for improved inservice education programs.

Education and background influence teachers' knowledge and participation with EE. Milkent's (1979) survey of Mississippi high school science teachers revealed that most teachers had little or no formal coursework pertaining to marine sciences, and that the teachers believed they did not have adequate knowledge for teaching most marine related topics. Why might this lack of knowledge have implications for teachers' behaviors? Cole (1990 in Mullighan and Griffin 1992) found that "experienced knowledge" guides teachers' actions in teaching EE. Experienced knowledge is derived from both professional and personal experience (Shuman 1995). A lack of experience with outdoor activities and hobbies has been listed as one reason why teachers do not participate in EE (Shuman 1995). However, teachers who attended a Project WILD training reported that their enjoyment of outdoor activities increased, and that they contributed to more environmental, conservation, or sportsman's organizations following the Project WILD workshop (Shomo 1993, Tudor 1992, Greene 1992, Fleming 1991,

Standage Accureach 1990, Baldwin 1990, Gilchrist 1990, Farnsworth 1989, Cantrell 1986, Charles 1986).

Other reasons exist that explain why teachers do not incorporate EE into their curricula. A study of teacher commitment to environmental stewardship and EE among 1,350 teachers in the New York Lake Ontario Basin revealed that teachers perceive lack of time and lack of school financial resources to be the most significant barriers preventing them from teaching their students about environmental topics (Dixon 1996). The majority of teachers indicated that various incentives would encourage them to include environmental topics in their classes, particularly having available quality resources that suggest ways to incorporate environmental lessons into their curriculum. In a multidisciplinary study, Mirka (1973 in Shuman 1995) attempted to identify factors that caused teachers to use or not to use the outdoors and its associated. Teachers cited factors such as: difficulty in finding a site for EE, insufficient knowledge, and unavailability of resource persons and resource guides. Mirka concluded that there was a need for pre-service and in-service teacher training program that emphasized techniques associated with use of the outdoors and its resources.

Shuman (1995) provides a summary of teacher training research in her graduate study of attitudinal factors that influence commitment to teaching environmental education. Specifically, she describes several studies that emphasize the benefits of inservice workshop training that show a positive change in both knowledge and opinion about EE as a result of their participation. Wilke et al. (1980) compared the effect of workshop length on teacher attitudes about teaching EE. In his study, he presented

information (curriculum and resources) to teachers in a two-hour versus a 60-hour workshop. His results showed that teacher attitudes became more positive toward using environmental resources after they participated in the workshops. He also determined that the longer the workshop, the more positive their increase in attitude change toward environmental issues. In a separate study, Kunz (1989) found that teacher participation in a seven hour Project Learning Tree workshop resulted in a positive attitude change toward the environment and outdoor activities.

Volunteers' Obstacles with Participation

During President Clinton's Summit for America's Future in late April 1997, United States General Colin Powell heralded the national justification for volunteers. "There are 15 million young Americans in need," Powell said at one volunteer rally. "We should not be satisfied until we have touched the lives of every one" (Mathis 1997: 1). In addition to impacting the lives of youth, volunteer programs have the potential to provide substantial benefits to individuals, the community and the volunteer organization. Volunteers become model stewards for other community members (Meehan and Berta 1993). They help – whether it is with youth education or with stream clean-ups – because they want to, not because of their job or other agendas (Cookson 1989). In the case of the environment, they may be eager to learn or lend their own scientific expertise to the program (Wiens 1996). Not surprising are the economic benefits gained from utilizing volunteers. Since 1991, volunteers have donated close to 10,000 hours to the

GLEP, valued at more than U.S. \$124,000 based on National Center for Volunteerism estimates of economic values of volunteerism (GLEP 1997).

The benefits of volunteers to programs appear to be enormous, but barriers to volunteer utilization exist, beginning with the publics' general unawareness of volunteer opportunities. A recent Roper/Times Mirror Magazines Environmental Forum Survey indicated that over 55% of Americans want to volunteer but most people "just don't know how" (In Balance 1996).

Volunteers' involvement is related to motivations for participation. According to Atkinson and Birch (1978), a person is motivated to behave by the strength of his or her motives, the expectancy of attaining a goal, and perceived incentives. Atkinson and Birch further theorize that the three underlying motives affecting behavior are needs for achievement, affiliation and influence or power. These motives form the McClelland Model of Motivation, which was developed to categorize the differing motivations people have for doing things, such as volunteering (Winans 1994). What do these categories mean?

1. **Achievement** motives influence one to take pride in accomplishment and to possess a desire for excellence.
2. **Affiliation** motives influence people to be most concerned about his or her relationship with others.
3. **Influence or power motives** are defined as indicating a desire for influence and control.

One study found that adult volunteers in community programs (similar to the GLEP) were motivated more by achievement and affiliation than by influence or power motives (Rouse and Clawson 1992).

McCune and Nelson (1995) expanded on the McClelland Model by identifying eight motivations to ascertain why people volunteered in a library program, including: social interaction/friendship, high visibility/potential for recognition, need for a challenge, mental stimulation, need to unravel a puzzle or satisfy a curiosity, service to humanity, to occupy time, and for affiliation with peers. Incentives such as tangible rewards, interpersonal rewards, and purposiveness also motivate people to volunteer. Tangible rewards are defined as goods, services, money, or equivalents, such as transportation and lunch stipends, or solidarity. Interpersonal rewards include fellowship, friendship, prestige, and similar positive outcomes resulting from personal relationships.

Purposiveness (satisfactions) lead people to help others toward achieving some goal (Vroom 1982). However, in a recent Extension survey, “helping others” as a goal for volunteering ranked low – only 5.6% of volunteers surveyed joined the program with the goal of helping others (Rouse and Clawson 1992). Researchers found that most people volunteer for purely altruistic reasons only when it is directed toward close kin (House 1997, Bass 1995 in Murnighan et al. 1993). However, Loewenstein, Thompson, and Bazerman (1989 in Murnighan et al. 1993) have shown that positive interpersonal relationships can produce kin-like connections among unrelated people. When people feel positively toward each other, and when their identification with the organization is salient

to them, they may more willingly and frequently contribute to voluntary action (Murnighan et al. 1993).

Retaining people within a program, even if their reasons are purely altruistic, comes largely through reward and recognition of the volunteer participants. Winans (1994) suggests recognizing each volunteer based on the McClelland Model of Motivation. For example, if people are motivated to volunteer for power and influence, he suggests giving them public recognition, more leadership, and promotion within the organization. If people are motivated by affiliation, program coordinators might do something personal as a reward, such as a party in their honor, or present a card everyone has signed or a gift to which everyone contributed. Finally, if people participate for achievement, organizers could tell these volunteers specific things they have accomplished that have been appreciated – then give these volunteers more responsibility (Winans 1994).

McCune and Nelson (1995) suggest a number of reward methods that are recognized as viable for volunteer retention. First, rewards can be based upon recognition of a volunteer's increasing skills and length of service both on and after the job by creating "career ladders" within the program, such as advancement to supervising positions or a change in title. Promotions may be based on the demonstration of skills or hours of service (McCune and Nelson 1995). Second, rewards may become more formal, anticipated events, such as a written certificate of service or a celebration/reception. Finally, acknowledgment through the general media (including newspaper articles, radio shows, or television clips) or through program publication (such as newsletters) provides

methods for public reward (McCune and Nelson 1995). For the GLEP, these types of incentives may result in greater volunteer retention.

Who Volunteers?

While people of all ages can and do volunteer, the literature identifies two specific age groups as especially viable volunteers: older adults and young people, especially older teenagers. A study of 346 older adult volunteers (age 50 and over) found that efforts should be made to recruit more men, adults over age 65, and retired adults since this study indicated that these groups of people are volunteering (Rouse and Clawson 1992).

Encouraging teens to serve as volunteers has a number of mutual benefits to the teens and the program participants. Elkind observed that putting older teens in charge of younger children is a maturing experience, forcing teenagers to move out of their rather egocentric perception of self and the world (Elkind 1990). This new perception can lead to thoughtful decisions about career and life for the young volunteer. In one survey, students involved in volunteer conservation groups called the experience "life-changing" (Rouse and Clawson 1992).

Several reforms have been proposed which involve the community, especially teenagers, in the educational process (Shumer 1992: F-3). Service learning is one such educational reform. The idea behind service learning is that teenage students can learn from community action and, at the same time, perform a variety of services (Nathan and Kielsmeier 1991). Furthermore, service learning rekindles an idea brought to life by John Dewey in the 1930s; that schools should be laboratories of learning, closely linked to

community needs. Recruiting teens as volunteer GLEP instructors leads to the application of meaningful, real-world learning in their lives and communities (Nathan and Kielsmeier 1991).

Michigan Volunteerism

Community-based, budget-conscious programs like the GLEP rely on local volunteers to contribute their time, knowledge, and energy to assist with program operations. However, unless those individuals are identified and made aware of the opportunities, involving volunteers becomes difficult. In 1997, the Institute for Public Policy and Social Research (IPPSR) at Michigan State University conducted a study of 975 adults to identify those Michigan residents who do volunteer (Tomlinson 1997). Professor Mark Wilson, who directed the study for the IPPSR, broadly defined volunteering as “giving time to others.” Key findings of the study provide insight for GLEP volunteer programming.

The IPPSR identified that approximately 40% of total Michigan residents volunteer, with men and women equally likely to volunteer. Of southeast Michigan (where the GLEP is housed) residents¹ surveyed, 40% volunteered during the past year. East Central Michigan had the highest proportion of resident volunteers over the last year (52%), and Detroit had the lowest, with 26% of its residents serving as volunteers.

¹ Includes Genesee, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties. Researchers treated Detroit as a separate region.

The IPPSR survey indicated that volunteerism is dependent on several key demographics. There is an age-related pattern in rates of volunteerism. The youngest and oldest age groups volunteer proportionately least often, and the 35-54 age group has the highest proportion of volunteers (49%) of the total volunteers surveyed. (This contradicts the studies by Rouse and Clawson (1992), which suggest that the older adults and teenagers are the most viable volunteers).

In Michigan, Caucasians volunteer proportionately more than African Americans (44% of Caucasians surveyed said they volunteered, compared to 20% of African Americans). Volunteerism increases with household income level; almost two-thirds of people with an annual household income of \$90,000 or more volunteer, while only one-third of those with a household income below \$50,000 donated some of their time to a charitable organization in the last year.

Generally, as the level of education increases, so does the proportion of people who volunteer. There are two exceptions. Those with a graduate degree (the highest level of educational attainment) are less likely to volunteer than those with some graduate work or a college degree. People with a technical school or junior college degree volunteer only about as much as people who have completed just tenth grade or less.

Why don't more people in Michigan volunteer? Of the 577 people who answered this question in the IPPSR survey, 58% said they lacked the time. An additional 10% of people surveyed listed physical/emotional issues, 7% said they were not asked to volunteer in an organization, and 5% indicated they had different interests than volunteering. Other reasons included lack of trust, income, transportation and initiative.

Summary

Environmental education (EE) in Michigan has expanded from its initiation in the 1960s to include experiential education activities that encourage environmental stewardship in young people. Program evaluations are important to insure that EE program goals are accomplished. While many aspects of the Project WILD EE program have been evaluated, formal evaluations of *vessel-based* EE programs like the GLEP have not occurred, particularly to discover the knowledge needs, concerns, and motivations of its participants. Research shows that although teachers generally think EE is important, they may not become involved if they do not feel they are knowledgeable, they do not feel comfortable teaching the topic, or they are not motivated to participate.

Volunteers often play a key role in EE programs, and the McClelland Model of Motivation helps to identify the motivations behind why people volunteer, including affiliation, achievement, and power incentives. A 1997 Michigan volunteerism survey reveals that volunteers need to feel motivated to participate in programs. Investigating teacher and volunteer cruise leader involvement in the GLEP will generate concrete recommendations for strengthening educators' participation and will provide insight prior to dissemination of the GLEP to other regions.

Chapter 4

METHODS

Overall Research Design and the Development of Evaluation Instruments

I evaluated the GLEP using two separate but similar four-page surveys administered to teachers and volunteer cruise leaders (Appendix B). I gathered different evaluation data from each of the two surveys, one administered before the GLEP training and cruise, and the second administered after the cruise. The first survey gathered background information, addressed motivations for program participation, asked for pre-training questions and concerns about participation, and self-assessed knowledge of various Great Lakes topics. The second survey included questions about perceptions and opinions of the GLEP, addressed comfort levels with teaching various Great Lakes related topics, and asked for opinions regarding programming strategies, such as the use of training tapes and various program advertising methods.

The surveys were developed primarily from six pre-existing evaluation instruments (Middleton 1995, Rupert 1995, TIMSS 1994, Zint 1994, Shaw 1993, Dann 1992). To assess educators' Great Lakes knowledge and comfort levels with teaching Great Lakes topics, I used 5-point, Likert-type scales. Educators' self-assessments of knowledge were rated with possible responses ranging from "strongly agree" to "strongly disagree." Educators' rated their comfort with teaching on a five point scale ranging from "not

comfortable” to “comfortable,” and “unaware of topic” to “above average knowledge for topic.” I utilized simple ‘yes’ and ‘no’ responses to gain quantitative data in some areas, which were coupled with qualitative, open-ended questions in the surveys. Unlike some quantitative data, interpretation of qualitative data is not constrained by predetermined categories of analysis and leads to depth and detail within the study. Recent developments in the evaluation profession have led to increased use of multiple methods that include combinations of qualitative and quantitative data (Patton 1987: 8).

Furthermore, theorists argue to expand beyond the quantitative nature of evaluation to include qualitative data, or uncategorized, evaluation (Lincoln and Guba 1985 in Brookfield 1986, Guba and Lincoln 1981, and Guba 1978). Certain evaluation purposes, questions, and situations are more consonant with qualitative methods, such as formative evaluations, which are conducted for the purpose of improving programs (Patton 1987). Qualitative evaluation data begin as raw, descriptive information about programs and people in programs (Patton 1987: 7). These data are then organized into major themes and categories, then analyzed, as was done with the GLEP qualitative data.

There are no general, agreed upon requirements for pre-testing a survey (Dillman 1978: 155). However, to see if potential respondents would have any trouble completing the survey questions, I submitted the preliminary survey instruments to a panel of seven reviewers, including university researchers skilled in survey development and implementation, Extension professionals, and graduate research assistants who recently designed and conducted their own survey work.

Dillman (1978) recommends that surveys, particularly mail surveys, contain the following elements without sacrificing content or study objectives: begin the survey with an "easy" question to alleviate fears that the questionnaire contains difficult questions, group similar types of questions, place demographic questions at the end of the survey, and provide directions for how to answer each question and to make questions fit each page.

In April 1996, after revising seven earlier revisions according to Dillman's recommendations and reviewer comments, I implemented the first surveys with the GLEP educators. Each survey included directions for completion and asked for the educators' names on the half sheet of paper attached to the front of the survey. To ensure confidentiality, I later removed this and attached a number to each survey (Appendix C). The Michigan State University Committee on Research Involving Human Subjects (UCRIHS) approved all research methodology during the 1996 and 1997 research seasons (Appendix D).

Evaluation Protocol

I surveyed the GLEP teachers during the spring 1996, fall 1996, and spring 1997 cruise seasons. GLEP volunteer cruise leaders were surveyed during the spring 1996 and spring 1997 cruise seasons. I did not survey the fall 1996 volunteer cruise leaders because, with one exception, all of the volunteers during this season ($n=8$) had been previously involved with the GLEP and had been surveyed during the spring 1996 cruise season (Table 4-1).

Table 4-1. Timetable and methods of educator survey administration.

Educators	Dates of survey administration	Which survey?	How administered?
Spring 1996 Teachers	April 17 and 18, 1996	survey one (pre-cruise survey)	personally distributed and collected during GLEP teacher training sessions
Spring 1996 Teachers	various dates in May and June 1996	survey two (post-cruise survey)	personally distributed and collected during Williamson's student survey data collection
Spring 1996 Volunteer Cruise Leaders	April 17 and 18, 1996	survey one	personally distributed and collected during GLEP training sessions
Spring 1996 Volunteer Cruise Leaders	returned throughout May and June 1996	survey two	mailed; follow-up phone calls made with additional surveys mailed for non-respondents; additional telephone surveys for non-respondents
Fall 1996 Teachers	January 1997	survey one and survey two	mailed; follow-up phone calls made with additional surveys mailed for non-respondents
Fall 1996 Volunteer Cruise Leaders	no survey (only one new cruise leader this season)	no survey one or survey two	no survey
Spring 1997 Teachers	From late April 1997 to early June 1997	survey one and survey two	mailed; follow-up phone calls made with additional surveys mailed for non-respondents
Spring 1997 Volunteer Cruise Leaders	March 26 and April 18, 1997	survey one	personally distributed and collected during GLEP orientation and training sessions
Spring 1997 Volunteer Cruise Leaders	June 1997	survey two	mailed; follow-up phone calls made with additional surveys mailed for non-respondents

Although I did not change the content of the survey, I modified the survey methods in specific ways during the cruise seasons (Table 4-1). I used three methods to administer surveys: in-person, mail, and telephone. For the in-person survey, I personally administered the pre-cruise survey (survey one) during the educator orientation and training programs in spring 1997. The post-cruise survey (survey two) was administered in-person in the teachers' classrooms during student survey administration by Williamson (1996). I mailed spring 1997 teachers survey packets that included a cover letter and a self-addressed, stamped envelope for return of the survey. Mailings with additional copies of the surveys were also used to increase response rates in all cruise seasons. Finally, I telephoned non-responding spring 1996 volunteer cruise leaders to increase response rates during this cruise season (Table 4-1).

In spring 1996 I personally administered survey one to volunteer cruise leaders. I mailed survey two to the spring 1996 volunteer cruise leaders, using telephone reminders and follow-up mailings to increase the response. During the fall 1996 and spring 1997 seasons, teachers received both survey one and survey two by mail. Again, I telephoned any non-respondents who had not returned their survey(s) within two weeks following the mailing. I mailed an additional survey to these educators with a cover letter explaining the importance of their participation and encouraging them to respond (Appendix E).

Survey Administration to Non-respondents

In the majority of cases, I called educators on the telephone only to remind them to complete their surveys or to offer to mail them another copy. However, in the fall of 1996

the volunteer cruise leader response rate was especially low ($n=7$), so I designed a telephone follow-up survey. The phone survey was identical to the original pencil and paper survey with modifications in wording to ease reading for the telephone surveyor (as recommended by Dillman) (1978) (Appendix B). I gained an additional 11 spring 1996 volunteer cruise leaders respondents as a result of the telephone surveys. However, three volunteer cruise leaders with whom I spoke declined to participate in the study, despite completion of the first survey. Their reasons included not enough time to participate and no interest in participating. Additionally, one spring 1996 volunteer cruise leader had an unlisted telephone number and another hung up on the telephone surveyor (a student intern). The five remaining non-responding cruise leaders simply could not be reached via telephone, despite three attempts at telephone contact during various times of the day and two follow-up mailings.

Spring 1997 teacher response rates were comparatively lower than in previous years, which I attributed to the research method (mail surveys, as compared to the successful spring 1996 survey response rate from in-person administration) as well as the timing of some teachers' cruises and the end of the busy fourth grade school year. Only five of the 35 spring 1997 teachers eligible to participate returned the original surveys mailed. Dillman found that most people who answer questionnaires do so almost immediately after they receive them (Dillman 1978: 183). He further states that a questionnaire that lies unanswered for a week or more is not very likely to be returned. To overcome this challenge, I mailed additional surveys at the end of two weeks following the first mailing. To further increase the chances for a higher response rate, I telephoned

the 30 non-respondents to remind them to reply and mailed up to two additional surveys to those who did not return their surveys. Several teachers with cruises late in the school year were especially difficult to reach, despite three phone messages and a second survey mailing. Without follow-up mailings, Dillman (1978) found that response rates would be less than half those normally obtained. Even with follow-up mailings and telephone reminders, my final response rate for spring 1997 teachers remained less than half. However, I was able to obtain five additional surveys (for a total of ten from spring 1997).

Data Analysis

Two research interns assisted me with data entry. I used the Statistical Package for Social Sciences (SPSS) software version 6.1.11 for survey response summaries (Norusis 1993). For 12 questions from the educators surveys, I pooled the data collected over all seasons to achieve an overall response for each group of educators and determined standard errors as:

$$SE = \sqrt{100^2} \sqrt{\frac{1}{N} \hat{P}(1 - \hat{P})}$$

with SE=standard error, N = sample size, and \hat{P} = estimated proportion, which follows from the binomial probability model.

This formula is based on the idea that the sampled group is taken randomly from a large but undefined population (e.g., all teachers that might have participated in such a program). It is important to recognize that if the reader wants to treat the group that was sampled as a population, without attempting to generalize beyond it, that the appropriate

standard errors would usually be substantially smaller. This is because a significant fraction of the population was sampled.

The qualitative responses were typed verbatim from the surveys into Microsoft Word for Windows 95, version 7.0 (1995). The responses were grouped by category and coded. The data were then entered for summation.

Additional Qualitative Information

The GLEP staff and Michigan State University researchers held several meetings with the GLEP co-directors, the GLEP task force, and GLEP teachers and volunteer cruise leaders during this evaluation. These two-day meetings, dubbed “writing retreats,” were held in March 1997 and July 1997. The purposes of these meetings were: to share the GLEP evaluation research results to date, and; to discuss the GLEP student curriculum and the guidebook (especially during the March 1997 writing retreat) that would be developed from this research, to aid in the expansion of the GLEP to other parts of the Great Lakes (Appendix F). I discussed evaluation results and the implications of these results with the GLEP co-directors during three other meetings during this evaluation. Research implications and recommendations based on these meetings are integrated into Chapter 6.

Limitations of Research

When interpreting, utilizing and applying the results of this research, special attention should be given to several limitations. First, although I was able to glean some

information about why educators drop out of the GLEP, I did not survey those teachers and volunteer cruise leaders who discontinued their involvement from previous seasons.

Second, the results obtained for six of the fall 1996 cruise leader volunteers were obtained after the cruise season to account for non-response. This is also true for six of the spring 1997 teachers. Thus, it is important to consider that they may have given biased responses when reflecting on questions such as “what questions do you hope to have answered at training,” when, in fact, they had already experienced the training.

Third, in addition to survey modifications, other minor changes in GLEP programming occurred during my evaluation due to the dynamics of the program. GLEP programming is dynamic. The co-directors continually modified their recruitment, orientation and training strategies for each cruise season. Most changes were relatively insignificant (e.g., modifying topics covered in orientation versus training sessions, or altering the location of the training sessions). Thus, modifications likely did not have a significant effect on the educators’ responses to survey questions.

Fourth, to determine educators’ knowledge and comfort levels with teaching Great Lakes topics, I used self-assessment questions on the surveys rather than measuring by other means, such as pre-cruise and post-cruise tests of knowledge of specific topics or pre-cruise and post-cruise evaluations of changes in teaching resulting from greater comfort levels.

Fifth, as with all survey research, reliability and validity are important concerns. In general, validity in this study was probably enhanced by review of the survey by the panel of university researchers and professionals. Although the surveys were not pre-tested with

educators, reliability and validity appear to be adequate because responding educators did not have questions during survey administration. However, some responses to particular items indicate that some reliability and/or validity issues may remain. For example, educators gave an especially low assessment of their knowledge of “fisheries” (survey one, question 6 and 7). There is some concern that educators may not have understood the meaning of the term “fisheries,” as these surveys were not pre-tested. However, the measurement instrument was reviewed and modified by a panel of university researchers and professionals, and educators did not question this term during the survey administration.

Finally, the groupings of the qualitative results were determined at the discretion and interpretation of the researcher. Three of the results tables (in Chapter 5) have over 25% of responses categorized in the “other” category (Tables 5-7, 5-12, 5-20). Readers should examine actual survey responses to develop their own interpretations.

Chapter 5

RESULTS

Results of Survey Administration

Response Rates

In general, educators' responses rates were satisfactory. A total of 106 teachers were eligible to participate in the 1996 and 1997 surveys, and I obtained 76 useable surveys for an overall response rate of 71.6% (Table 5-1). The primary reasons for the 30 unuseable cases were a response to only one of the two surveys (n=18) or non-response to both surveys (n=12).

A total of 40 volunteer cruise leader were eligible to participate in the 1996-97 surveys (Table 5-2). I obtained 31 useable surveys for an overall response rate of 77.5%. The primary reason for unuseable cases was non-response to one or both surveys (n=9).

Table 5-1. Teacher response rates.

Cruise season and year	# of eligible teachers	# of respondents (to at least one survey)	# of useable surveys ²	Overall response rate
Spring 1996	56	56	56	
Fall 1996	15 ¹	11	10	
Spring 1997	35 ¹	18	10	
Totals	106	85	76	71.6%

¹# of Eligible Teachers = Only fourth grade teachers new to GLEP were eligible to receive surveys

²# of Useable Surveys = Only those responding to both surveys were included in the analysis



Table 5-2. Volunteer cruise leader response rates.

Cruise season and year	# of eligible cruise leaders¹	# respondents (to at least one survey)	# of useable surveys²	Final response rate
Spring 1996	23	23	18	
Spring 1997	17	17	13	
Totals	40	40	31	77.5%

¹# of Eligible Cruise Leaders = Only volunteers new to the GLEP were eligible to receive surveys

²# of Useable Surveys = Only those responding to both the surveys were included in the analysis

Analysis of Potential Non-response Bias

Achieving a high response rate is the best way to reduce the effects of non-response bias (Fisher 1996: 123). While a significant number of educators did participate in the evaluation (I achieved a response rate greater than or equal to 71.0% from both teachers and volunteer cruise leaders), it is important to know whether those educators in my research who did not respond differ greatly from those who did respond. Dillman indicates that the extent of differences between respondents and non-respondents can seldom be determined. However, indirect methods can be used and inferences drawn to check for differences (Dillman 1978).

Addressing Teacher Non-response Bias

Non-response from this study came largely from teachers who were asked to complete and return both of their surveys via mail. Of the 106 teachers who were surveyed, 50 fall 1996 and spring 1997 teachers were asked to respond to both the pre-cruise and the post-cruise surveys via mail, with 20 responding to both surveys (Table 5-1). However, nine teachers classified officially as non-respondents responded to survey

one (these teachers were not included in the final analysis). When comparing the results of the teacher surveys, I found no differences in the results between the nine non-respondents and the 76 respondents. These nine teachers showed a similar demographic profile and indicated the same level of knowledge of Great Lakes topics. Four of the nine non-respondents had participated in the past; five were first time participants. One of the nine non-respondents was a fall 1996 participant. The other eight participated in spring 1997. In summary, it appears that their non-response arose from either a lower interest or commitment to the GLEP, or simply a lack of interest in responding to a mail survey, which Steeh (1981) found to be a growing general trend among all types of mail surveys since 1950.

Addressing Volunteer Cruise Leader Non-response Bias

Volunteer cruise leaders were surveyed via mail; a larger percentage of volunteers (rather than teachers) responded by this method. The nine volunteer cruise leaders who did not respond to the second survey did, however, respond to the first survey. As a result, I was able to look for differences between based on their responses to the first survey.

There was one difference in non-respondents and respondents in terms of demographic variables; their participation in Great Lakes extracurricular activities/hobbies. Only one of the nine respondents indicated that they participate in extracurricular activities related to the Great Lakes, while more than half (51.7%) of respondents indicated that he/she participates in Great Lakes extracurricular activities. Otherwise, there were no

notable differences on the basis of gender, number of children, employment, and level of education. I assumed that this would mean a lower level of self-assessed knowledge of Great Lakes topics from non-respondents, but I found this not to be the case.

However, other differences are worth noting. Of the nine non-respondents, only one had volunteered for the GLEP in the past (which means that eight of the nine non-respondents were first time volunteers). These non-respondents also indicated lower levels of involvement in other volunteer organizations. Four listed that the GLEP was their first experience as a volunteer, two indicated involvement with one other organization, and three indicated involvement in two, three or more other organizations. Conversely, over one-third of respondents (36.7%) indicated that they volunteer for one other organization, and close to half of respondents (43.3%) volunteer for two, three or more other organizations. In summary, it appears that the nine non-responding volunteers had a lower level of interest in and commitment to volunteering with the GLEP.

Analysis of Potential Response Bias Due to Survey Methodologies

The use of the three data collection systems used in this evaluation – in-person, mail, and telephone – assumes that each method produces equivalent responses (Table 5-3). Various methodologies may, in fact, be beneficial. Dillman (1978) notes that sole reliance on one method or another for a specific survey may hinder response rates and that various methods may compensate for the inadequacies of the others. Use of various data collection methodologies may increase response rates and overcome inadequacies, but it is

Table 5-3. Number of useable surveys by the three survey administration methods.

Teachers				
Season	Survey	# of respondents to each method of data collection		
		Mail	In-person	Phone
Spring 1996	survey 1		56	
	survey 2		56	
Fall 1996	survey 1	10		
	survey 2	10		
Spring 1997	survey 1	10		
	survey 2	10		
Volunteer Cruise Leaders				
Season	Survey	# of respondents to each method of data collection		
		Mail	In-person	Phone
Spring 1996	survey 1		18	
	survey 2	7		11
Spring 1997	survey 1		13	
	survey 2	13		

possible that responses were biased by method. Dillman (1978) reports that past research, including his own, suggests that differences in the quality of responses obtained by mail, telephone, and face-to-face methods are rather minor. For example, based on an example of an experiment comparing the responses via face-to-face and telephone interviews, Rogers concluded that, "the quality of data obtained by telephone on complex attitudinal and knowledge items as well as on personal items is comparable to that collected in person" (Rogers 1972 in Dillman 1978).

With the GLEP evaluation, I found little evidence that would suggest that methodologies produced biased responses among evaluation participants. The surveys used for the in-person, mail, and telephone surveys were the same with the exception of some word changes on the surveys to ease reading and transition for the telephone surveyor. The telephone surveyor reported no instances of confusion or misunderstanding from participants from the survey questions read. Additionally, I received no questions during the in-person survey administration that would lead me to believe that participants would struggle to complete their mail survey. Evidence exists which supports this; none of the mail surveys were returned with questions in the margins. Additionally, I did not receive any telephone calls about the survey and its clarity (three phone numbers were included on the survey to meet this need). Pre-testing and editing of the surveys by reviewers likely aided in providing clear survey instruments. In conclusion, I did not find differences in the responses based on the data-gathering method used.

GLEP Educator Background

Teachers' Background

Seventy to 95% of GLEP teachers surveyed in the 1996 and 1997 cruise seasons are females. Most have 14 to 20 years of teaching experience and at least some graduate level education (Table 5-4).

Table 5-4. Teacher background, experience and demographic information.

Cruise season and year	# of respondents	% female	Years teaching experience mean (SD)¹	Age mean (SD)¹	% w/ Education > B.A. degree
Spring 1996	56	95	15.0 (1.30)	46 (1.18)	90.3
Fall 1996	10	70	19.9 (11.0)	47 (7.35)	100.0
Spring 1997	10	80	14.1 (8.81)	39 (9.93)	100.0

¹SD=standard deviation

Michigan elementary classrooms (K-5) are self-contained (students stay with the same teacher for all subjects). Therefore, to the question “what subjects do you currently teach?” GLEP teachers responded “most or all subjects,” which include: math, spelling, reading, social studies, writing, science, drama, English, computers, and handwriting. Of the 76 teachers who responded to the 1996 and 1997 GLEP surveys, only 21.6% majored in a science (e.g., botany, biology, chemistry) in college. Other college majors listed include education (37.8%), social studies (37.8%), English (25.7%), language arts (14.9%), foreign language (5.4%), or another major (40.5%), including electronics, art, psychology, special education, and computers (Appendix G). (Note that percents will not add to 100% due to multiple responses by individual teachers).

Many professional teaching organizations exist, some of which provide teacher development opportunities through conferences and membership services. Fifty-six percent of GLEP teachers surveyed indicate that they belong to one or more professional teaching organization, environmental organizations, or other organizations. Of these respondents who belong to one or more of these organizations, 66.7% belong to teaching

organizations, specifically. One-fifth (18.4%) of teachers list membership in the Michigan Education Association (MEA). Other responses include: the National Education Association (NEA), Michigan Science Teachers Association (MSTA), teaching sororities, and the Macomb Reading Council. Teachers (27.8%) also list membership in environmental organizations including: the National Geographic Society, National Wildlife Federation, the Arbor Day Foundation, and World Wildlife Fund (Appendix H).

Volunteer Cruise Leaders' Background

Volunteer cruise leaders are predominately female (Table 5-5). In spring 1997, the percentage of females decreased, since several male Master Gardener participants volunteered with the GLEP. The mean age of volunteers is about 43 - 44 years of age. Approximately one-third of GLEP volunteer cruise leaders surveyed are high school or college students, and approximately one-fifth of volunteers surveyed are retired.

Most volunteer cruise leaders surveyed (69.2%) are currently employed outside the home. Nearly as many have children (67.7%). Twenty percent of volunteers with children report that their child(ren) have participated or would be participating with the GLEP as a student during their fourth grade school year. For 20% of the volunteer cruise leaders, the GLEP was their first volunteer experience. More than one-third (36.7%) of GLEP cruise leaders volunteer for at least one other organization.

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Table 5-5. Volunteer cruise leader background, experience and demographic information.

Cruise season and year	# of respondents	% female	Age mean (SD) ¹	% in high school or college	% w/ Education > B.A. degree	% retired
Spring 1996	18	77.8	44 (16.93)	38.9	27.9	22.2
Spring 1997	13	53.8	43 (15.59)	30.8	30.8	15.4

¹SD=standard deviation

Recruitment, Retention, and Training of Educators

Educators' Past Participation in the GLEP

According to the GLEP co-directors, teachers participate consistently either in the spring or in the fall cruises from year to year. The research showed that over half of GLEP teachers surveyed have been involved with the program in past years (Table 5-6). Only new spring 1997 teachers (n=35) were surveyed. The remaining 42 teachers were "veteran" teachers (they had participated in past seasons).

Table 5-6. Percent of total GLEP educators by season who participated with the GLEP in the past.

Cruise season and year	% and (SE) ¹ of GLEP teachers who were veterans ² in each research season	% and (SE) ¹ of GLEP volunteers who were veterans ² in each research season
Spring 1996	62.5 (5.5)	26.0 (7.8)
Fall 1996	60.0 (5.6)	87.5 (5.9)
Spring 1997	54.5 (5.7)	23.5 (7.6)

¹SE=standard error²Veteran means a past participant

In contrast to teachers' repeat participation in the GLEP, volunteers' year-to-year participation in the GLEP is inconsistent (Figure 5-1). In spring 1996, six volunteers indicated that they had participated with the program before, while seventeen were first-time participants. Following the spring 1996 season, fourteen volunteers discontinued their participation with the GLEP. However, seven of the spring 1996 volunteer cruise leaders continued into the fall 1996; the GLEP had only one new volunteer that season, for a total of eight active fall 1996 volunteer cruise leaders. Four of these eight active volunteered again in the spring 1997; the other four did not. Thirteen new volunteers were recruited in spring 1997.

Advertising and Recruiting Strategies To Attract GLEP Educators

The GLEP utilizes a number of advertising and recruiting strategies to make educators aware of the program (Table 5-7). While mailings helped to make 15.8% of

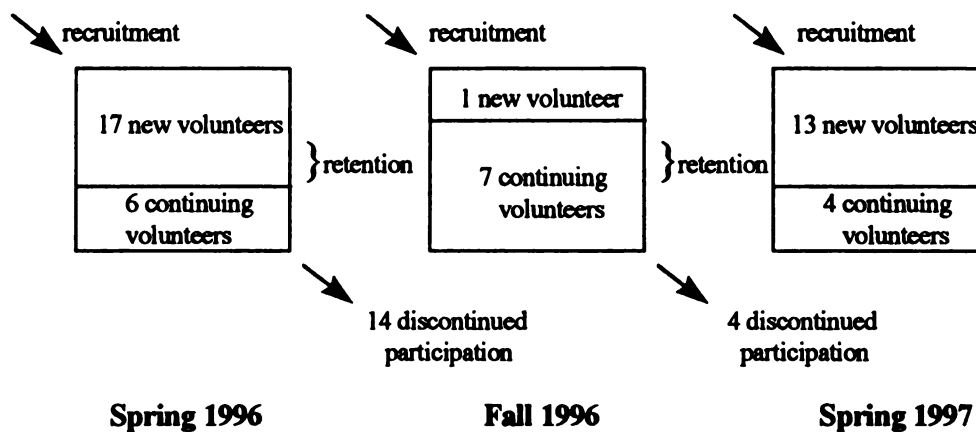


Figure 5-1. GLEP Volunteer Recruitment and Retention, 1996-1997.

teachers aware of the program, almost half (48.7%) of teachers surveyed indicated that they learned of the GLEP via personal communications (word-of-mouth) from other teachers or coworkers. GLEP teachers indicated that staff members (13.2%) and their school principal (11.8%) also helped them become aware of the program. Many volunteer cruise leaders (35.5%) checked the "other" category to indicate how they heard about the program. Recruiting through the Master Gardener or through 4-H programs in spring 1997 accounted for a majority of these responses (Table 5-7).

Table 5-7. How teachers and volunteer cruise leaders became aware of the GLEP.

Method	% (SE) ¹ of teachers responding ² (n=76)	% (SE) ¹ of volunteers responding ² (n=31)
Mail flyer	15.8 (4.1)	N/A
Newspaper advertisement	0 (-)	16.1 (6.6)
Newspaper article	0 (-)	16.1 (6.6)
Radio public service announcement	0 (-)	6.5 (4.4)
GLEP teacher, coworker	48.7 (5.7)	N/A
GLEP staff member	13.2 (3.8)	12.9 (6.0)
Principal	11.8 (3.7)	N/A
GLEP cruise leader	2.6 (1.8)	6.5 (4.4)
Parent of a student	2.6 (1.8)	N/A
Don't remember	7.9 (3.0)	3.2 (3.1)
Intermediate School District (ISD) workshop	5.3 (2.5)	0 (-)
Other workshop	2.6 (1.8)	3.2 (3.1)
Community service club	1.3 (1.3)	6.5 (4.4)
Other	1.3 (1.3)	35.5 (8.5)

¹SE=standard error

²1996 and 1997 pooled data. Percent will not sum to 100% because of multiple responses.



Influencing Other Teachers to Participate in the Program

Analysis shows that the majority of teachers (73.7%) indicate that "more funding" would encourage other teachers to participate in the GLEP (Table 5-8). Almost one-third of teachers (32.9%) surveyed indicated that more inservice classes would influence other teachers to participate, and one-third indicated that better access to teaching resources would influence them to participate in the GLEP. "Other" responses include: more advertising (n=3), more information on when to sign up for the program (n=1), and more information about pre-trip and post-trip activities (n=1).

Educators' Use of GLEP Training Materials

Both teachers (86.8%) and cruise leader volunteers (73.3%) indicated that they used the GLEP information packets that accompanied their trainings. While use of the information packets was high, the majority of GLEP teachers (77.6%) did not use a GLEP video training tape, which supplements their training. These videos became available to

Table 5-8. Situations that GLEP teachers indicated would influence other teachers to participate with the GLEP.

Situations	% (SE) ¹ of teachers responding (n=76) ²
More funding	73.7 (5.0)
More inservice classes on topic	32.9 (5.3)
Better access to resources	27.6 (5.1)
More support from administration	13.2 (3.8)
Other	6.6 (2.8)

¹SE=standard error

²Percent will not sum to 100% because of multiple responses. 1996 and 1997 pooled data

GLEP teachers in spring 1997. Teachers listed reasons for not using videos such as: did not know about the tapes, forgot to watch the tapes, no time to watch the tapes, and not interested in viewing tapes.

Approximately one-third of volunteer cruise leaders indicated that their training was very good in all areas (Table 5-9). Close to one-half (45.2%) indicated that training was very good in increasing their knowledge about the Great Lakes. Additionally, nearly one-half (45.2%) of volunteer cruise leaders indicated that training was excellent in increasing their interest in Great Lakes issues. However, nearly 15% felt training was either fair or poor in improving their ability to work effectively with teachers and parents. Eighteen volunteer cruise leaders (60%) used the training video. The remaining 40% indicated that they did not know the tapes were available.

Table 5-9. Volunteer cruise leaders' perceptions of training.

Impact ²	Training was poor in this area.	Training was fair in this area.	Training was good in this area.	Training was very good in this area.	Training was excellent in this area.
% (SE) ¹ of volunteers					
Increasing your knowledge about the Great Lakes.	0 (-)	0 (-)	22.6 (7.5)	45.2 (8.9)	32.3 (8.4)
Improving your confidence in teaching Great Lakes issues to students.	0 (-)	9.7 (5.3)	32.3 (8.4)	32.3 (8.4)	25.8 (7.8)
Improving your ability to work effectively with teachers and parents.	3.2 (3.1)	12.9 (6.0)	32.3 (8.4)	38.7 (8.7)	12.9 (6.0)
Improving your ability to teach cruise stations.	0 (-)	6.5 (4.4)	25.8 (7.8)	32.3 (8.4)	35.5 (8.5)
Increasing your interest in Great Lakes issues.	3.2 (3.1)	3.2 (3.1)	12.9 (6.0)	35.5 (8.5)	45.2 (8.9)

¹SE=standard error²Percent will not sum to 100% because of multiple responses. 1996 and 1997 pooled data.

GLEP Educators' Experiences, Knowledge, and Comfort in Teaching about the Great Lakes

Educators' Outdoor Activities Related to the Great Lakes

With some exception, the majority of GLEP teachers and volunteers have had experiences with outdoor activities (Table 5-10). Nearly all educators surveyed have been boating, while fewer educators, especially volunteers, read or subscribe to magazines or books about water, oceans or Great Lakes (13.3%). Additionally, nearly half of volunteers leaders watch nature programs (45.2%) or have some diving or snorkeling experience (48.4%).

Table 5-10. Teachers' and volunteer cruise leaders' experiences with outdoor activities.

Have you ever gone...	% and (SE)¹ of teachers responding (n=76)²	% and (SE)¹ of volunteers responding (n=31)²
Boating?	97.4 (1.8)	100.0 (-)
Fishing?	90.8 (3.3)	90.3 (5.3)
Fishing on one of the Great Lakes?	65.8 (5.4)	60.0 (8.8)
Camping?	60.8 (5.6)	100.0 (-)
Diving or snorkeling?	52.6 (5.7)	48.4 (8.9)
Do you...	% and (SE)¹ of teachers responding (n=76)	% and (SE)¹ of volunteers responding (n=31)
Watch nature programs on TV about water, oceans or Great Lakes?	88.2 (3.7)	45.2 (8.9)
Subscribe to or read magazines or books about water, oceans or Great Lakes?	55.3 (5.7)	13.3 (6.1)

¹SE=standard error²1996 and 1997 pooled data.*Educators' Questions Prior to GLEP Training*Teachers' Pre-GLEP Questions

Participating GLEP teachers had many questions about the program prior to their orientation and training (Table 5-11). Nearly one-third of teachers (32.8%) indicated that they were interested in learning about the activities on their cruise date or obtaining an outline of plans for the cruise during the GLEP orientation and training sessions. More than one-fifth of teachers (24.1%) indicated questions about the program, such as how to prepare for the cruise, or the most appropriate post-cruise activities. These teachers were

Table 5-11. Teacher and volunteer cruise leader questions about participating with the GLEP prior to orientation and training.

Question listed regarding...	% and (SE) ¹ of teachers responding ² (n=59)	% and (SE) ¹ of volunteers responding ² (n=18)
Day's activities, plans for the day of the cruise	32.8 (6.1)	0 (-)
Preparation/follow-up for cruise or program/understanding specifics of program	24.1 (5.5)	16.7 (8.7)
Great Lakes issues, water quality, learning about water	22.4 (5.4)	33.3 (11.1)
Teacher's role/responsibilities	20.7 (5.2)	N/A
Parents' role	10.3 (3.9)	N/A
Safety aboard the boat	3.4 (2.3)	N/A
Teaching techniques, being an effective teacher	0 (-)	44.4 (11.7)

¹SE=standard error

²1996 and 1997 pooled data. Percent will not total to 100% due to multiple responses. Qualitative data from responses to open-ended questions.

interested in learning the details of how the program is operated and their role with the program. In fact, one-fifth of teachers (20.7%) had questions about their responsibilities for teaching while on the cruise; several teachers indicated questions such as "what is my role during the field trip – very specific tasks explained." Teachers (22.4%) also had questions regarding the Great Lakes and environmental quality, such as "What is the state doing to clean-up the river and lake?," "What is the status of the Clinton River's health?," and "Does dirty water mean that it is polluted?"

Volunteer Cruise Leaders' Pre-GLEP Questions

Nearly half of the volunteer cruise leaders (44.4%) responded that they are interested in learning effective teaching techniques or skills that would make them better volunteer educators (Table 5-11). Questions such as “what do I need to learn as a leader to be more effective, and what scientific information do I need to use” and “how do I gain a thorough understanding of all tests and the meaning of the results so this can be most accurately conveyed to the children and their teachers” were common survey responses. Similar to the teachers, many volunteer cruise leaders (33.3%) had questions about Great Lakes issues and water quality. Nearly one-fifth (16.7%) wanted to know specific details about the GLEP organization.

Educators' Concerns Prior to GLEP Training

In addition to questions about the GLEP, some educators listed concerns about participating with the GLEP. While many educators indicated that they had “no concerns” prior to their participation (33.9% of teachers; 22.2% of volunteer cruise leaders), others listed concerns such as expense, safety and weather (Table 5-12).

Nearly one-fifth of teachers listed the program expense as a concern (16.9%); some teachers simply stated “increasing cost” on their survey. Safety aboard the boat, such as concern about the availability of life jackets, was also listed by almost one-fifth of teachers (16.9%).

Almost one-third (33.3%) of volunteers indicated concerns about doing an accurate, complete job as instructors aboard the vessel. Nearly one-fifth (16.7%) of

Table 5-12. Teacher and volunteer cruise leader concerns about participating with the GLEP prior to orientation and training.

Concern listed regarding...	% and (SE) ¹ of teachers responding ² (n=58)	% and (SE) ¹ of volunteers responding ² (n=18)
No concerns	33.9 (6.2)	22.2 (9.8)
Expense	16.9 (4.9)	N/A
Safety	16.9 (4.9)	5.6 (5.4)
Weather	11.9 (4.2)	0 (-)
Role of teacher	8.5 (3.6)	N/A
Communications with GLEP personnel	3.4 (2.3)	0 (-)
Time	0 (-)	16.7 (8.7)
Doing an accurate teaching job	0 (-)	33.3 (11.1)
Other	42.4 (6.4)	16.1(8.6)

¹ SE=standard error

² 1996 and 1997 pooled data. Qualitative data from responses to open-ended question.

volunteers listed a lack of time, or a concern about the time commitment with the program (Table 5-12).

Educators' Self-Assessed Knowledge of Great Lakes Topics Prior to GLEP Training

Teachers' Knowledge

More than 61.0% of teachers surveyed indicated that they were unaware, aware, or had some knowledge of the following topics, but that their knowledge was inadequate for teaching: carbon dioxide (61.6%), geography of Lake Huron (62.7%), plankton (63.2%), navigation (71.1%), pH levels (72.3%), cultural aspects of the Great Lakes (76.3%), calcium in water (77.6%), and dissolved oxygen (80.2%) (Table 5-13).

Table 5-13. Teacher self-assessed knowledge of topics before training.

Unaware of this topic or its meaning	Aware of this topic or its meaning	Have some knowledge of topic, but inadequate for teaching	Have adequate knowledge for teaching topic	Have above average knowledge for teaching topic	Topic ²
% and (SE) ¹					
63.2	(5.5)	36.8	(5.5)		Plankton (zooplankton, phytoplankton)
40.0	(5.6)	60.0	(5.6)		Wetlands
43.4	(5.6)	56.6	(5.6)		Aquatic food webs
44.6	(5.7)	55.4	(5.7)		Influence of aquatic environments on humans
86.8	(3.8)	11.8	(3.7)		Fisheries
45.3	(5.7)	54.7	(5.7)		Aquatic animals
59.5	(5.6)	40.6	(5.6)		Aquatic plants
77.6	(4.7)	22.3	(4.7)		Calcium in water (hardness, softness)
31.5	(5.3)	68.4	(5.3)		Water pollution
61.6	(5.5)	38.3	(5.5)		Carbon dioxide (CO ₂)
11.8	(3.7)	86.9	(3.8)		The water cycle
71.1	(5.2)	28.9	(5.2)		Navigation - using maps and charts
62.7	(5.5)	42.1	(5.6)		Geography of Lake Huron
57.9	(5.6)	42.1	(5.6)		Geography of Lake St. Clair
92.1	(3.0)	7.9	(3.0)		Shipboard knot-tying (marlinspike)
76.3	(4.8)	23.6	(4.8)		Cultural aspects of the Great Lakes (i.e. shipwrecks, folk music)
80.2	(4.5)	19.7	(4.5)		Dissolved oxygen (DO)
72.3	(5.1)	27.7	(5.1)		pH levels

¹SE=standard error²Pooled 1996 and 1997 data for all topics.

Teachers indicated that their awareness and knowledge was weakest in teaching fisheries (86.8%) and shipboard-knot tying (92.1%). Teachers appeared to have the greatest knowledge of wetlands (60.0%), water pollution (68.4%), and the water cycle (86.9%) before GLEP training, with 60% or more of the teachers surveyed indicating adequate or above average knowledge for teaching these three topics.

Volunteer Cruise Leaders' Knowledge

No more than 25% of volunteer cruise leaders indicated before his/her training that they have adequate or above average knowledge for teaching any GLEP topics (Table 5-14). Nearly 75% of volunteers indicated that they were unaware, aware, or had knowledge of a topic, but that their knowledge was inadequate for teaching all topics listed. More than 85% of volunteers indicated that they were unaware, aware, or had some knowledge of aquatic plants (83.3%), cultural aspects of the Great Lakes (87.2%), or fisheries (96.7%),.

Educators' Post-Cruise Comfort with Teaching Great Lakes Topics

Teachers' Comfort in Teaching

Both new GLEP teachers and veteran teachers learn several stations so they can assist during the cruise. New GLEP teachers learn about the "Beat the Teacher" Game learning station, as well as the pH/water color/water clarity station. Veteran GLEP teachers learn the dissolved oxygen test and navigation stations. Following their training,



many (86.8%) of the teachers indicated that they are somewhat comfortable or comfortable teaching the "Beat the Teacher" Game station. More than half indicate that they are comfortable teaching bottom sampling (53.9%), and pH/water clarity/water color testing (68.4%). More than one-fourth (28.9%) were somewhat comfortable to comfortable with teaching calcium hardness, while one-fourth indicated that they were not comfortable to somewhat uncomfortable teaching calcium hardness (however, over one-third (38.2%) did not teach this station). Well over one-third (40.8%) of teachers indicated that they were uncomfortable or somewhat uncomfortable teaching shipboard knot-tying (Table 5-15).



Table 5-14. Volunteer knowledge about Great Lakes topics before the cruise.

Unaware of this topic or its meaning	Aware of this topic or its meaning	Have some knowledge of topic, but inadequate for teaching	Have adequate knowledge for teaching topic	Have above average knowledge for teaching topic	Topic ²
% and (SE) ¹					
80.6	(7.1)	19.4	(7.1)		Plankton (zooplankton, phytoplankton)
83.8	(6.6)	16.1	(6.6)		Wetlands
83.9	(6.6)	16.1	(6.6)		Aquatic food webs
80.6	(7.1)	19.3	(7.0)		Influence of aquatic environments on humans
96.7	(3.2)	3.2	(3.1)		Fisheries
83.3	(6.7)	16.7	(6.8)		Aquatic animals n=30
87.1	(6.0)	12.9	(6.0)		Aquatic plants
83.3	(6.8)	16.7	(6.7)		Calcium in water (hardness, softness) n=30
74.2	(7.8)	25.9	(7.8)		Water pollution
74.2	(7.8)	25.8	(7.8)		Carbon dioxide (CO ₂)
80.7	(7.0)	19.3	(7.0)		The water cycle
74.1	(7.8)	25.9	(7.8)		Navigation - using maps and charts
77.4	(7.5)	22.6	(7.5)		Geography of Lake Huron
77.4	(7.5)	22.6	(7.5)		Geography of Lake St. Clair
74.2	(7.8)	25.8	(7.8)		Shipboard knot-tying (marlinspike)
87.2	(6.0)	12.9	(6.0)		Cultural aspects of the Great Lakes (i.e. shipwrecks, folk music)
83.9	(6.6)	16.1	(6.6)		Dissolved oxygen (DO)
80.7	(7.0)	19.3	(7.0)		pH levels

¹SE=standard error²Pooled 1996 and 1997 data for all topics.

Table 5-15. Teachers' post-cruise comfort levels with teaching the GLEP stations.

I did not teach this station	I am not comfortable teaching this station	I am somewhat uncomfortable teaching this station	I am somewhat comfortable teaching this station	I am comfortable teaching this station	Stations
% and (SE) ¹ of teachers					
38.2	26.3	(5.2)	28.9	(5.3)	Calcium hardness n=71
27.6	25.0	(5.1)	42.1	(5.0)	Dissolved oxygen (DO) test n=72
30.3	40.8	(5.7)	25.0	(5.8)	Shipboard knot tying (marlinspike) n=73
26.3	26.8	(5.2)	42.1	(5.8)	Navigation - using maps and charts n=72
25.0	25.0	(5.0)	46.0	(5.8)	Plankton net sampling n=73
31.6	19.7	(4.7)	42.1	(5.8)	Weather observation/water sample collection/carbon dioxide n=71
6.6	2.6	(1.8)	86.8	(3.9)	Beat the teacher n=73
13.2	13.1	(3.9)	68.4	(5.4)	pH test/water clarity/water color n=72
26.3	14.5	(4.0)	53.9	(5.7)	Bottom sampling n=76

¹SE=standard errorVolunteer Cruise Leaders' Comfort in Teaching

With two exceptions, more than one-half of volunteer cruise leaders indicated that they are comfortable teaching each station following the training and cruise season (Table 5-16). Less than half of the volunteers indicated that they were somewhat comfortable to comfortable teaching calcium hardness (46.6%) and pH/water clarity/water color (29.0). However, more than half of volunteers in these two categories did not teach these stations.

Table 5-16. Volunteers' post-cruise comfort levels with teaching the GLEP stations.

I did not teach this station	I am not comfortable teaching this station	I am somewhat uncomfortable teaching this station	I am somewhat comfortable teaching this station	I am comfortable teaching this station	Stations
% and (SE) ¹					
46.7	6.7 (4.5)		46.6 (9.1)		Calcium hardness n=30
25.8	13.0 (6.0)		61.2 (8.7)		Dissolved oxygen (DO) test
22.6	9.7 (5.3)		67.8 (8.3)		Shipboard knot tying (marlinspike)
19.4	3.2 (3.1)		77.4 (7.5)		Navigation - using maps and charts
22.6	3.2 (3.1)		74.2 (7.8)		Plankton net sampling
29.0	12.9 (6.0)		58.1 (8.8)		Weather observation/water sample collection/carbon dioxide
64.5	6.5 (4.4)		29.0 (8.1)		pH test/water clarity/water color
25.8	6.5 (4.4)		67.7 (8.4)		Bottom sampling

¹SE=standard error

GLEP Educators' Program Participation and Perceptions

Lessons Taught Pre-cruise and Intentions to Teach Post-cruise

During the spring cruise seasons, a large percentage of teachers (average of 95.5% for both seasons) indicated that they teach Great Lakes topics in the classroom prior to their cruise (Table 5-17). Post-cruise teaching intentions in spring were lower than pre-cruise teaching rates. Teachers indicated (by written responses) that this is due to time constraints at the end of the school year.

These percentages 'reversed' with the fall 1996 teachers. More of the fall 1996 teachers than spring 1996 teachers intended to teach post-cruise activities. Several fall

Table 5-17. Percent of GLEP teachers who taught about Great Lakes topics pre-cruise and post-cruise.

Cruise season and year	% and (SE)¹ of teacher who teach pre-cruise topics	% and (SE)¹ of teachers who teach post-cruise topics
Spring 1996	91.1 (3.2)	82.1 (4.4)
Fall 1996	70.0 (5.2)	90.0 (3.4)
Spring 1997 ²	100.0 (-)	80.0 (4.5)

¹SE=standard error

²I surveyed only the new teachers who had not completed a survey during or before spring 1996.

1996 teachers listed time constraints during the beginning of the school year prior to their cruise as reasons why they did not teach pre-cruise activities. More than three-fourths (76.3%) of teachers said they taught pre-cruise activities and intended to teach post-cruise activities.

Teaching Topics and Sources: Pre-cruise and Post-cruise

What topics are taught before and after the GLEP cruise? Nearly half (48.5%) of the teachers who teach pre-cruise activities listed water-related topics (Table 5-18). However, following the cruise, 25.0% of teachers reviewed pre-cruise activities or conducted review activities, such as analyzing results of their water samples taken during the cruise.



Table 5-18. Topics taught pre-cruise and intentions to teach post-cruise topics.

Topic	% and (SE) ¹ of teachers who taught pre-cruise activities (n=68) ⁴	% and (SE) ¹ of teachers who intended to teach post-cruise activities (n=64) ⁴
Water ²	48.5 (6.0)	13.2 (4.2)
Food web or food chain	14.7 (4.2)	4.0 (2.4)
Michigan history or geology	10.2 (3.6)	3.0 (2.1)
Exotic species	5.0 (2.6)	4.0 (2.4)
Not sure yet	N/A	11.7 (4.0)
Review ³	N/A	25.0 (5.4)
Other	10.2 (3.6)	11.7 (4.0)

¹SE=standard error

²Watersheds, wetlands, lakes, rivers, streams, water cycle, water flow.

³Continue aquatic testing from specific cruise activities (bottom dredging, water samples).

⁴1996 and 1997 pooled data. Qualitative data from responses to open-ended questions. Percent will not sum to 100% because of multiple responses and because some teachers did not report specific topics they teach or intend to teach.

Teachers indicated that they use a variety of sources -- textbooks, curricula, materials -- to teach GLEP topics before and after their cruise (Table 5-19). Over one-third (36.7%) of GLEP teachers indicate that they use the GLEP pre-field learning activities before their cruise. This declines to 16.1% after the cruise. Nearly one-fifth (17.6%) use textbooks while fewer than 12% use Project WET, Project WILD, Paddle-to-the-Sea, DNR materials or their own teaching materials in the pre-cruise and post-cruise segments.

Table 5-19. Sources GLEP teachers used when teaching about Great Lakes topics pre-cruise and post-cruise.

Sources	% (SE) ¹ of teachers who use these pre-cruise teaching sources ⁴	% (SE) ¹ of teachers who use these post-cruise teaching sources ⁴
GLEP curriculum ²	36.7 (5.5)	16.1 (4.2)
Books ³	17.6 (4.3)	7.0 (2.9)
Project WET and/or Project WILD curriculums	11.7 (3.6)	4.0 (2.2)
Paddle to the Sea curriculum	8.0 (3.1)	0 (-)
Teachers' personal materials	5.0 (2.5)	2.0 (1.6)
Department of Natural Resources (DNR) materials	2.0 (1.6)	0 (-)

¹SE=standard error

²Specific aspects of the GLEP pre-field activities were not indicated.

³Science, social studies, Michigan studies text and/or reference books.

⁴1996 and 1997 pooled data. Qualitative data from responses to open-ended questions. Percent will not sum to 100% because of multiple responses and because some teachers did not report specific topics they teach or intend to teach.

Educators' Perceptions of the GLEP

Teachers and volunteer cruise leaders enjoyed the program (Table 5-20). Nearly one-third of teachers (28.9%) indicated in their responses that they “enjoyed the whole program.” Over one-fourth of teachers (26.3%) appreciated that the cruise offered a hands-on opportunity for their students. Almost one-fifth of teachers (18.4%) mentioned that they like a specific cruise learning station activity, such as plankton net bottom sampling or boat navigation.

More than half of the cruise leader volunteers (63.3%) indicated that they enjoyed working with the parents, students and teachers (Table 5-20). Over ten percent (13.3%) enjoyed working outside on the lake or aboard the boat, and 13.3% liked the whole program. Nearly one-fifth (17.2%) listed a response categorized under “other” reasons that they enjoyed the program, such as, “very comfortable atmosphere” and “student/parent reactions.”

Table 5-20. Aspects of the GLEP educators enjoyed the most.

Categories of responses listed	% (SE) ¹ of teachers responding ² (n=71)	% (SE) ¹ of volunteers responding ² (n=30)
Like all of it; enjoyed whole program	28.9 (5.3)	13.3 (6.2)
Hands-on experience for children	26.3 (5.2)	0 (-)
(Specific cruise activity mentioned)	18.4 (4.6)	0 (-)
Instructors/instruction good	13.2 (4.0)	N/A
Learning about Great Lakes or water	0 (-)	3.3 (3.2)
Liked working with students, parents, teachers	N/A	63.3 (8.8)
Working outside on boat or lake	0 (-)	13.3 (6.2)
Other	26.3 (5.2)	17.2 (6.8)

¹SE=standard error

²1996 and 1997 pooled data. Qualitative data from responses to open-ended questions. Percent will not sum to 100% because of multiple responses.

Educators also listed aspects of the program they least enjoyed (Table 5-21).

Nearly one-fifth of teachers (17.1%) disliked the weather conditions the day of their cruise (i.e., foggy, cold, rainy). Over one-third of teachers (36.8%) listed comments categorized under “other” such as, “I got sea sick,” “the speaker system was terrible” and, “the teacher orientation seemed like a waste of time.”

Over one-fourth (26.1%) of volunteer cruise leaders indicated that they disliked the weather. Over one-fourth (26.1%) also indicated that they felt unprepared to teach the cruise activities, listing comments such as “not knowing enough.” Few (8.7%) mentioned that they disliked the time commitment involved with volunteering.

Table 5-21. Aspects of the GLEP educators enjoyed the least.

Categories of responses listed	% (SE)¹ of teachers responding (n=62)²	% (SE)¹ of volunteers responding (n=22)²
Weather	17.1 (4.7)	26.1 (9.3)
Expense	6.6 (3.1)	N/A
Did not like “Beat the Teacher” station	6.6 (3.1)	N/A
Lack of organization or communication from GLEP	5.3 (2.8)	0 (-)
Instruction/instructors poor in some regard	2.6 (2.0)	0 (-)
Safety	2.6 (2.0)	0 (-)
Other	36.8 (6.1)	8.7 (6.0)
Felt unprepared to teach	0 (-)	26.1 (9.3)
Long days/time commitment	0 (-)	8.7 (6.0)

¹SE=standard error

²1996 and 1997 pooled data. Qualitative data from responses to open-ended questions. Percent will not sum to 100% because of multiple responses.

GLEP Educators' Future Participation

The majority of teachers (86.8%) surveyed indicated that they would be interested in participating with the GLEP during another season. Teachers' reasons for continuing their participation include: "The students loved it and they learned a lot" and "ties in with Michigan studies and offers excellent science opportunities."

However, nine teachers from cruise seasons I surveyed said they would not participate with the GLEP in the future (six from spring 1996, two from fall 1996, and one from spring 1997). Their reasons include: "The price was too expensive and Michigan weather too unpredictable;" and "I only do Michigan theme on alternating years" (Appendix I). Volunteer cruise leaders surveyed also indicated that they would be interested in continuing their participation with the GLEP (87.0%). Two people (6.5%) indicated they *possibly* would be interested in serving as a volunteer cruise leader during another season. Another two people (6.5%) – both from the spring 1996 cruise season – indicated that they would not be interested in continuing with the program because: "I am going to college in the fall so I will not be in the area" and "I cannot. My wife is pregnant."

Teachers Who Do Not Intend to Participate in Future

This research shows that once teachers participate with the GLEP, they keep coming back and they plan to keep doing so. Over 90% of the 76 teachers surveyed indicated that they would be interested in participating again. Furthermore, over 60% of teachers surveyed during the spring and fall 1996 seasons had participated in previous

seasons. But what about the nearly 10% of teachers (n=9) surveyed in spring 1996, fall 1996, and spring 1997 who indicated that they would not participate in the GLEP again? I separated the results of their surveys to look for common characteristics among these nine teachers that might suggest reasons for their non-participation in the future.

While I assumed that there would be obvious differences between these nine teachers and the 69 other teachers who said they would continue their participation with the GLEP, overall I found many similarities between the two groups. Each of the nine teachers (all females) had between 5 and 31 years of teaching experience (the total group had between 14 to almost 20 years of experience). Three of the nine earned a science major in college; thirteen of the 69 teachers who planned to continue GLEP participation also had a science major. Eight of the nine teachers taught both pre-cruise and post-cruise activities in their classroom. Also, eight of the nine went to a GLEP orientation session, and all nine used the GLEP Pre-field activities in their classroom. They all had experiences with Great Lakes activities, including boating, camping and fishing, and eight of the nine participate with extracurricular Great Lakes related hobbies and activities, such as boating or visiting lighthouses.

There were other common traits among the nine teachers. Five of the nine teachers who said that they would not continue their participation with the program were first time participants with the GLEP. This suggests that perhaps they wanted to discontinue their GLEP participation because they were not comfortable teaching topics or did not believe they were knowledgeable to teach about the Great Lakes, due to lack of experience with these topics. However, the results show that these nine teachers have

the same levels of comfort and knowledge as the teachers who planned to continue their participation.

With the exception of the program expense, these nine teachers appear to have discontinued their involvement due to individual teaching needs that they believed could not be met with the GLEP. Of the four who did not mention expense as a reason for discontinuing their participating, one teacher said she would be teaching 5th grade in following years, hence she stopped participating. Another teacher wanted a program that would specifically focus on Michigan Educational Assessment Program (MEAP) science objectives for fourth graders. One spring 1996 teacher wanted more time to prepare her students for the cruise, and a fall 1996 teacher only teaches with a "Michigan theme" on alternating years.

Chapter 6

DISCUSSION

Keeping in mind the limitations of this research, the results of this program evaluation (combined with the literature review, the writing retreats, and meetings with the GLEP staff) have implications for strengthening the current GLEP and for future programs and evaluations. The results for each research question (presented in Chapter 1) are interpreted below. Recommendations based on these results are included. The results of Research Question 1 – What are the educators’ demographic backgrounds? – were presented in Chapter 5, and are woven into the following discussion.

Recruitment, Retention, and Training of Educators

Research Question 2. What programming strategies are currently used to recruit, train, and retain the GLEP educators?

Subquestion 2a. Educators will identify specific program-related barriers to their participation. Participating teachers will also identify barriers related to the involvement of other teachers.

While program demand is not presently influenced by cost (GLEP staff consistently reserve all available cruise dates) (Stewart 1997), program cost appears to be discouraging some teachers’ participation. Five of the nine teachers who indicated on their surveys that they would not come back to the GLEP had concerns with the expense. Three teachers indicated that they “loved the trip and would like to participate in the



future” but they had trouble raising the money. In fact, the GLEP expense was a common concern indicated by a majority of teachers surveyed (regardless of their future participation). Almost three-fourths (73.7%) of teachers indicated that more funding would influence other teachers to participate with the GLEP (Table 5-8). Thus, more time explaining different fund-raising techniques or gathering additional community representatives and businesses to sponsor trips may be necessary to sustain some teachers’ involvement. **I recommend that the GLEP staff emphasize fund-raising strategies to help teachers reduce the costs of their participation with the program.**

Another perceived barrier to participation is time, or a perceived lack of it. One spring 1996 teacher wrote that the “orientation seemed like a waste of time.” Almost 10% of teachers surveyed indicated that they did not use the training videos because they had no time. Project WILD researchers found a similar response in their program evaluations. Among the top reasons teachers did not participate with Project WILD were a lack of planning time and a lack of time in the school day (Greene 1992, Standage Accureach 1990, Baldwin 1990, Gilchrist 1990, Zosel 1988, Smith 1988, Cantrell 1987, Charles 1986, Fleming 1983 in Pitman 1996: 5). Incentives may resolve the challenge of teacher participation at trainings, which will encourage teachers to use their time not only for GLEP training but also for their own career advancement. The state of Michigan certification requires each teacher to earn graduate credits or continuing education units (CEUs) to maintain his/her certification (Elshoff 1997). This may be accomplished through participation in at EE curricula inservice workshops, such as Project Wet, Project

WILD, and Project Learning Tree (Elshoff 1997). To address non-attendance at GLEP training sessions, and to encourage attendance at future vessel-based EE training sessions, **I recommend that the GLEP integrate graduate level and CEU requirements into their teacher trainings, which will provide an added incentive for teachers to attend inservice workshops.** This feature can then be used in GLEP advertising when recruiting new teachers to the GLEP as well as with future vessel-based, EE programs.

Subquestion 2b. Based on trends recorded by GLEP staff, teachers will show consistent participation from year-to-year, while volunteer turn-over is more pronounced.

From the 85 teachers who responded to the first survey (9 were not included in the final respondent group [n=76] as they did not complete the second survey), I was able to determine what percent had participated in the past (Table 5-6). Greater than 50% of these teachers indicated that they had participated in a previous season. Repeat participation in the program indicates that the GLEP is meeting teachers' needs for Great Lakes, EE programming for their classrooms.

Though teacher retention is not a problem, volunteer recruitment and retention is an ongoing challenge for GLEP staff. From the responses indicated by volunteers surveyed in this evaluation, it appears that retaining volunteers would not be a problem; 27 of the 31 volunteers surveyed intended to participate again in the future. However, the actual number of participants per season reveals a different story. For example, only four veteran volunteers participated in the spring 1997 cruise season. Other Extension volunteer programs have addressed this challenge of volunteer retention, pinpointing demographics

as a probable issue. One North Carolina Extension program surveyed volunteers in a youth development program and found adults over age 65, retired adults, and men were the most likely volunteers (Rouse and Clawson 1992). This could be due to more females entering the workforce and changes in household structure due to divorce or increasing numbers of single parent households. **Since the GLEP volunteers surveyed in spring 1996 and spring 1997 were predominantly female, a more concerted effort needs to be made to recruit male volunteers.**

The literature also indicates that the most viable volunteers are teens and retired people. During the two GLEP research seasons, I found that 34.8% of volunteers were teenagers and 18.8% retirees (Table 5-5). The largest percentage of volunteers fell between these two age brackets, resulting in a median age of 43 and 44 years of age – people who are neither teenagers nor of retirement age. **I recommend that the GLEP prepare a more targeted recruitment effort toward teens and retired people.**

Time – or lack of it – appears to be another reason volunteers are not staying with the program. More than half of volunteers (67.7%) have children, and 69.2% have jobs outside the home. Additionally, volunteers are donating their time not only to the GLEP but also with other organizations. Close to one-fourth (23.3%) volunteer for three or more other organizations. Clearly, these people are busy and simply may not have the time to contribute to the GLEP. **To address this, the GLEP needs to concentrate its advertising and recruiting among older generations and teens in order to involve people who can contribute their time for more than a single season.** This will reduce

the amount of turnover and time spent training large numbers of (potentially short term) recruits.

Another way that the GLEP may recruit additional volunteers who are committed to the program is through incentives, or earning something in exchange for their volunteer time. The GLEP began this type of exchange in spring 1997 with the Macomb County Master Gardener program. By recruiting Master Gardener participants, the GLEP could achieve its need for dedicated volunteers – and the volunteers, in turn, earned credit toward their Master Gardener certification. As one spring 1997 volunteer cruise leader commented, “I enjoy working with the kids, and for the Master Gardener volunteer hours.” **I recommend that the GLEP continue working with existing Extension programs, like Master Gardeners, to offer volunteers incentives in exchange for their teaching time aboard the cruise.** High school or college credits may be an incentive for younger volunteers.

Subquestion 2c. Educators will record specific methods that indicate how they became aware of the program. The highest proportion of teachers will report that they learned about the program from other teachers, colleagues, and from mailings to the school. Volunteers, however, will indicate that the media made them aware of the GLEP opportunity.

The evaluation results have a number of implications that may strengthen the GLEP and ease implementation of future programs, beginning with developing awareness of the program. In concurrence with subquestion 2c, nearly half of teachers (48.7%) surveyed indicated that they became aware of the program primarily by word-of-mouth, personal communications from teachers and co-workers. However, a new program will

not have the luxury of veteran teachers to spread the word. With 22 GLEP teachers surveyed holding a membership in a professional teaching organization, such as the Michigan Education Association (MEA), advertising through these organizations would help to build awareness among the teacher "network." Echoing the GLEP results, teachers in New Jersey indicated that they learned about the Project WILD opportunity through teachers union magazines, their school or board of education, mailings, and EE centers (Dunne 1992). Mailings to the school appeared to be a useful method to inform teachers of the program, with more than 15% of teachers listing mailings as how they became aware of the program. **The GLEP staff (particularly staffers of future programs) should continue school mailings and consider expanding its advertising to teacher "networks," such as professional teaching organizations and other EE programs.**

Radio announcements, newspaper advertisements, and newspaper articles appear to be an effective way for potential volunteers to become aware of the program. Nearly half of the volunteers surveyed learned about the program from these media sources. The largest percent of volunteers surveyed (35.5%) learned about the GLEP through another Extension program (specifically, Master Gardeners and 4-H). **I recommend that the GLEP continue to advertise for volunteer cruise leaders within Extension networks.** Recruiting volunteers who already know, understand, and trust Extension appears to be a viable marketing tool. As Loewenstein, Thompson, and Bazerman (1989 in Murnighan et al. 1993) described, positive interpersonal relationships – such as those produced in a

work place, a team, or through a volunteer organization – can produce kin-like connections among unrelated people. Their identification with the organization then becomes salient, and they may more willingly and frequently contribute to voluntary action (Murnighan et al. 1993).

GLEP Educators' Great Lakes Experiences, Knowledge, and Comfort Levels

Research Question 3: What are the GLEP educators' life experiences, knowledge, and comfort levels in teaching about the Great Lakes?

Subquestion 3a. Using self-assessments, educators will show a low knowledge of specified Great Lakes topics before GLEP training, and higher comfort levels with teaching Great Lakes topics after training.

Based on the teachers' self-assessments of their knowledge before the program and their comfort levels in teaching specific topics after the GLEP cruise, it appears that teachers need specific knowledge in several GLEP areas. More than 50% of teachers surveyed said that they were unaware, had only an awareness, or that the knowledge they do have is inadequate for teaching the following topics: plankton, fisheries, aquatic plants, calcium in water, carbon dioxide, navigation, geography of Lake Huron and Lake St. Clair, pH levels, shipboard knot-tying, dissolved oxygen, and cultural aspects of the Great Lakes region. Fisheries (86.8%) and shipboard knot tying (92.1%) had the highest percentages of teachers who were unaware of these topics, or who reported that their knowledge was inadequate for teaching. **During trainings, I recommend that the GLEP staff concentrate on improving teachers' knowledge in these topic areas.**

Teachers indicated that their comfort levels following the GLEP training and cruise were high in some, but not all, topic areas. Greater than one-fourth of teachers surveyed indicated that they were “not comfortable” or “somewhat uncomfortable” teaching calcium hardness (26.3%), navigation (26.8%), and shipboard knot-tying (40.8%). Since close to half (48.5%) of the teachers surveyed indicated that they taught about water topics (i.e. watersheds, wetlands, lakes, rivers, streams, water cycle, and water flow) in their classrooms pre-cruise, and with close to 40% of teachers using the GLEP teaching curriculum, it appears that these topics would be accepted for inservice training. The evaluation results suggest that inservice training appears to be an effective way to introduce the teachers to the GLEP, to help them incorporate it into their curriculum, and to boost their knowledge and comfort levels with teaching Great Lakes topics. Project WILD evaluations show a similar response. Among Project WILD teachers, the primary motivation for teachers attending a Project WILD workshop was a personal interest in wildlife and the environment (Shomo 1993, Gigar 1993, Dunne 1992, Bissell 1992, Greene 1992, Fleming 1991). The results of my evaluation show that GLEP teachers might participate in more training, despite the GLEP’s continued difficulty with low teacher attendance at the after school training sessions.

Close to one-third (32.9%) of teachers surveyed said that “more inservice classes” would influence other teachers to participate in the program. Inservice classes provide a wealth of information, including ways to utilize materials in their classrooms and ways that teachers may increase their own knowledge. The Project WET, Project WILD, and

Project Learning Tree curricula use inservice training as a program dissemination method. In one evaluation of an Ohio Project WILD inservice program, participating teachers felt strongly that the workshop was “helpful in preparing them to use the Project WILD materials” and 81% of survey respondents reported using the materials after the workshop (Charles 1988). The purpose of Project WILD inservice workshops is to demonstrate activities and to have teachers instruct them as well – known as “peer teaching” – so that they feel comfortable with the topics and curriculum materials. **I recommend that the GLEP staff include “peer teaching” in their teacher trainings.**

Duration of the workshop plays an important role in what activities teachers will use and in what topics are covered. Zosel (1986) found that teachers who participated in inservice workshops of seven hours in length or longer actually used more activities than teachers with under seven hours of workshop training. **I recommend that the GLEP draw from Project WET, WILD, and Learning Tree inservice training programs and strategies to develop longer, more intensive training models that may improve teachers' comfort levels and boost their knowledge of specific Great Lakes topics.**

Survey responses indicated that volunteers are looking for ways to enhance their Great Lakes knowledge (33.3%) and for ways that will make them more effective teachers (44.4%). Over one-third of volunteer cruise leaders surveyed (33.3%) listed “doing an accurate job” as a concern about participating with the program. Though 74% and greater of surveyed volunteers rated their pre-cruise knowledge inadequate for training in all topics (Table 5-14), it appears that the GLEP training does make volunteers feel



comfortable, confident and knowledgeable with teaching about the Great Lakes. More than 60% of volunteers indicated that they were somewhat comfortable to comfortable teaching all stations (except for calcium hardness and pH test/water clarity/water color, which they traditionally do not teach during the cruise). **The GLEP staff should take these results as a positive sign about its volunteer training and maintain its current training strategies, making specific efforts to increase volunteers' knowledge of a number of Great Lakes topics during volunteer cruise leader training.**

Subquestion 3b. High proportions of educators will report a background of participation in Great Lakes activities and experiences.

Researchers have found a relationship between teachers' experience, background, and education of science related topics and their participation in EE (Simmons 1995, Bethel 1982, Peyton 1977, Ritz 1977, Bozardt 1976, Cummings 1976, Hungerford 1975, Howie 1974). It appears that teachers' Great Lakes experience may be linked to their longevity with the GLEP. While GLEP teachers show only moderate formal education in sciences (21.6% had a science-related major in college), the overwhelming majority had experiences on the Great Lakes. Over half of teachers had gone camping, diving or snorkeling in their lives. Over 55% watch nature programs on TV about the Great Lakes and oceans, in addition to reading magazines or books on these topics. The highest numbers of teachers had gone boating (97.4%) and fishing (90.8%). These proportions are high, given general Michigan recreation statistics. According to the U.S. Coast Guard, Michigan leads the nation in number of registered watercraft (856,749 boats were registered in 1989), giving Michigan residents relatively easy access to the Michigan's

surrounding Great Lakes (U.S. Coast Guard 1990). According to a Michigan Department of Natural Resources (1989) survey, Macomb County residents held the third highest number of annual fishing licenses in the state. Together, these statistics about GLEP educators' contact with aquatic resources through fishing and boating may indicate that GLEP teachers and volunteers are likely to come to the program with at least some familiarity and experience with Great Lakes resources, based on their personal experience and interests.

The GLEP staff plan to incorporate more Great Lakes culture, folklore, and maritime history into the program. However, only 12.9% of volunteers surveyed said their knowledge was adequate or above average for teaching these topics. There is a need to recruit volunteers who are skilled with Great Lakes folklore and history. To meet this need, Michigan State University researchers LuAnne Kozma and Hawk Tolson (1997) identified and documented maritime folklife resources that would be of use to the GLEP curriculum. In addition to a number of Michigan libraries and museums, they contacted 23 people in the Macomb County area who are practitioners of occupation-based maritime traditions, such as boat captains, sailmakers, quilters, riggers, knot tiers, and U.S. Coast Guard members. **From these results, I recommend that future GLEP staff members advertise within boating, fishing, and maritime organizations to recruit volunteers with an existing interest and knowledge of these activities.**

Subquestion 3c. Educators will have pre-cruise and post-cruise questions and concerns about their participation with the GLEP.

The GLEP staff always need information on the questions and concerns educators have about their GLEP participation, so that these may be addressed during the trainings. While one-third of teachers had no concerns about their GLEP participation, nearly one-third (32.8%) indicated a strong need for information pertaining to the day of their cruise (Table 5-11). Teachers also showed an interest in pre-cruise preparation and post-cruise activities, as well as the teacher and parent role during the GLEP. **During training, the GLEP staff should continue to make it a point to address teachers' questions,** through print materials, discussion at training workshops, and in GLEP mailings.

Volunteers had questions related primarily to concerns about doing an accurate teaching job and about learning effective teaching techniques. Judging from post-cruise, self-assessed comfort levels with teaching Great Lakes topics, it appears that these needs are being met through the current training procedures. However, over one-fourth (26.1%) of volunteers indicated that they felt unprepared to teach cruise activities, listing comments such as "I did not feel like I knew enough." **Encouraging the use of training videos, giving volunteers more practice time, and providing them access to literature about Great Lakes topics may help to alleviate these doubts.**

GLEP Educators' Program Participation and Perceptions

Research Question 4. What are the educators' perceptions of the program?

Subquestion 4a. Most participating educators will have positive perceptions of the program.

Subquestion 4b. Most teachers will indicate that they teach pre-cruise and post-cruise GLEP activities in their classrooms.

Subquestion 4c. The majority of GLEP educators will indicate that they are interested in participating with the GLEP during another season.

The results of these subquestions can be combined into a single discussion. The overwhelming majority of 1996-1997 educators surveyed had positive perceptions of the program. This finding is evident through their comments on the surveys and intentions for future participation (86.8% of teachers and 87.0% of volunteers said they were interested in participating again). There were some negative perceptions although some aspects of the program cannot be controlled. For example, nearly one-fourth of teachers and volunteers surveyed disliked the weather. There are factors the GLEP staff can control, such as program expense and making the most of their time by offering training incentives. For volunteer cruise leaders, recognition efforts and incentives based on individual needs may encourage longer-term involvement with the GLEP.

More than three-fourths (76.3%) of GLEP teachers surveyed taught pre-cruise activities and intended to teach post-cruise. However, their use of specific materials declines after their cruise. While over one-third (36.7%) of teachers indicated that they used the GLEP curriculum before their cruise, only 16.1% of teachers said they used this

source post-cruise. **During training, I recommend that the GLEP staff emphasize curriculum activities in the pre-cruise and post-cruise segments.**

GLEP teachers show a strong interest in teaching water related topics. Close to half (48.5%) taught watersheds, wetlands, lakes, rivers, streams, the water cycle, and water flow before their cruise. However, less than 15% of teachers taught other topics, such as food webs, Michigan history, and exotic species (Table 5-18). This is likely due to low knowledge in these topic areas, as demonstrated by teachers self-assessed, pre-cruise knowledge levels in all topic areas except for the water cycle, wetlands, aquatic food webs, and water pollution. Project WILD teachers also indicated this need, and showed interest in attending shorter, follow-up training workshops that focus on the curriculum and develop knowledge (Young, Thompson, and Thompson 1995, Shaw 1993, Tudor 1992, Bissell 1992, Greene 1992, Fleming 1991, Standage Accureach 1990, Gilchrist 1990, Farnsworth 1989, Zosel 1988, Smith 1988, Cantrell 1986, Charles 1986, Yannone 1985). **The GLEP staff may want to consider follow-up workshops or specialized, topic-specific trainings that will increase teachers knowledge and emphasize other topic areas.**

Implications for GLEP Dissemination

The results of this research will help in the design and development of a GLEP dissemination guide to serve as a reference for other communities and organizations interested in hosting vessel-based, EE programs. During the March 1997 GLEP writing

retreat, I presented a draft outline that would serve as a Table of Contents, which was discussed and suggestions made for its improvement (Appendix F). During this writing retreat and other meetings with GLEP staff, it was decided by GLEP staff that the program expansion should include a “interactive, hands-on mode for dissemination” (Stewart 1997). For example, people from any new site should visit, train, apprentice, and serve with the GLEP in Macomb County, in addition to receiving written support materials (such as a dissemination guide).

The research results provided in the earlier discussions are applicable to the development of a dissemination guide. Furthermore, I recommend that before any new programs are implemented, each community and its potential teachers and volunteers should be carefully assessed, because each Great Lakes community differs in its demographics, economics, cultural components, and natural resources. This assessment may include teacher pre-surveys (such as the type used in this evaluation) as well as the identification of potential task force members, teacher funding sources, volunteer cruise leaders, and folklife resources. Recognizing the unique qualities of each Great Lakes community will help to provide a program that has greater acceptance, longevity, and effectiveness among its participants.

Future Research

Avoiding the limitations of this research when conducting further evaluations of the existing and future program will help to pinpoint additional programming strengths

and weaknesses. This may be accomplished by conducting focus groups with educators who terminated their involvement with the GLEP during the last seven years to discover more about why they discontinued their involvement, or conducting focus groups or administering written surveys with veteran teachers (i.e. two or more years of continued GLEP participation) to determine how and why the program has been successful in their classrooms. Also, future evaluations may include surveys designed specifically to identify changes pre-cruise and post-cruise in educators' knowledge and comfort levels.

With knowledgeable, comfortable, informed teachers and volunteer educators, EE programs will be successful. As Harold Hungerford, professor and coordinator with the Science Education Center in Illinois wrote:

If education programs are the vehicles by which EE goals are taken to the classroom, then instructors are the driving force behind those programs (Hungerford 1990: 100).

Success is a relative term, but for the Great Lakes Education Program and similar vessel-based EE programs, success is defined by educators who provide youth with a greater sense of stewardship for aquatic resources in the Great Lakes and beyond.



APPENDICES

APPENDIX A: GLEP Teacher Information and Registration Packets

"...ten to fifteen years from now they'll still be able to look back on the experience - testing the water samples, seeing the lake environment, looking at the development along the Clinton River. This program shows them how the Great Lakes influenced Michigan's history, and it also ties into the science curriculum."

*Laura Thomas,
Anchor Bay Schools*

"The kids said that it was the best field trip that they think they will ever experience! When you get the students out on the water, you can see and hear that they have internalized the concepts. Because they are more aware of everything, they are more excited and concerned about water and the environment."

*Key Smith,
Chippewa Valley Schools*

IV. FOR MORE INFORMATION

Contact the Macomb County MSU Extension office at 21885 Dunham Road, Suite 12; Clinton Twp, MI 48036, or call (810)469-6085. Don't miss the boat!

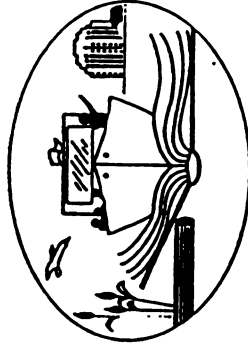
MICHIGAN STATE UNIVERSITY,
UNIVERSITY OF MICHIGAN,
U.S. DEPARTMENTS OF AGRICULTURE AND
COMMERCE, AND MACOMB COUNTY BOARD OF
COMMISSIONERS COOPERATING

MSU Extension programs are open to all without regard to race, color, national origin, sex, handicap, age or religion.

The award-winning *Great Lakes Education Program* is brought to you by the following sponsors who are dedicated to enhancing the education of Michigan's youth:

**MICHIGAN SEA GRANT
COLLEGE PROGRAM**

**MICHIGAN STATE UNIVERSITY
EXTENSION**



1997 PROGRAM INFORMATION

Sponsored by:

Macomb County MSU Extension

Michigan Sea Grant Extension

THE GREAT LAKES EDUCATION PROGRAM

I. What is the Great Lakes Education Program?

A fourth-grade classroom and field educational opportunity focusing on Great Lakes and Clinton River resources. It is designed to increase student interest in these valuable resources, and build a better understanding of their role as resource stewards.

The program consists of three segments, each integrating elements of history, geography, physical and biological sciences, mathematics, literature and the arts:

- ♦ A classroom-based introduction to the Great Lakes and Clinton River
- ♦ A waterborne field experience
- ♦ Post-field classroom activities which serve to reinforce new information and concepts.

Opportunities are also provided for continuing water resource scholarship.

II. Why should you participate in this educational opportunity? Because it is:

RELEVANT Fourth grade students in Michigan generally have a very incomplete understanding of Great Lakes and local water resources. As future decision-makers, they need to understand the importance of these resources and their personal roles as wise stewards.

INTERESTING Whether because of natural inclination or the variety of activities and experiences involved, classes that have participated in the Great Lakes/Clinton River program have shown great interest in learning about our water resources.

MULTIDISCIPLINARY

By considering the water, land, life and human elements of our coastal environment, this opportunity provides an excellent way to integrate social, physical and biological sciences, mathematics, literature, writing, and the arts around a common local theme.

MEMORABLE This educational opportunity will provide your students with learning experiences that they will remember the rest of their lives. By

using a variety of learning methods and environments, interest and enthusiasm are maximized.

EASY As a teacher, it is easy for you to participate. You need not be a Great Lakes or water resources expert. You need only an interest in broadening your student's horizons. You are provided with all necessary classroom learning materials, a training workshop, support contacts, and volunteer assistance in order to make your class's learning experience valuable and interesting.

III. What do other teachers say about the Great Lakes Education Program?

"My new students are asking when it will be their turn ... I'm hearing vocabulary from the program in everyday use, and some of it is pretty high-tech! The sophistication of the materials makes even fourth graders feel like accomplished chemists."

Debra Kulesza,
Van Dyke Public Schools (Warren)

"It provides a hands-on experience that increases understanding of the importance of water quality in the Great Lakes ... Students are able to see results firsthand."

Allan Jacobs,
Trinity Lutheran (Utica)

SPRING 1995 GREAT LAKES EDUCATION PROGRAM SCHEDULE

Morning Cruises: 9:00 - 11:45 am, departing Mt. Clemens
 Afternoon Cruises: 12:15 - 2:45 pm, departing Metro Beach Metropark
 Shaded dates are not available

MAY, 1995

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1	2	3	4	5
8	9	10	11	12
15	16	17	18	19
22	23	24	25	26
29 <i>Memorial Day</i>	30	31		

JUNE, 1995

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
			1	2
5	6	7	8	9
12	13	14	15	16

GREAT LAKES EDUCATION PROGRAM Spring 1995 Registration Information

The Macomb MSU Extension is pleased to offer our award-winning *Great Lakes Education Program* to your fourth grade class. The 2¼ hour educational field trip takes place aboard the 45' steel-hulled *E/V Clinton*, based in downtown Mt. Clemens. The vessel is Coast Guard inspected and licensed, and is operated and insured by Waterways Cruises, Inc., whose owner-operators are experienced graduates of the Great Lakes Maritime Academy.

Confirmed reservation will be accepted on a first come, first serve basis. All confirmed reservations must include this reservation form and the \$100 deposit. NO telephone reservations will be accepted.

To reserve a schoolship date:

- 1) Refer to the enclosed calendars for available cruise dates:
 - Morning cruises are 9:00 am - 11:45 am. (Limited time adjustment possible)
Departure is downtown Mt. Clemens, with arrival at Metro Beach Metropark.
 - Afternoon cruises are from 12:15 pm - 3:00 pm. (Limited time adjustment possible)
Departure is Metro Beach Metropark, with arrival in downtown Mt. Clemens.
- 2) Sign and return the enclosed reservation commitment with a \$100 deposit for each class cruise you are booking. This will confirm your reservation. No reservations for spring will be taken after March 1, 1995. We reserve the right to reschedule your class in order to fill a date.
Return to: Macomb CES-NRPP, Great Lakes Education Program, 21885 Dunham Road, Clinton Township, MI 48036.

- ☛ **FEES:** The cost per class (based on two classes per day) is \$375. An additional \$50 fee is added if only one class reserves a given date. This fee reflects subsidies by MSU Extension and the Detroit Edison Foundation and includes vessel fees, a 140 page Learning Activities manual, orientation and volunteer training. 1995 Fall cruise dates are available for scheduling at reduced rates.
- ☛ **DEPOSIT:** A \$100 deposit is due with your signed reservation commitment for each class.
- ☛ **BALANCE:** The balance is due no later than 21 days prior to your cruise.
- ☛ **REFUNDS:** Your \$100 deposit is refundable (less \$25 cancellation fee) if we receive written notice of your cancellation at least 21 days before your cruise date. Written cancellation within 21 days of your cruise, following your full payment, will entail a \$125 cancellation fee. If the captain cancels a cruise due to unavoidable circumstances, an alternate date will be scheduled.
- ☛ **CLASS SIZE:** We recommend class sizes of up to 30 students, with 5 adult chaperones (including the teacher). The maximum group size is 35.
- ☛ **ORIENTATION TRAINING:** All teachers and adult chaperones must attend a two-hour orientation and training session.

- 4) Macomb MSU Extension will send you written confirmation of your reservation(s) as soon as your signed reservation commitment and \$100 deposit have been received. Detailed information regarding the cruise schedule and activities, classroom learning activities and materials, and program policies will be mailed with your confirmation. We look forward to discovering the wonders of our Great Lakes with you in Spring 1995!

**MACOMB MSU EXTENSION
1995 GREAT LAKES EDUCATION PROGRAM
RESERVATION COMMITMENT**

The Great Lakes Education Program is in its fifth year, serving Macomb County fourth grade teachers and students. If you are interested in having your class participate our 1994 program, you may register now by returning this reservation commitment form as soon as possible.

A deposit of \$100 for each class cruise booked, submitted with this signed commitment, will reserve your place on our 1995 schedule. The total balance due can be remitted with your deposit if you wish, but must be paid no later than 21 days prior to your cruise. This is also the deadline for reservation cancellation. Your deposit and any other funds received will be refunded (less a \$25 cancellation fee) if Macomb MSU Extension receives your written notice of cancellation at least 21 days prior to your scheduled cruise date. For those who have paid in full, cancellation within 21 days of your cruise date will entail a \$125 cancellation fee.

The captain of the vessel shall determine circumstances under which the vessel will sail, rules of conduct, and other matters aboard the vessel. If the captain must cancel a cruise due to hazardous conditions or other unavoidable circumstances, an alternate date will be scheduled.

Teacher: _____

District: _____

School: _____

Street: _____

City: _____ Michigan Zip: _____

Phone: _____

Number in Group: _____ students _____ adults (35 combined maximum)

Cruise Date: _____ Cruise Time: ☐ Morning ☐ Afternoon

Please sign and date this reservation commitment in the spaces indicated below. Make checks payable to Macomb MSU Extension, and return both to:

Thank You!

Macomb MSU Extension-NRPP
Great Lakes Education Program
21885 Dunham Road
Clinton Township, MI 48036

Signature: _____

Name: _____

Date: _____

Amount Enclosed: _____ Check Number _____

NOTE: Metro Beach Nature Center companion program **MUST BE** scheduled through the Nature Center by calling 463-4332. You are **NOT** automatically scheduled by returning this form!

How To Fund Your Class's Participation In The Great Lakes Education Program

Many classes are interested in participating in the Great Lakes/Clinton River Education Program, but not all have the discretionary funds available to cover the cost of participation. If you are among the teachers challenged to secure at least a part of the cost, we have some suggestions that should enhance your ability to do so.

1) FAMILIARIZE YOURSELF WITH THE PROGRAM

Before approaching any person or group for funding assistance, make sure you have thoroughly studied the program's descriptive brochure, viewed the promotional video, and asked program staff to answer any questions that you have. Know why you want to participate, what your students will get from the experience, and how it fits into the rest of your curriculum.

2) LOOK TO INTERNAL SOURCES FOR POTENTIAL FUNDING

You might first want to look for internal sources of potential funding for your class. Internal sources would include, but not be limited to, discretionary class funds, funds available from your school administration for field trips or special events, funds available through your school's parent-teacher association, special fund-raising opportunities, or student fees.

Keep in mind that it may be easier to combine funding from more than one source than to find one source able to underwrite the entire cost. For example, you may obtain \$50 from discretionary class funds, another \$50 from your principal, \$100 from your parent-teacher association, \$50 from student fees (\$2 per student), and another \$150 from fund-raising activities (*one proven strategy is to work the concession stands at the Palace for a percentage of sales - call Volume Services at 377-8291 if interested*). Suddenly you have come up with \$400 and are well on your way to walking up the gangplank! But what about the rest? You may find that internal sources cover your entire cost, or only \$100. If you are among the former, congratulations. If you are among the latter, other potential sources are available.

3) LOOK TO EXTERNAL SOURCES FOR POTENTIAL FUNDING

Once you have exhausted potential internal funding sources, it is time to look outside the school environment. In this context we are primarily talking about private sector sources of funds such as businesses, non-profit organizations and foundations. Any number of local businesses with an interest in education and/or Great Lakes resources would make excellent candidates for partial or complete funding of your class's participation in the program. Many non-profit organizations and foundations also provide support for worthwhile educational opportunities.

The list of potential local businesses and organizations that may be eager to "adopt" your class and fund your participation in the Great Lakes/Clinton River Education Program is limited only by your imagination. We have included below a partial listing of the types of business that you would want to consider approaching for funding support.

Restaurants	Service Clubs
Banks/Savings & Loans	Department Stores
Grocery Stores	Building Supply Companies
Automobile Dealers	Automobile Service Businesses
Hospitals	Appliance Stores
Pharmacies	Boat Dealers
Marinas	Bowling Alleys
Construction Companies	Automobile Rental Agencies
Insurance Companies	Printing Shops
Hotels/Motels	Home Furnishing Stores
Video Rental Stores	Hardware Stores
Toy Stores	Party Stores
Radio Stations	Newspapers
Sporting Clubs	Automobile Suppliers
Business Supply Firms	Yacht/Boating Clubs

The key to successfully approaching local businesses or groups such as these will be to focus on the local level (the owners and/or employees may have students that go to your school) and be able to explain why your request for support should be a priority for them. You should be able to identify a wide variety of potential sources such as these within a short distance of your school. And by using the promotional video and program brochure that have been provided to you, most of their questions should be answered adequately. Keep in mind that many businesses such as these support amateur athletic teams of all sorts and may appreciate the opportunity to sponsor such a memorable educational experience. And explore the idea of establishing permanent partnerships with these sources in order to obtain their annual support of your class's participation.

4) CONTACT PROGRAM STAFF FOR ASSISTANCE

If you have tried to secure the necessary funds by diligently pursuing internal and external sources, contact a staff member at the Cooperative Extension Service. We may have some additional suggestions for you. Just don't give up! Remember, this is an opportunity your students will have only once, and if they do participate, they are likely to remember it as one of the highlights of their education.

To contact a program staff member, call (313)469-6085, or write to:

Great Lakes Education Program
Cooperative Extension Service
21885 Dunham Road
Clinton Township, Michigan 48036

**METRO BEACH NATURE CENTER
PROGRAMS THAT RELATE TO
THE GREAT LAKES/CLINTON RIVER EDUCATION PROGRAM**

VOYAGEUR CANOE TRIP - Help paddle the 34-foot Voyageur Canoe through the Metro Beach north marsh while naturalist talks of Michigan history and the fur trade and the natural history of the wetlands. Trip is 1-1/2 or can be shortened to one hour to meet group needs. Available mid-May through mid-October, Tuesdays through Saturdays. Minimum of 10 persons, maximum 18, six of which must be adults. Therefore, for school groups, one appointment would include 6 adults and 13 children. Cost is \$30 per appointment. No one under 4 years of age on canoe. *Weather conditions, such as high winds or rain, may make it unsafe to operate the canoe. All attempts will be made to offer an alternative program if cancellation is necessary.

Registration for canoes are booked beginning January 1st of the same year appointment is to be made. At the present time, Metro Beach offers 3 canoes per day, so morning groups will get two canoes, but afternoon one group of 13 children.

At present, we do not hold dates open for Great Lakes/Clinton River Education Program groups. Appointments for the Voyageur canoe or the Guided Outdoor Field Trip at the Nature Center are made on a first come, first serve basis from groups all over Metro Detroit area. **The earlier you can reserve an appointment, the more likely we can schedule your group.** Call us as soon as you book your Great Lakes/Clinton River Education Program date.

GUIDED OUTDOOR FIELD TRIP AT THE NATURE CENTER - Introduction indoors with the naturalist includes viewing the Nature Center exhibits that relate to marshes and Great Lakes and voyageur history. Some live animals such as turtles, snakes, frogs and fish are on exhibit to show some of the wildlife at Metro Beach. There is an introductory discussion about wetlands and the Metro Beach marsh including what is a wetland, the importance of wetlands, how they effect water quality, food webs and interrelationships of plants and animals, identification of aquatic insects and how they indicate water quality. Indoor discussion is followed by a walk on the trail to observe marsh and its plants and animals. Walk may include dipping in the marsh for aquatic invertebrae and, if time allows, some water testing such as pH and CO2.

Aquatic dipping can be requested, but the decision to dip or not is at the discretion of the naturalist at the time, depending on marsh conditions and time allowed.

Outdoor field trip program last 1-1/2 hour. **PROGRAM IS FREE.** Available Tuesdays through Saturdays.

For more information or to make an appointment, please call the Metro Beach Nature Center: (810) 463-4332 or 1-800-477-2757.



APPENDIX B: 1996 and 1997 Educator Surveys

Great Lakes Education Program (GLEP)
Spring 1996, Fall 1996 and Spring 1997 Teacher Survey I

Please take about 10 to 15 minutes to carefully complete this survey. Your participation will help us to evaluate the GLEP in order to improve programming and teacher recruitment. Please keep in mind that there are no "right" or "wrong" answers. When you are finished please hand the survey to GLEP personnel.

Participation in this survey is **voluntary**. You will not be penalized should you choose not to participate. **Your name will not be associated with your responses.** The sheet stapled to the front of the survey with your name and other information will be detached and kept separate from your responses. If you would like additional information about this evaluation, please contact Amy Nevala at 517/353-0308, GLEP staff at 810/469-5180 or Shari Dann at 517/353-0675.

1. Have you participated with the GLEP as a teacher in the past:

☐ no

☐ yes → **1b. If yes, during what seasons and years did you participate?**
(for example, spring 1992 and fall 1994)

2. How did you first hear about the GLEP? (check all that apply)

☐ newspaper advertisement

☐ GLEP staff member

☐ newspaper article

☐ GLEP teacher, fellow teacher,
coworker

☐ radio public service announcement

☐ GLEP cruise leader

☐ principal

☐ parent of a student

☐ community service club

☐ other, _____

☐ Intermediate School District workshop

☐ don't remember

☐ other workshop _____

☐ mail flyer

3. What questions did you hope to have addressed during GLEP training?



4. What concerns did you have about participating with the GLEP?

5. In your opinion, which of the situations would influence other teachers to participate in programs like the GLEP? (check all that apply)

- ☐ more in-service classes on the topic
☐ better access to resources
☐ more support from administration
☐ more funding
☐ other, _____

6. Please circle yes or no to the following activities.

yes	no	Have you ever gone fishing?
yes	no	Have you ever gone boating?
yes	no	Have you ever gone fishing on one of the Great Lakes?
yes	no	Have you ever gone camping?
yes	no	Have you ever been diving or snorkeling?
yes	no	Do you watch nature programs on TV about water, the oceans or the Great Lakes?
yes	no	Do you subscribe to or read magazines or books about water, oceans, or the Great Lakes?
yes	no	Do you teach about water, the oceans and the Great Lakes in your classroom?

The following question asks about your knowledge of various topics.

7. Please circle the number in the left hand column that comes closest to describing your knowledge of each topic listed in the right hand column.

Unaware of this topic or its meaning	Aware of this topic or its meaning	Have some knowledge of topic, but inadequate for teaching	Have adequate knowledge for teaching topic	Have above average knowledge for teaching topic	Topic
1	2	3	4	5	Plankton (zooplankton, phytoplankton)
1	2	3	4	5	Wetlands
1	2	3	4	5	Aquatic food webs
1	2	3	4	5	Influence of aquatic environments on humans
1	2	3	4	5	Fisheries
1	2	3	4	5	Aquatic animals
1	2	3	4	5	Aquatic plants
1	2	3	4	5	Calcium in water (hardness, softness)
1	2	3	4	5	Water pollution
1	2	3	4	5	Carbon dioxide (CO ₂)
1	2	3	4	5	The water cycle
1	2	3	4	5	Navigation - using maps and charts
1	2	3	4	5	Geography of Lake Huron
1	2	3	4	5	Geography of Lake St. Clair
1	2	3	4	5	Shipboard knot-tying (marlinspike)
1	2	3	4	5	Cultural aspects of the Great Lakes (i.e. shipwrecks, folk music)
1	2	3	4	5	Dissolved oxygen (DO)
1	2	3	4	5	pH levels

The following questions are for statistical purposes only.

8. Are you: male female

9. How many years have you been teaching? (*not including student teaching*)
 _____ years

10. What subjects do you currently teach? (*please list all subjects including team taught classes*)

11. What professional teaching organizations and/or environmental organizations do you belong to?

12. Do you participate in any extracurricular activities/hobbies related to the Great Lakes?

_____no

_____yes → **12b. If yes, please list the extracurricular activities/hobbies.**

13. In what year were you born? 19_____

14. Please circle the number that represents the highest grade you have completed.

Elementary
1 2 3 4 5 6 7 8

High School
9 10 11 12

College
13 14 15 16

Graduate Level
17 18 19 20 21 22

15. What was/were your college major(s)?

16. We would appreciate any additional comments about the GLEP or this survey.

Thank you for your participation with this survey!

Great Lakes Education Program (GLEP)
Spring 1996, Fall 1996 and Spring 1997 Teacher Survey II

Please take about 10 to 15 minutes to carefully complete this survey. Your participation will help us to evaluate the GLEP in order to improve programming. Please keep in mind that there are no "right" or "wrong" answers. When you are finished please hand the survey to GLEP personnel.

Participation in this survey is **voluntary**. You will not be penalized should you choose not to participate. **Your name will not be associated with your responses.** The sheet stapled to the front of the survey with your name and other information will be detached and kept separate from your responses. If you would like additional information about this evaluation, please contact Amy Nevala at 517/353-0308, GLEP staff at 810/469-5180 or Shari Dann at 517/353-0675.

The following questions are about your training.

The GLEP offers opportunities for teachers to become familiar with the program, including an orientation session and on-shore training (at the boat dock). Training materials are also available, including a teacher information packet and training videos.

1. What GLEP training opportunities did you participate in this year? (if you participated in training during another season or year, please indicate when)

2. Teacher orientation sessions are held early each fall and spring for participating GLEP cruise leaders. Have you attended a GLEP teacher orientation session?

☐ no

☐ yes → if yes, when? Spring 1997 or another year? _____

3. Did you use the GLEP video training tapes at any time during training?

☐ no → if no, why did you choose not to use the video training tapes?

☐ yes → if yes, which tapes did you use?

3b. If you answered *yes* to the previous question, please elaborate on how the video tapes were helpful, and how they could be improved.

4. Have you used the teacher information packet during the GLEP?

___no→ if no, why did you choose not to use it?

___yes → if yes, what sections did you use most? What sections did you use least?

5. Please list any suggestions, revisions or additions to the GLEP teacher information packet.

The following questions are about your comfort level and enjoyment of the GLEP.

6. Please circle the number in the left hand column that describes your comfort level in teaching the stations listed in the right hand column:

I did not teach this station	I am not comfortable teaching this station	I am somewhat uncomfortable teaching this station	I am somewhat comfortable teaching this station	I am comfortable teaching this station	Stations
0	1	2	3	4	Calcium hardness
0	1	2	3	4	Dissolved oxygen (DO) test
0	1	2	3	4	Shipboard knot tying (marlinspike)
0	1	2	3	4	Navigation - using maps and charts
0	1	2	3	4	Plankton net bottom sampling
0	1	2	3	4	Weather observation/water sample collection/carbon dioxide
0	1	2	3	4	Beat the teacher
0	1	2	3	4	pH test/water clarity/water color
0	1	2	3	4	Bottom sampling and water temperature

7. How could training be improved to help you better teach these stations?

8. Overall, what aspects of the GLEP did you most enjoy?

9. Overall, what aspects of the GLEP did you least enjoy?



10. Did you teach about Great Lakes topics in your classroom prior to the GLEP cruise?

☐ no

☐ yes →

If yes, please name or describe the lesson(s) you taught, and where you got the lesson(s) (i.e. GLEP pre-field activities, Project WET activities, etc.)

11. Do you intend to teach post-cruise activities?

☐ no

☐ yes →

if yes, please name or describe the lesson(s) you intend to teach, and where you will get the lesson(s) (i.e. GLEP pre-field activities, Project WET activities, etc.)

12. Would you be interested in participating with the GLEP during another season?

☐ no →

if no, what is/are your reason(s) for discontinuing to participate with the program?

☐ yes →

if yes, what is/are your reason(s) for continuing your participation with the program?

13. We would appreciate any additional comments about the GLEP or this survey.

Great Lakes Education Program (GLEP)
Spring 1996 and Spring 1997 Cruise Leader Survey I

Please take about 10 to 15 minutes to carefully complete this survey. Your participation will help us to evaluate the GLEP in order to improve programming and volunteer recruitment. Please keep in mind that there are no "right" or "wrong" answers. When you are finished please hand the survey to GLEP personnel.

Participation in this survey is voluntary. You will not be penalized should you choose not to participate. **Your name will not be associated with your responses.** The sheet stapled to the front of the survey with your name and other information will be detached and kept separate from your responses. If you would like additional information about this evaluation, please contact Amy Nevala at 517/353-0308, GLEP staff at 810/469-5180 or Shari Dann at 517/353-0675.

1. Have you volunteered as a cruise leader with the GLEP in the past:

☐ no

☐ yes →

1b. If yes, during what seasons and years were you a cruise leader?
(for example, spring 1992 and fall 1994)

2. How did you first hear about the GLEP cruise leader opportunity? (check all that apply)

☐ newspaper advertisement

☐ GLEP staff member

☐ newspaper article

☐ GLEP teacher

☐ radio public service announcement

☐ GLEP cruise leader

☐ community service club

☐ other, _____

☐ high school counselor or teacher

☐ don't remember

☐ Intermediate School District workshop

☐ other workshop, _____

3. What questions do you hope to have addressed during GLEP training?



4. What concerns do you have about participating as a GLEP cruise leader?

5. Please circle yes or no to the following activities.

yes	no	Have you ever gone fishing?
yes	no	Have you ever gone boating?
yes	no	Have you ever gone fishing on one of the Great Lakes?
yes	no	Have you ever gone camping?
yes	no	Have you ever been diving or snorkeling?
yes	no	Do you watch nature programs on TV about water, the oceans or the Great Lakes?
yes	no	Do you subscribe to or read magazines or books about water, oceans, or the Great Lakes?
yes	no	Do you teach about water, the oceans and the Great Lakes with any groups other than GLEP?

The following question asks about your knowledge of various topics.

6. Please circle the number in the left hand column that comes closest to describing your knowledge of each topic listed in the right hand column.

Unaware of this topic or its meaning	Aware of this topic or its meaning	Have some knowledge of topic, but inadequate for teaching	Have adequate knowledge for teaching topic	Have above average knowledge for teaching topic	Topic
1	2	3	4	5	Plankton (zooplankton, phytoplankton)
1	2	3	4	5	Wetlands
1	2	3	4	5	Aquatic food webs
1	2	3	4	5	Influence of aquatic environments on humans
1	2	3	4	5	Fisheries
1	2	3	4	5	Aquatic animals
1	2	3	4	5	Aquatic plants
1	2	3	4	5	Calcium in water (hardness, softness)
1	2	3	4	5	Water pollution
1	2	3	4	5	Carbon dioxide (CO ₂)
1	2	3	4	5	The water cycle
1	2	3	4	5	Navigation - using maps and charts
1	2	3	4	5	Geography of Lake Huron
1	2	3	4	5	Geography of Lake St. Clair
1	2	3	4	5	Shipboard knot-tying (marlinspike)
1	2	3	4	5	Cultural aspects of the Great Lakes (i.e. shipwrecks, folk music)
1	2	3	4	5	Dissolved oxygen (DO)
1	2	3	4	5	pH levels

The following questions are for statistical purposes only.

7. Are you: male female

8. Please circle the number that represents the highest grade you have completed.

Elementary

High School

College

Graduate Level

1 2 3 4 5 6 7 8

9 10 11 12

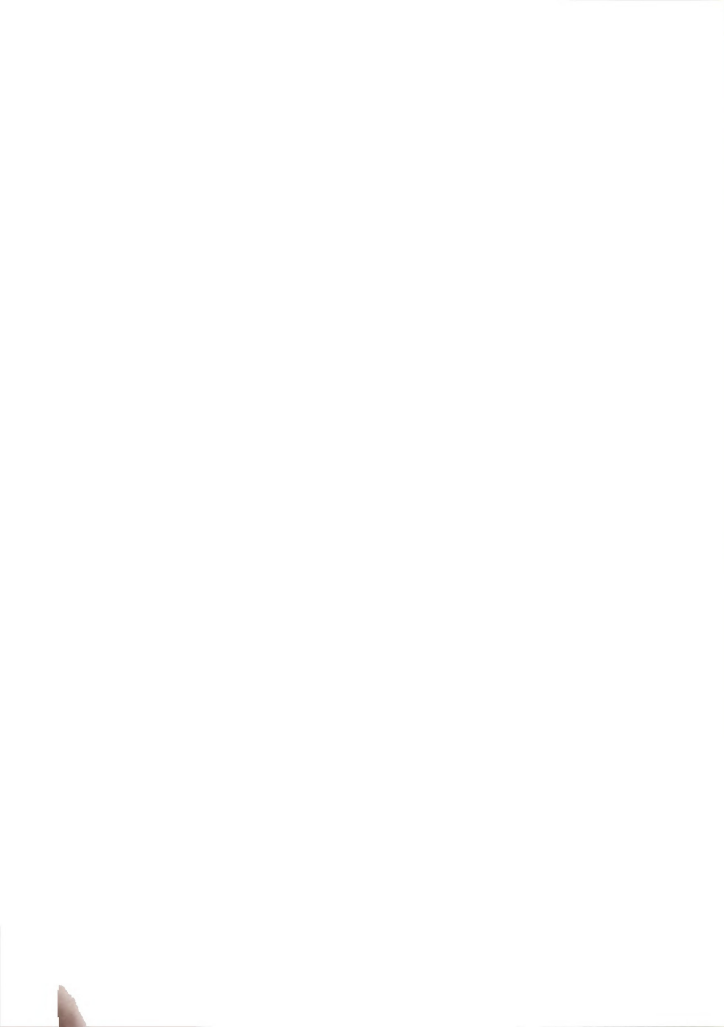
13 14 15 16

17 18 19 20 21 22

9. Are you currently a student?

___no

___yes → 9b. If yes, are you in *high school* or *college*? (circle one)



9c. If you are a *college student*, what is your major and career interests?

9d. If you are a *high school student*, what are your college and/or career interests?

10. Are you currently employed outside the home?

☐ no → if no, list any former occupations:

☐ yes → if yes, list current occupations:

11. Are you currently retired?

☐ no

☐ yes

12. In what year were you born? 19____

13. Do you have children?

☐ no

☐ yes → **13b. If yes, have they participated, or will they participate as a student with the GLEP? When?**

14. Do you participate in any extracurricular activities/hobbies related to the Great Lakes?

☐ no

☐ yes → **14b. If yes, please list the extracurricular activities/hobbies.**

15. How many different organizations do you volunteer for?

☐ this is my first experience as a volunteer

☐ 1 other organization (please list) _____

☐ 2 other organizations (please list) _____

☐ 3 or more other organizations (please list) _____

16. We would appreciate any additional comments about the GLEP or this survey.

Thank you for your participation with this survey!

**Great Lakes Education Program (GLEP)
Spring 1996 and Spring 1997 Cruise Leader Survey II**

Please take about 10 to 15 minutes to carefully complete this survey. Your participation will help us to evaluate the GLEP in order to improve programming and volunteer recruitment. Please keep in mind that there are no "right" or "wrong" answers. When you are finished please hand the survey to GLEP personnel.

Participation in this survey is **voluntary**. You will not be penalized should you choose not to participate. **Your name will not be associated with your responses.** The sheet stapled to the front of the survey with your name and other information will be detached and kept separate from your responses. If you would like additional information about this evaluation, please contact Amy Nevala at 517/353-0308, GLEP staff at 810/469-5180 or Shari Dann at 517/353-0675.

The following questions are about your training.

The GLEP offers opportunities for cruise leaders to become familiar with the program, including an orientation session, on-shore training (at the boat dock) and three training cruises. Training materials are also available, including a cruise leader training packet and training videos.

1. What training opportunities did you participate in this year? (if you participated in training during another season, please indicate when)

2. Cruise leader orientation sessions are held early each fall and spring for participating GLEP cruise leaders. Have you attended a GLEP cruise leader orientation session?

☐ no

☐ yes → if yes, when? Spring 1996 or another year? _____



3. Did you use the video training tapes at any time during training?

___no→ if no, why did you choose not to use the video training tapes?

___yes→ if yes, which tapes did you use?

3b. If you answered yes to question four, please elaborate on how the tapes were helpful, and how they could be improved.

4. Have you used the cruise leader information packet during the GLEP?

___no→ if no, why did you choose not to use it?

___yes → if yes, what sections did you use most? What sections did you use least?

5. Please list any suggestions, revisions or additions to the cruise leader information packet.

6. How would you assess the impact of cruise leader training on (circle the number that applies to you):

Impact	Training was poor in this area.	Training was fair in this area.	Training was good in this area.	Training was very good in this area.	Training was excellent in this area.
Increasing your knowledge about the Great Lakes.	1	2	3	4	5
Improving your confidence in teaching Great Lakes issues to students.	1	2	3	4	5
Improving your ability to work effectively with teachers and parents.	1	2	3	4	5
Improving your ability to teach cruise stations.	1	2	3	4	5
Increasing your interest in Great Lakes issues.	1	2	3	4	5

The following questions ask about your comfort level and level of enjoyment with the GLEP.

7. Please circle the number in the left hand column that describes your comfort level in teaching the stations listed in the right hand column:

I did not teach this station	I am not comfortable teaching this station	I am somewhat uncomfortable teaching this station	I am somewhat comfortable teaching this station	I am comfortable teaching this station	Stations
0	1	2	3	4	Calcium hardness
0	1	2	3	4	Dissolved oxygen (DO) test
0	1	2	3	4	Shipboard knot tying (marlinspike)
0	1	2	3	4	Navigation - using maps and charts
0	1	2	3	4	Plankton net bottom sampling
0	1	2	3	4	Weather observation/water sample collection/carbon dioxide
0	1	2	3	4	pH test/water clarity/water color
0	1	2	3	4	Bottom sampling and water temperature

8. How could training be improved to help you better teach these stations?

9. Overall, what aspects of the GLEP did you most enjoy?

10. Overall, what aspects of the GLEP did you least enjoy?

11. Would you be interested in serving as a cruise leader during another season?

 no → if no, what is/are your reason(s) for discontinuing to participate with the program?

 yes → if yes, what is/are your reason(s) for continuing your participation with the program?

12. We would appreciate any additional comments about the GLEP or this survey.

Thank you for your participation with this survey!



**Great Lakes Education Program (GLEP)
Spring 1996 Cruise Leader Telephone Survey II**

Approximately how many cruises did you volunteer on during the spring 1996 season? ____ Were they considered training cruises or were you solely in charge of teaching a particular station?

The following questions are about your training.

The GLEP offers opportunities for cruise leaders to become familiar with the program, including an orientation session, on-shore training (at the boat dock) and three training cruises. Training materials are also available, including a cruise leader training packet and training videos.

1. What training opportunities did you participate in spring 1996? (if you participated in training during another season, please indicate when)

2. Cruise leader orientation sessions are held early each fall and spring for participating GLEP cruise leaders. Have you attended a GLEP cruise leader orientation session?

____no

____yes → if yes, when? Spring 1996 or another year? _____

3. Did you use the video training tapes at any time during training?

____no → if no, why did you choose not to use the video training tapes?

____yes → if yes, which tapes did you use?

3b. Please elaborate on how the tapes were helpful, and how they could be improved.

4. Have you used the cruise leader information packet during the GLEP?

no → if no, why did you choose not to use it?

yes → if yes, what sections did you use most? What sections did you use least?

5. Please list any suggestions, revisions or additions to the cruise leader information packet.

6. Now I am going to ask you to rate your training based on five choices. How would you assess the impact of training on:

Impact	Training was poor in this area.	Training was fair in this area.	Training was good in this area.	Training was very good in this area.	Training was excellent in this area.
Increasing your knowledge about the Great Lakes.	1	2	3	4	5
Improving your confidence in teaching Great Lakes issues to students.	1	2	3	4	5
Improving your ability to work effectively with teachers and parents.	1	2	3	4	5
Improving your ability to teach cruise stations.	1	2	3	4	5
Increasing your interest in Great Lakes issues.	1	2	3	4	5



The following questions ask about your comfort level and level of enjoyment with the GLEP.

7. I am going to state a cruise leader station then ask you to rate your comfort level in teaching the station.

I did not teach this station	I am not comfortable teaching this station	I am somewhat uncomfortable teaching this station	I am somewhat comfortable teaching this station	I am comfortable teaching this station	Stations
0	1	2	3	4	Calcium hardness
0	1	2	3	4	Dissolved oxygen (DO) test
0	1	2	3	4	Shipboard knot tying (marlinspike)
0	1	2	3	4	Navigation - using maps and charts
0	1	2	3	4	Plankton net bottom sampling
0	1	2	3	4	Weather observation/water sample collection/carbon dioxide
0	1	2	3	4	pH test/water clarity/water color
0	1	2	3	4	Bottom sampling and water temperature

8. How could training be improved to help you better teach these stations?

We are just about through with the survey. I'll remind you that your name will not be associated with your responses on the remaining questions.

9. Overall, what aspects of the GLEP did you most enjoy?

10. Overall, what aspects of the GLEP did you least enjoy?

11. Would you be interested in serving as a cruise leader during another season?

___no→ if no, what is/are your reason(s) for discontinuing to participate with the program?

___yes → if yes, what is/are your reason(s) for continuing your participation with the program?

12. We would appreciate any additional comments about the GLEP or this survey.

Thank you for your participation with this survey!

APPENDIX C: GLEP Survey Cover Sheets

GLEP SURVEY COVER SHEETS

Great Lakes Education Program (GLEP) [Season, year] Teacher Survey One

Name _____

Training Date _____

Great Lakes Education Program (GLEP) [Season, year] Teacher Survey Two

Name _____

School/District _____

Today's Date _____

Cruise Date _____

Were you on the:

☐ Big Boat (Friendship)

☐ Small Boat (Clinton)

Was your cruise in the:

☐ morning (a.m.)

☐ afternoon (p.m.)

Great Lakes Education Program (GLEP)
[Season, year] Volunteer Cruise Leader Survey One

Name _____

First Training Date _____

Great Lakes Education Program (GLEP)
[Season, year] Volunteer Cruise Leader Survey Two

Name _____

Today's Date _____

How many cruises did you volunteer on this season? (approximate if necessary)

**APPENDIX D: Project Approval by the Michigan State University Committee on
Research Involving Human Subjects (UCRIHS)**



**MICHIGAN STATE
UNIVERSITY**

April 12, 1996

TO: Anne Bierzychudek
4A Natural Resources Bldg.

RE: IRB#: 95-510
TITLE: MULTI-DISCIPLINARY, VESSEL-BASED, ENVIRONMENTAL
EDUCATION: AN EVALUATION OF THE GREAT LAKES
EDUCATION PROGRAM
REVISION REQUESTED: 04/05/96
CATEGORY: 1-B
APPROVAL DATE: 10/02/95

The University Committee on Research Involving Human Subjects' (UCRHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRHS approved this project and any revisions listed above.

RENEWAL: UCRHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



**OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES**

University Committee on
Research Involving
Human Subjects
(UCRHS)
Michigan State University
232 Administration Building
East Lansing, Michigan
48824-1045
517/355-2180
FAX: 517/432-1171

**PROBLEMS/
CHANGES:** Should either of the following arise during the course of the work, investigators must notify UCRHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 432-1171.

Sincerely,

David E. Wright
David E. Wright, Ph.D.
UCRHS Chair

DEW:bed

cc: Shari L. Dann
Amy Nevala

FAX	AMN NEVALA
TO:	
DEPT:	FAX #:
FROM:	PHONE:
CO:	FAX #:
Post-It brand fax transmittal memo 787	
NO. OF PAGES 1	

MICHIGAN STATE 127
UNIVERSITY

July 26, 1996

TO: Shari L. Dann
11B Natural Resources Bldg.

RE: IRB#: 95-510
TITLE: MULTI-DISCIPLINARY, VESSEL-BASED, ENVIRONMENTAL
EDUCATION: AN EVALUATION OF THE GREAT LAKES
EDUCATION PROGRAM
REVISION REQUESTED: N/A
CATEGORY: 1-B
APPROVAL DATE: 07/26/96

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



**PROBLEMS/
CHANGES:**

Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

**OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES**

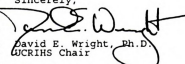
If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 432-1171.

University Committee on
Research Involving
Human Subjects
(UCRIHS)

Michigan State University
232 Administration Building
East Lansing, Michigan
48824-1046

517/355-2180
FAX: 517/432-1171

Sincerely,


David E. Wright, Ph.D.
UCRIHS Chair

DEW:bed

cc: Amy Nevala
Anne Bierzychudek

The Michigan State University
IDEA is Inspiring Diversity
Excellence in Action

MSU is an affirmative action,
equal opportunity institution

APPENDIX E: GLEP Educator Survey Cover Letters

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

(Date)

(Teacher name)
(Teacher address)

Dear (Teacher name):

In (month, year) you participated with the Great Lakes Education Program (GLEP) cruise with your class. I hope it was enjoyable for both you and your students.

We are conducting a survey evaluation of the GLEP. Before your GLEP cruise, you completed the first part of this evaluation. We would appreciate your input with the second part of the survey. Your responses will help GLEP personnel to evaluate and improve the vessel-based education program for future years. There are more detailed instructions regarding your participation on the enclosed survey.

Please return the survey in the enclosed, self-addressed envelope before (Date). If you have any questions please do not hesitate to call me at 517/353-0308.

Thanks for your participation!

Sincerely,

Amy E. Nevala
Graduate Research Assistant
Department of Fisheries and Wildlife
Michigan State University

Enclosures

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
13 NATURAL RESOURCES BUILDING
(517) 355-4477
FAX (517) 432-1699

EAST LANSING • MICHIGAN • 48824-1222

(January 1997)

(Teacher name)

(Teacher address)

Dear (Teacher name),

Last fall, you and your class participated with the Great Lakes Education Program (GLEP), a vessel-based, environmental education program located in Mt. Clemens, Michigan. I am currently evaluating the GLEP through research at Michigan State University under the guidance of Dr. Shari Dann, an assistant professor in the Department of Fisheries and Wildlife.

By filling out the enclosed surveys, your input will help us to improve GLEP programming for participating teachers. Please take about 10 to 15 minutes to carefully complete both surveys. Keep in mind that there are no "right" or "wrong" answers on the surveys.

Participation with the surveys is voluntary. You will not be penalized should you choose not to complete them. Your name will not be associated with your responses. The sheet stapled to the front of the survey with your name and other information will be detached and kept separate from your responses. If you would like additional information about this evaluation, please contact Amy Nevala at 517/353-0308, GLEP staff at 810/469-5180 or Shari Dann at 517/353-0675.

When you are finished, please mail the surveys in the enclosed self-addressed, stamped envelope. Either myself or an assistant will be calling in the next week to find out if you have any questions about the surveys.

Thanks in advance for your time and input.

Sincerely,

Amy E. Nevala
Graduate Research Assistant
Department of Fisheries and Wildlife
Michigan State University

Enclosures

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
15 NATURAL RESOURCES BUILDING
(517) 455-4477
FAX (517) 452-1699

EAST LANSING • MICHIGAN • 48824-1222

(Date)

(Teacher/Volunteer Cruise Leader name)
(Teacher/Volunteer Cruise Leader address)

Dear (Teacher/Volunteer Cruise Leader name):

Thank you for agreeing to fill out a survey for the Great Lakes Education Program (GLEP) evaluation. As I mentioned on the phone, your input will help us improve the program for (teachers/volunteer cruise leaders) like you, as well as to expand vessel-based, environmental education opportunities to other around the Great Lakes.

When you are finished please return the survey in the self-addressed, stamped envelope. If you have any questions, please call me at 517/353-0308. Thank you again for your time.

Sincerely,

Amy E. Nevala
Graduate Research Assistant
Department of Fisheries and Wildlife
Michigan State University

Enclosures

<p style="text-align: center;">Telephone Questionnaire Volunteer Cruise Leader Spring 1996 Follow-up Survey Great Lakes Education Program (GLEP)</p>

Name of volunteer cruise leader:

Phone #:

Contact tries: Date Time Survey complete?

Hello, my name is (name). I am calling from Michigan State University regarding the Great Lakes Education Program, which you were involved with during the spring of 1996. Do you remember being involved with the program?

(If no, explain the program, ask them general questions about their involvement.)

(If yes, go on reading these directions.)

There are two parts to the survey. The second part we weren't able to get from you at the time of your involvement. Having both of your surveys will help us to improve the program, regardless of your level of involvement. Will you take about 10 minutes now to answer the questions from that survey?

(If no, ask "could we arrange a time I could call you back to complete the survey?")

(If still no, say "thank you for your time and involvement.")

(If yes, say "great, thank you. I want to remind you that your name will not be associated with your responses.")

GO ON TO FIRST SURVEY QUESTION...

APPENDIX F: March 1997 GLEP Writing Retreat



**GLEP Writing Retreat
March 21 & 22, 1997
St. Clair Inn, St. Clair, Michigan**

TABLE OF CONTENTS

- 1) GLEP Writing Retreat Agenda
- 2) GLEP Writing Retreat Minutes added to Agenda
- 3) Appendix A- Commonly asked questions about the GLEP replication guide.
- 4) Appendix B- Dissemination Guide Notes
- 5) Appendix C- Discussion and review of NAAEE Guidelines for Excellence: What School-age Learners Should Know and Be Able To Do
- 6) Appendix D- Discussion and review of Environmental Education Materials: Guidelines for Excellence
- 7) Appendix E- Group Comments About the Retreat
- 8) Appendix F- Mailing List of Participants
- 9) Appendix G- "What is Maritime Folklife?"

GLEP Writing Retreat
March 21 & 22, 1997
St. Clair Inn, St. Clair, Michigan

Day One

10:00 AM - Noon

Introductions:

- GLEP personnel; MSU research staff; Task Force representatives; Key beneficiaries.

Review workshop agenda and opportunities.

Purpose of workshop:

- to review GLEP research findings.
- to begin the process of drafting the dissemination guide.
- to update the GLEP 4th grade curriculum.

Review of GLEP 1996 operations:

- Accomplishments/Setbacks
- Attendance
- Changes/updates

Noon

LUNCH

1:30-4:30

Updates on GLEP Research/Evaluation Findings (Each ½ hour presentation will be followed by ½ hour of facilitated brainstorming.)

- 1) GLEP impacts on youth- Anne Williamson
 - Key results: student attitudes, knowledge, and behavioral intentions.
 - Implications and recommendations for GLEP
 - Critical curriculum review (findings & recommendations).
- 2) GLEP Teachers/Cruise Leaders- Amy Nevala
 - Survey results: Motivations for participation and perceptions of GLEP.
 - Implications for GLEP programming.
- 3) Folklife resources- Hawk Tolson
 - Local resources for GLEP.
 - Implications for GLEP curriculum.
 - Suggestions for dissemination guide (locating folklife resources in your area.)

5:00-7:00

DINNER

7:00-9:00

Organizing and energizing for work! (Break down into groups)

- 1) Dissemination Guide- develop detailed how-to outline
 - Design program: Review existing GLEP program implementation materials.
 - Manage administrative aspects: Discuss needed elements and how to develop them.
 - Review "Prototype dissemination guide" and outline, and decide on a final format.
- 2) Curriculum Revisions:
 - Review NAAEE Learner and Materials guides.

7:00-8:00

8:00-9:00	<ul style="list-style-type: none"> -Revise GLEP curriculum framework- Incorporate MI standards and benchmarks and NAAEE recommendations. -Activity Layout- identify which activities from the curriculum work best for GLEP and develop standard activity layout.
Day Two	
9:00 AM- Noon	<p>Work Groups Continued:</p> <ol style="list-style-type: none"> 1) Dissemination Guide- develop detailed how-to outline <ul style="list-style-type: none"> -Manage administrative aspects: -Design program 2) Curriculum Revisions: <ul style="list-style-type: none"> -Revise GLEP curriculum framework -Activity Layout
Noon- 2:00	<p>SACK LUNCH</p> <ol style="list-style-type: none"> 1) Reimbursement procedures explained. 2) Work groups report out on progress/tasks to be done.
2:00	Field trip to sail maker.



**GLEP Writing Retreat
March 21 & 22, 1997
St. Clair Inn, St. Clair, Michigan
Minutes (unbolded) added to Agenda (bolded)**

Day One10:00 AM - Noon **Introductions of:**

**GLEP personnel; MSU research staff; Task Force
representatives; Key beneficiaries.**

Steve Stewart led the introductions. Total attendance was 21 people.

Individual introductions:

- 1) Patrick Livingston - MSUE and MI Sea Grant - GLEP (volunteer coordinator).
- 2) Bill Stark - Michigan 4th grade teacher and GLEP task force member.
- 3) Art Carter - Detroit Public Schools. Will also be developing a charter school for Marine Tech/Science on Detroit River.
- 4) LuAnne Kozma - MSU Museum, Extension, and former curator/archivist for city of St Clair shores
- 5) Alice Miller - Michigan 6th grade teacher and former science chair.
- 6) Terry Gibb - MSUE and MI Sea Grant - GLEP (classroom coordinator).
- 7) Lynda Billotto - MI Sea Grant - GLEP (general coordinator).
- 8) Tom Smith - Chief of interpretive services, Detroit Metro Park- interested in improvements at his end to better serve students. He is thinking of developing a vessel program on Lake Erie. A voyager canoe program has been in existence for over 15 years in the wetlands and marshes.
- 9) Bette Nibel - Macomb Community College instructor. She would like to expand GLEP for older ages (teens). 4-H club leader at present.
- 10) Dave Green - NY Sea Grant - about 80% nonformal education and 4-H, sport fishing.
- 11) Jim Lubner - WI Sea Grant - Education Specialist. Education responsibilities include: Aquatic and natural resource issues, pre and inservice education for teachers and teachers at Audubon, Operation Pathfinder (fully funded teacher workshop on oceanography and coastal processes, 1997 Duluth, MN)
- 12) Dave Strand - GVSU vessel program and former teacher. Two vessels and two teachers and deckhand on board each boat.
- 13) Carey Rogers - Earth Tomorrow, NWF Regional Office
- 14) Mark Mitchell - Inland Seas Education Association, Education Coordinator
- 15) Shari Dann - MSU Fisheries and Wildlife and Extension, Asst. Professor
- 16) Hawk Tolson - MSU Resource Development and Extension, Graduate Student
- 17) Amy Nevala - MSU Fisheries and Wildlife, Graduate Student
- 18) Anne Williamson - MSU Fisheries and Wildlife and Extension, Graduate Student
- 19) Michelle Haggerty - MSU Fisheries and Wildlife, Undergraduate (recorder)
- 20) Heidi Prather - MSU Fisheries and Wildlife, Undergraduate (recorder)
- 21) Steve Stewart - MSUE and MI Sea Grant - GLEP, Program Director

Review workshop agenda and opportunities.

We have brought everybody together at this retreat so that we can all share our expertise in different areas in order to increase the effectiveness of GLEP.

Purpose of workshop:

To review GLEP research findings.

To begin the process of drafting the dissemination guide.

To update the GLEP 4th grade curriculum.



Review of GLEP 1996 operations:

The review started off with a viewing of the GLEP promotional video. In a brief overview of the program, Stewart stated that GLEP consists of three phases: pre-cruise, cruise, and post-cruise. The classroom manual/curriculum has four focus areas with pre- and post-cruise activities, and the vessel experience consists of 8 learning stations. The time frame for Great Lakes classroom activities is variable. It is suggested that teachers familiarize their students with the program at least 4 weeks prior to the cruise. Some teachers also choose to teach about the Great Lakes throughout the whole year.

Accomplishments/Setbacks

Stewart and Gibb mentioned that foul weather was a minor setback. Livingston stated that volunteers are needed. Participation is growing and both fall and spring agendas are full.

Attendance

Gibb said that 77 total classes participated in the spring of 1996.

Changes/updates

Concerns that were mentioned include meeting National Science Standards and improving students' skills.

Noon

LUNCH

1:30-4:30

Updates on GLEP Research/Evaluation Findings (Each ½ hour presentation will be followed by ½ hour of facilitated brainstorming.)

1) GLEP impacts on youth- Anne Williamson

Key results: student attitudes, knowledge, and behavioral intentions.

The focus of this research was to measure the impacts of the GLEP vessel experience on fourth grade students' changes in Great Lakes knowledge, attitudes toward the Great Lakes, and responsible behavioral intentions. A valid and reliable written survey was developed from eight pre-existing instruments. The study incorporated a quasi-experimental, pre- post-test design involving 39 fourth grade classrooms (945 students). Students exhibited a highly significant increase in Great Lakes knowledge, a significant increase in girls' positive attitudes toward the Great Lakes, and no change in responsible behavioral intentions as a result of the GLEP vessel experience. Additionally, girls had significantly higher pre- post-cruise behavioral intentions than boys did, and boys had significantly more Great Lakes and aquatic experiences than girls did.

Implications and recommendations for GLEP

Recommendations include conducting longer-term follow-up evaluations with students, continuing evaluation of cruise experience and written curriculum effects on students, improving measurement of attitudes and behavioral intentions, and strengthening cruise and written curricula.

Critical curriculum review (findings & recommendations).

The North American Association for Environmental Education (NAAEE) Guidelines for Excellence, State of Michigan Education Standards, and NAAEE Environmental Education Materials Guidelines were presented and related to the GLEP curriculum. Recommendations to GLEP include strengthening the curriculum framework to include skills and behavioral goals and objectives for students, and developing a curriculum text that is easy to use with cross-references and activities in a consistent format as in Project WET.

Discussion which followed the presentation included:

1) What is to be done about variable amount of student exposure to pre- post- activities? (Livingston)

Answer: The data collected from Anne and Amy's studies will be used to determine the reasons teachers use or do not use activities, and whether or not the use of these pre-cruise activities increased students' pre-test scores.

2) Since there was no change in behavioral intentions, this area needs to be addressed.

3) Was it (the evaluation) all natural-resource, science oriented and/or testing only natural-science measurements? (Kozma)

Answer: Yes, the survey was mostly science based because the previous seven surveys that were referenced mainly contained science related questions.

4) What part of knowledge gain can be attributed to classroom? (Steve)

Answer: We do not know since only the cruise experience was evaluated.

Future evaluation, after making curriculum revisions, will test all three phases of GLEP.

5) Rogers noted the importance of securing funding for this type of research.

6) What are some of the reactions from educators?

-Consistent formatting of the curriculum relates to its usability.

-More teachers are used to the Project WET activity format.

-Wary of environmental advocacy (touchy-feely) versus environmental education (developing skills, thought processes)

7) Stewart suggested borrowing activities from Project WET, but to be aware of copyright issues.

2) GLEP Teachers/Cruise Leaders- Amy Nevala

One purpose of the March 1997 GLEP writing retreat was to share research results and begin discussion of the GLEP dissemination/replication guide, referred to in the research proposal as "Odyssey: A Guide to Organizing and Conducting Local Vessel-Based Education

Programs." It will be used by potential GLEP coordinators as a reference or "road-map" to developing a program of their own.

Goals of the GLEP writing retreat... thinking about the dissemination guide

Identify gaps in existing/drafted materials

Recommendations to strengthen materials

Types of roles people would be interested in playing

Identify sets of tasks for the future

Survey results: Motivations for teachers/volunteer participation and perceptions of the GLEP

This study will investigate the following research questions:

1. What existing programming strategies are the most prevalent in recruiting, training and maintaining educators?
2. How are the educators' life experiences, knowledge and comfort level related to their involvement with the GLEP?
3. What are the educators' perceptions of the program and how do these encourage or discourage participation with the GLEP?

This research supports the idea that curriculum developers, teachers and students are important evaluators of educational programming as a way to improve how efficiently and effectively a program is planned, taught and learned (Bennett 1994).

Methods of evaluation include pre-cruise surveys (focused on motivations) and post-cruise surveys (focused on program perceptions). Both surveys included questions re: knowledge, concerns, comfort levels and Great Lakes related activities.

Teachers were surveyed in springs 1996 and 1997 and fall 1996. Cruise leaders were surveyed fall 1996 and spring 1997.

Not all data have yet been analyzed, however I did provide some initial results from the fall 1996 teacher and cruise leaders surveys. A copy of these results are attached SEE APPENDIX A.

Implications of research results for GLEP programming were discussed in general terms at this point throughout the evening dissemination guide breakout group as well as during the next morning's meeting.

3) Folklife resources- Hawk Tolson and LuAnne Kozma

Kozma briefly explained folklife as "Anthropology in your own back yard." She described the field of folklore's early start in the U.S. in 1888 with the founding of the American Folklore Society, whose purpose was to study the 'fast-vanishing forms of folklore, such as those traditions

by Native-Americans, blacks, and children." At that time, folklore was considered to be vanishing, and that it was something "other people" had, not yourself. The field has had many influences on it through the years, including history, anthropology, sociology, psychology, art history, and arts education. In time, the terms folklore and folklife merged to become somewhat synonymous.

Some common misconceptions about folklore and folklife include: old, history, rural, cute, false wives tales, superstition, lost arts, relics and survivals, what other people have, and things that are not familiar/close to you. Folklife are traditions that are passed on from person to person in a folk group, in an informal way, by word of mouth or by example. Folklife isn't only something people in the past had, but current traditions we continue today. We all have traditions, and we all belong to many folk groups. Examples of folk groups are people who share: ethnicity, stages of life, age, gender, the region in which they live, occupation, interests, hobbies, family, and recreation. Some genres or categories of folklife include: custom, narrative, music, dance, food, celebration, belief, games, work, skill, craft, and architecture. The word "maritime" means having to do with water. Therefore, maritime folklife includes traditions and folklife of a maritime group of people, whether that group is an occupational group of maritime workers, or simply a community situated on the water in which community members feel a connection to the water. Examples of maritime folklife include; boatbuilding, fish foodways, nautical terminology, a festival celebrating the sea, a fishing contest, fish luremaking, fishing techniques, and weatherlore.

Local resources for GLEP.

Tolson described how local GLEP resources were found. First, topographical maps were connected to form one large map from which landmarks and interesting features could be noted. Yellow pages, historical societies, museums, yachtsman's clubs, watershed council Clinton River Watershed Council (CRWC), archives and libraries were also used to gather interesting local history, information, and leads to potential tradition-bearers. The Historical Society may even have a slide show available.

Interesting finds in the Clinton River area include: 1) "Boat Town" which is where most of the boats in the area are located 2) the Cadet Program which trains young sea-persons 3) the Aston Family, long-time owners of the Clinton River Marina, 4) the Doyle Boston Sail Making Company in Mt. Clemens and 5) the Anchor Bay Festival of Lights, a recreational folklife/maritime festival and boat parade.

Hawk showed slides of some of the tradition-bearers we interviewed.

Implications for GLEP curriculum.

- Strengthen the "Lookout Challenge" activity on board the vessel by including more points along the river.
- Sing a folksong or involve kids with a tradition bearer or traditional food.
- Boat names can involve or result in interesting tales.
- Voyager canoes of the 17th and 18th centuries might be included.
- A knot board could be added to Marlinspike activity aboard the boat.

Suggestions for dissemination guide (locating folklife resources in your area.)

See Appendix G-"What is Maritime Folklife?"

5:00-7:00 **DINNER**

7:00-9:00 **Organizing and energizing for work! (Break down into groups)**

1) Dissemination Guide- develop detailed how-to outline

Facilitator: Amy Nevala

Group participants: Steve Stewart, Terry Gibb, Hawk Tolson, Dave Green, Patrick Livingston, Shari Dann

Notetaker: Michelle Haggerty

This evening was designated as 1) a follow-up question and answer session from the day's presentation 2) a brainstorming session anticipating a more focused Saturday morning session. Questions brought up by attending participants are italicized below, followed by the discussion highlights.

Who is this guide for?

Extension offices primary MI but eventually extending throughout the Great Lakes region. counties might be targeted first, surrounding states second.

How specific is the guide going to be?

General consensus that the first guide/curriculum will not have marine content. It will be freshwater/watershed focused.

Is this a marketing thing where other people have seen it and will request material to get started? Are we working on a document to sell the program on why others should have it or a how do I get started book?

Are we working on selling a program? Setting up a program? Or both? Do we start by assuming we've got interested people?

We are going to need to develop an awareness piece (perhaps a promotional video and/or website -- we need to start by describing what we've done, accomplishments) then come up with a GLEP cookbook which is actually the recipe for putting a GLEP together.

Looking at the programs with that track record of success.

We need to address what comes first—Funding? Boat? Commitment? And who or what is going to get the commitment needed for a successful program.

When should we work on the awareness piece?

What kind of givens do we have, such as is it geared toward specific classes,... you need a 45 foot boat before you can make the program work?

This is for school classes—sets parameters for type of boat needed.

Need a task force to develop and carry the program.

Volunteers are needed, except in magical cases where huge grant monies are supporting a program...

How will it be piloted?

The GLEP has identified one to three potential counties that may be used to pilot the program within the next year or two.

Market/audience—who is it for? Should there be a section that targets specific grade levels?

Plans to continue targeting upper level elementary children, but the plan is still intact to involve 7th and 10th graders down the road.

State's standards and the MEAP are big concerns for teachers that need to be addressed...

Do other people think that we should keep going with the 4th grade?—Does it have to target a specific age group?

Is the curriculum so complete that it's for 4th graders—It's that way because MSU targeted 4th grade because that is part of their requirements for the year to learn about the Great Lakes.

What kind of base have kids had before they get to 4th, 5th, and 6th grade?

When the GLEP started, what were the most useful tools?

Definitely resource people (including task force folks).

Designing a strategic plan.

Evaluating your resources.

How are we going to expect other programs to start their GLEP? Actual dissemination—what is the plan for this?

That's the importance of a task force...picked up the program and took it as their own...

Will the guide stand on its own...vs. having a team go into the new GLEP and help them start?

What business are we in?

Stepping back to roots—there's a fine line between being too broad and too narrow.

How did you pick the task force?

Just picked people that expressed interest



Regarding the table of contents and the packaging/formatting of the guide....

Are we starting general—then moving on to show GLEP as a case study and then designing your own?--YES

3 ring binders are good!

Do we want it more like a workbook?

What about room for creativity within the guide?

Allowing programs flexibility when creating a program.... so not to limit there own imaginations... the guide should be developed with this in mind.

Do we need a check list for other programs to follow? If so what type? How extensive?

2) Curriculum Revisions: Lead by Anne Williamson

Group Participants: Bette Nibel, Jim Lubner, Alice Miller, LuAnne Kozma, David Strand, Bill Stark, Dr. Arthur Carter, Tom Smith, Carey Rogers, Shari Dann, Steve Stewart

7:00-8:00

Review NAAEE Learner and Materials guides.

The North American Association for Environmental Education (NAAEE) has developed a set of *learner guidelines/framework* for programs to follow when developing curricula. These guidelines have been carefully scrutinized and suggest a complete set of subjects and objectives to be covered by all thorough environmental education programs. These guidelines also follow closely with state and national education standards.

The NAAEE has published a document that suggests guidelines for environmental education *materials*. This guide suggests ways to present environmental issues in a non-biased manner, activity layouts that are used most easily by teachers, and several other guidelines.

8:00-9:00

Revise GLEP curriculum framework- Incorporate MI standards and benchmarks and NAAEE recommendations.

Small groups reviewed 4 of the 7 NAAEE guidelines and revised them as necessary to fit with the GLEP program. Some State of Michigan Standards were also added to a few of the guidelines for completeness. The NAAEE guidelines that were reviewed include 1b) Knowledge of Human Processes and Systems, 2) Inquiry Skills, 4) Skills for Decision and Action, and 5) Sense of Personal Responsibility.

Activity Layout- Identify which activities from the curriculum work best for GLEP and develop standard activity layout.

See Day Two – Work groups continued.

Day Two

9:00 AM- Noon

Work Groups Continued:

Prior to starting the day's agenda, the dissemination group met briefly with the curriculum group for a five minute update of the previous evening's accomplishments.

1) Dissemination Guide- develop detailed how-to outline

Facilitator: Amy Nevala

Group participants: Terry Gibb, Hawk Tolson, Dave Green, Patrick Livingston (for a short time), Lynda Billotto (GLEP coordinator), Mark Mitchell (ISEA)

Notetaker: Michelle Haggerty

Agenda for Saturday March 22, 1997 Dissemination Guide Group

Focus: Developing a more detailed "how-to" outline using focus questions.

9:00 Update curriculum group--recap issues discussed last p.m.

What are some consensus items? (Summary)

Focal Question 1: How to develop a task force?

Focal Question 2: Potential challenges to GLEP programming?

10:15-10:30 Break

Focal Question 3: Volunteers and other community resources

"Parking lot issues" discussion

11:45 Wrap-up, summary, evaluation (did we meet the goals?)

Where do we go from here?

The discussion of Focal Questions 1, 2, and 3 are summarized in detail in the attached Appendix B.

Dissemination guide group: What are some consensus items (from last night's discussion)?

1. We need a program awareness piece (video) "what GLEP did" as well as a duplication guide (cookbook) to describe "how can you do it."
2. With regard to the guide's formatting... checklists are good as well as strategic plan questions (goals and objectives)
3. Do we know who this is for...Extension offices? Primarily in Michigan and throughout the Great Lakes region.

4. We know the guide is the wrapping on an adaptable curriculum.

5. We know the importance of:

-task force

-identifying challenges within the program....the GLEP guide will be proactive in addressing these concerns.

-identifying volunteers, community resources (i.e. folklife) at the start of any new program

2) Curriculum Revisions:

Revise GLEP curriculum framework

The 4 NAAEE guidelines reviewed and edited to fit with GLEP on day 1 were presented by the small groups to the rest of the curriculum review team. Suggestions and ideas were discussed. The current GLEP curriculum framework will be incorporated into the NAAEE guidelines for a complete, overall framework (See Appendix C).

Activity Layout (and curriculum guidelines)

NAAEE guidelines for materials were discussed and presented by small groups. It was agreed that 4 of the 6 guidelines were necessary: 3) Emphasis on skills building, 4) Action Orientation, 5) Instructional Soundness, and 6) Usability. There was not enough time to read and discuss the others: 1) Fairness and Accuracy and 2) Depth. The layout and content of activities was discussed and agreed upon (See Appendix D).

Noon- 2:00

SACK LUNCH

1) Reimbursement procedures explained.

2) Work groups report out on progress/tasks to be done.

WHAT NEXT?

It was agreed by all that tasks need to be divided among several individuals.

Certain information needs to be collected regarding the dissemination guide and curriculum:

Which curriculum activities work best?

Any suggestions for new activities?

Teachers need to be surveyed in-depth about materials.

More teacher involvement should be included in the next step for the curriculum.

A mixed group task force and some GLEP teachers should be involved with the dissemination guide.

When is the Michigan Intermediate School Districts retreat?...last week in Aug. or July? Retreats should be scheduled in advance so teachers are able to attend.

Decisions on a dissemination protocol need to be made.

Official dissemination and curriculum format decisions need to be made.

Potential additions and deletions to materials.

Size of dissemination and curriculum materials have yet to be determined.

Possibly take apart and reorganize curriculum.

Complete/revise curriculum framework.

Specific suggestions from Bill Stark (GLEP teacher) include:

Utilize input from teachers - how can they help with the review?

- GLEP curriculum is difficult to use - needs index

**** 1)** *Essential activities that need to be done before taking trip should be highlighted. i.e. - explanations of water quality tests*

2) *Menu/correlations/indexes need to be provided*

- *materials - WILD, Paddle to the Sea, List Correlation, Supplementary*

materials to program (science kits)

- *folklore - teachers not familiar with information - list of speakers (provide additional resources)*

**** 3)** *Include Pre and Post tests for teachers*

To conclude the retreat, four questions were asked to help evaluate the weekend:

1) What about the retreat worked? I most appreciated...

2) What didn't work? I would have preferred...

3) I learned...

4) I would be most willing to/ interested in...

(See Appendix E for responses)

2:00

Field trip to sail maker.

Canceled.

Dissemination Guide Break-out Group Notes

Focal Question 1: How to develop a task force?

We need to conceptualize a vessel-based education program for others. This includes setting parameters, perhaps part of the introduction. Start the guide with the definition of 'schoolship'.

We must identify resource needs for the task force, at least the basics. To make starting a program a bit easier.

How are people picked for the task force? The GLEP uses folks from Huron Metro Park, Office of the Great Lakes, Teachers, ISD consultants. A task force is similar to advisory committee. A diverse group of people:

- creates partnerships/stakeholders
- lends credibility

The GLEP has used different people for different stages of the program's development. For example, six years into the program, two teachers are left on the task force.

Task force members can lend insight into:

- programming (business people)
- getting the word out (marketing/advertising people)
- training
- funding (people with grant writing skills)
- look for players with interest in water quality
- volunteering (cruise leaders as a task force member)

Once a program makes an initial ID of potential task force:

- start making phone calls to query of interest, availability, other contacts
- continue working on potential funding sources

Commitment levels are important. That's why it's important to potentially have people on board for specific stages. Don't worry about there be too many people (volunteers, can this be the case?!) → just need a good mix.

Ideal members of the task force need to have these qualities:

- dependable
- enthusiastic
- committed
- knowledgeable

Recipe for the ideal task force would include the following types (according to GLEP staff):

- Folklife--museum/historical society
- teachers
- MetroPark, Watershed
- Science based folks--consultants
- administrators at school
- grant writing/fundraising
- captain or "boat" person

Focal Question 2: Potential challenges to GLEP programming

Participants brainstormed potential challenges to developing a GLEP for determining:

1. costs – especially initially is difficult – using volunteers, printing advertising, getting word out about the overall program
2. where do schools and students come from?
3. does the grade matter? Who is the program targeting?
4. funding requirements? Who are the funders?
5. curriculum that each state requires
6. school schedules, especially as the 7th and 10th grade programs get started (high school -50 minute class schedule)
 - elementary as multi-disciplinary, is flexibility a concern?
7. local demographics
8. the curriculum of each state. Elementary schools are flexible, High school is more structured and interdisciplinary.

The challenge is: How do we take a one day experience to this and make it a broader experience?

Inland Seas programmer Mark Mitchell brought up some important points:

- a one day exposure to a broad experience may not be enough to make the educational difference....
- time of year that the teacher goes determines attention, maturity, background of their students (i.e. 4th grade students at the beginning of the school year vs. the end of the year)

Getting teachers to use the info...

- make the notebook user friendly -don't copy Project Wild but use it as a model
- identify good teachers (good meaning they'll put the full effort into the objectives of the GLEP and determine what they use in the curriculum notebook)

What are some challenges that come from the parent of the students (as cruise chaperones)?

-Too many parents interested (in being chaperones)... there are ways to "weed them out" if they are only interested in a "free boat trip"

-a benefit... some parents become cruise leader volunteers following their chaperone experience!

-how can parents get involved? With the GLEP, it is up to the teacher to get the parents

The task force issue continues to arise... continually emphasize the importance and how, without one, big challenges arise...

-the task force is a long term group that may have some short-term participants involved.

-how is the task force going to change down the road? --It's needs driven--it's fluid--people come and go.

How did the GLEP pick out/up people for their task force?

-We selected stakeholders such as Office of the Great Lakes, ISD, Metroparks Authorities, Teachers, DNR, Macomb Science, others interested individuals, 6th grade, 4th grade, --generally people interested in water more than a grade level. (Advisory Committee)

-How do you approach those you would like on the task force? GLEP just called them from contacts already had.

-You may need to put together a concept paper with objectives and goals and send it to these potential task force members.

-Visioning meetings... bring in interested people and picked people from those who brought "visions" to the table.

-Have people have a sense of ownership for more commitment and what they can get out of it.

-Can there be too many people on a task force? Would you ever have too many people on a task force? --You really only need a good mix.

Recipe for the ideal task force—who would they be and how would you get them?

For folklife -- would look in Museum Historical Societies

teachers businesses, grantwriters, fund-raisers

Science based people/consultants, metroparks, Tip of the Mitt

Administrator at the school level

Boat Captain-(person)

General advisory and Extension Advisory

Developing the dissemination guide:

- Another challenge relates directly to the development of the dissemination guide... how much of this type of discussion needs to go into the guide and to what extent?
- How do you want to disseminate this--is it a stand alone document, are there trainers, is it a team?
- Where are the students going to come from? Who and when are you going to target.
- Funding may require a specific target group.

Time of year a teacher takes their class influences education behavior etc.

Getting them to use the guide is hard too.

Getting teachers to use the books--why should they come to trainings? Try to make it so you're bringing new info each year to get them there.

Challenges with parent volunteers-what is the best way they can get involved?

- The problem is too many and weeding them out.
- We need to prep teachers on finding good and interested parents.
- Parents get put with their child and their friends--is this right?
- Then there are some parents who turn out to be cruise leaders themselves.
- Who decides how, and what parents are involved?
- Orientation is usually a way of de-selecting parents--if they can't go to the training then you can't go on the cruise.
- What about a pre-trip manual--similar to the Inland seas.

Should teacher training be mandatory?

- What kind of incentive are you going to give?
- How can they have ownership?

Strategic Plan Questions...

- What is the goal/Mission/ Vision?
- Who is your audience and at what grade does it come together?
- What are your water and maritime resources?
- What is your access to resources (boat, etc.)?
- What are your human resources?--partners, implementers, task force
- What are your major challenges?--money, human, policy
- Who is this for/What is the Market/ Audience?--counties/locales, k-12, Great Lakes Region, Access to water, boats with capacity for around 30 people, Extension, Sea Grant, ISD, 4-H.

Focal Question 3: Volunteers

Inland Seas Volunteer Training:

- 10 week training program
- accreditation/credit for study
- rely largely on retired folks as volunteers (3 boats, 5 volunteers/day)
- word of mouth gets their name out there
- also advertise via newspaper (there is only one in their town)
- offer an internship program

Other ISEA ideas:

- assess your needs and who you're going to need
- incentives related to volunteers build into recruiting/retention (i.e.: food, special opportunities, door prizes)
- What can you do to develop ownership?
(open house on boat to solicit volunteers)

Parking lot discussion items

These were great ideas people had that had to be tabled until the next retreat in order to stay on task and focused on the questions at hand.

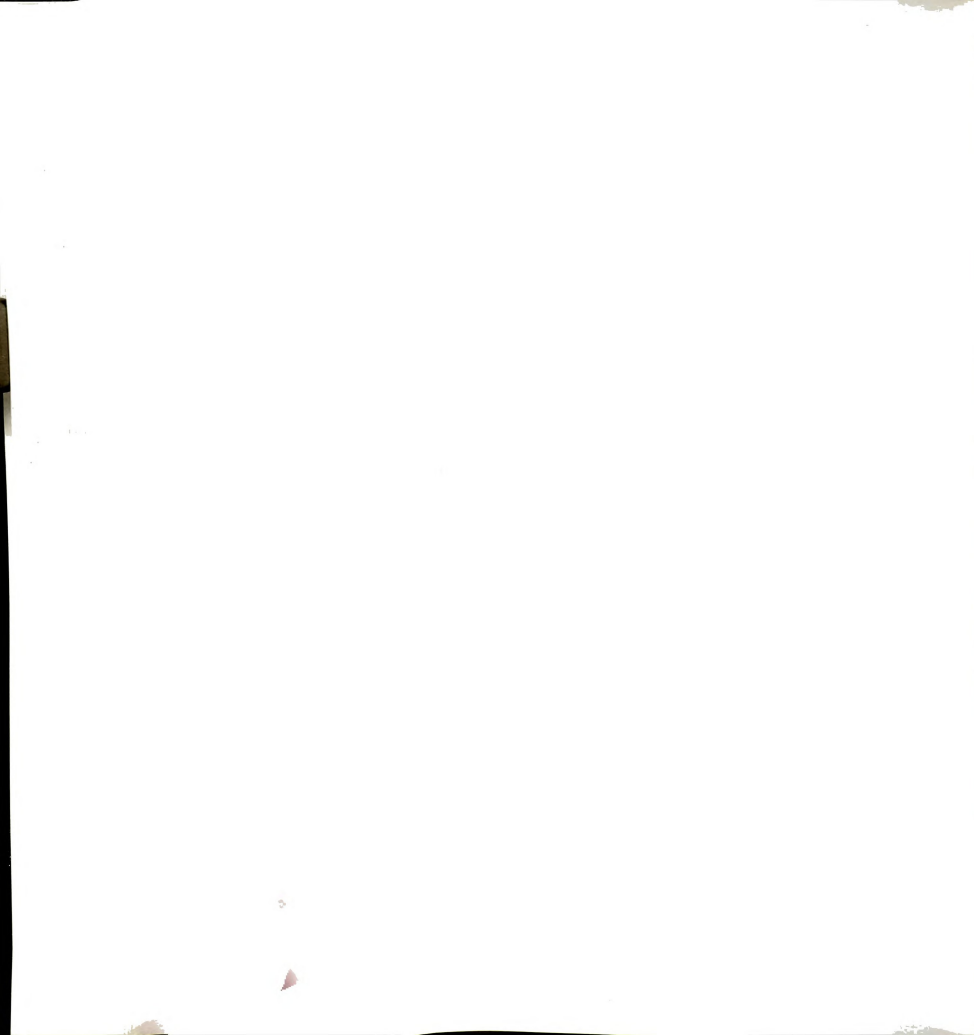
- Self assessment
- Volunteers... what specifically makes good volunteers?
- how do you want to disseminate (stand alone or team and who are they? Workshops?)

Piloting the program in a new community...

- paying for the program (looking at demographics)
- strategies for fundraising

Strategic Items...

- other existing materials:
- how to guide-facilitators (Master Composters)
- formatting--Project WET
- want it familiar, friendly
- Differences in the way people process info...



DRAFT Table of Contents
Prototype Great Lakes Education Program (GLEP) Dissemination Guide

1. Preface

What is this guide? What are its
 objectives, goals, purposes? Who is it for?

Why do this program?

2. The Great Lakes Education Program Some existing GLEP materials (research
 proposals, ongoing documentation)

What is it?

Who is it for?

What is the history?

Why is it important?

Curriculum features

Successful programming features

Successful programming strategies

DRAFT Table of Contents
Prototype Great Lakes Education Program (GLEP) Dissemination Guide

3. Designing your GLEP program	Some existing materials—i.e. Flow chart of annual activities
Determining/defining objectives and goals	
Program design and access	
Managing for success	
Who's in charge... and what are they in charge of?	
Finding funding for GLEPs	
Locating resources within your community (information and services, gathering materials)	
Developing your task force (who are they? what do they do?)	
Safety, liability, legal aspects	
Program delivery... Specifics for cruise leaders, teachers, parents, students:	
Before the cruise	
During the cruise	
After the cruise	
Recruiting and training teachers	Existing materials; Amy's research
Recruiting and training volunteers	
Scheduling GLEP cruises	Existing materials
The role of parents	Existing materials
Program support, partners and networks—who can you contact for assistance?	
Evaluation	

APPENDIX G: GLEP Teachers' College Majors

GLEP TEACHERS COLLEGE MAJORS

Spring 1996 Teachers

Electronics
Elementary Education
Elementary Education - Linguistics; Science
Math Elementary Ed
Special Education - Emotionally Impaired Elementary Ed.
Chemical Engineering, Psychology
Social Sciences, Parks & Recreation, Elem. Administration, Reading
English - Math
English
Educably Mentally Impaired
Lang. Arts/Soc. Sci./Rdg.
Soc St.
3 minors science, social science, content and method
Social science=major english=minor in elementary education
language arts
undergraduate/bachelors=special education-mentally impaired; graduate/masters=early
childhood and learning disabilities
elementary education science and English
Elementary Ed.
Elementary Education (BS + MAT)
French/ Early Childhood Education and Reading and Language (2 masters degrees)
BA Journalism Business, MA Teaching, Curriculum Leadership, MAZ master in art of
teaching
English, Drama Arts
Social Studies
Lang. Arts, Art, Instructional technology
B/A
Elementary education
Sociology
Social Science, Reading,/Language Arts
Biology
English major
Special Education—Mentally impaired, Learning Disabilities, English
Science/Social Science
Social Studies

Elementary Ed.
 Eng/History(S.S.)
 English/Soc. Studies
 English, Math (minor)
 Fine Arts, History and Reading
 Art/Phys Ed.
 Science. Rdg., Social Studies, Language Arts
 Special education MI
 Elem. Science/Social Studies
 3 minors-- elementary ed. english, Social Studies
 Science
 math/science
 Art for BA Elementary Ed. For MAT. Computer and Middle School Teaching for Ed.
 Spec.
 science
 Soc. Sci. P.E. Elem Ed.
 Elementary Education/English
 French
 Social Science
 Elementary Ed.
 Social Science and Biology
 Science/Education
 Science, Eng.
 Elem. Ed.
 English, S.S.
 english, early childhood
 S. Science, lang.
 Social Studies
 maj.—Social Studies, Minor—Science
 Art group major
 Minors-English, creative arts, Elem. Ed.
 Social Studies, Theology/Sociology
 English/Soc. Studies

Fall 1996 Teachers

Science Block English
 Education with a science major.
 Soc. Studies, integrated creative arts.
 Music Education and Elementary Education
 English, S. Studies, Speech
 German/French/ Social Studies , Elem. Curriculum
 Liberal Arts, Physical Education—Psychology



English
 English, Art
 Teaching hearing impaired
 English Language and Literature

Spring 1997 Teachers

Social Science and reading
 Social Science, English, Science
 math science, special ed L-D
 Undergraduate=Advertising, Masters=Elementary Education with a major in Social Science.
 Language arts, Elem. Ed., Curriculum, and Instruction
 Elementary Education
 Elementary Ed.=Math and Language Arts., Counseling--K-12
 Social Studies--Major
 Elementary Education, reading, art education
 Social Sciences
 mathematics--elementary education
 Literature, Social Science
 Undergrad--History Major, English Major, Masters in Reading/Writing
 Science, Elementary Education

APPENDIX H: GLEP Teachers' Membership in Organizations

GLEP TEACHERS MEMBERSHIP IN ORGANIZATIONS

Spring 1996 Teachers

MEA National Geographic
National Wildlife Federation
MFT
MEA, Council for exceptional Students Macomb Reading Council
Defenders of Wildlife Humane Society of US Wilderness Society MEA
Michigan Ed. Assn.
IRA, MRA, NCIE
MEA, NEA
MEA NEA UEA
International Reading Association
Horace Mann Honor Society, Macomb Reading Council
Michigan Reading Association
MEA
MEA
MEA, NEA, MEA-NEA Local 1, MEA-NEA Local, L'Anse Creuse
NEA, MEA, ADK
National Geographic, International and Michigan Reading Association, Michigan Council
for the Social Studies
Macomb Reading Council
Arbor Foundation
NEA, NCEA
MEA/NEA
World Wildlife Federation
NCNA (National Catholic Ed. Assc.)
Audubon
National Catholic Ed. Assc.
Michigan Science Teachers Association
ASCD Greenpeace
MACUL, ASCD, MAMSE, NSMLST
NDSTA
Van Dyke Professional Personnel
ADK, MEA
Delta Kappa Gamma
LEA (Lutheran Ed. Assoc.)

Spring 1996 continued

Project Wild. The usual
 MSTA, WWF, MDSTA
 MSTA, NSTA
 National geographic
 none at the present time except MEA
 Defenders Nature Cons., National Wildlife
 MEA, NEA
 ADK sorority
 MEA
 MEA/NEA

Fall 1996 Teachers

MEA, NEA, UEA, IFAW & Greenpeace
 Troy Nature Center
 Michigan Education Association, MEA/NEA Local1, Anchor Bay Education Program
 Task Force, Great Lakes Lighthouse Keepers Ass.
 MEA, MUCC, MAEOE???
 AATG (German)
 Ducks Unlimited, Pheasants Forever
 MEA, MAEOE, MSTA, Grand Traverse Land Conservancy, Tip of the Mit Watershed
 Council
 Michigan Science Teachers , Michigan Math Teachers

Spring 1997 Teachers

none
 UEA, MEA
 none
 Michigan Environmental Something....
 Cousteau Society, ASCD, ATE
 Greenpeace Program
 Macomb Reading Council
 Argim--at one time--not currently
 none
 none

APPENDIX I: Teachers' Reasons for not Participating with the GLEP in the Future

TEACHERS' REASONS FOR NOT PARTICIPATING WITH THE GLEP IN THE FUTURE

Spring 1996

The price was too expensive and "Michigan" weather is too unpredictable. We will try something indoors next year. Rescheduling after the small "accident" (engine trouble) was not our choice and it was difficult to get chaperones so quickly after the first boat trip. It was rescheduled the next week.

Expensive prices for field trip would limit our participation

This is a very expensive trip--\$450 per class for a three hour field trip is extravagant

Expense

More time to prepare students for the cruise.

We are having trouble with our colleagues because of the cost.

I will only be teaching 5th grade next year not 4th like I was this year.

Fall 1996

Will leave it for fourth.

I only do "Michigan" as a theme on alternating years.

Spring 1997

It no longer is one of our MEAP Science objectives.

BIBLIOGRAPHY

BIBLIOGRAPHY

- American Sail Training Association. (1995). *ASTA Directory of Sail Training Ships and Programs*, Newport, RI: American Sail Training Association.
- Atkinson, J. W. and Birch D. (1978). *Introduction to motivation*. New York, NY: D. Van Nostrand Company.
- Baldwin, K. (1990). *Summary: Arizona Project WILD 1990 -- Survey of use*. Phoenix, AZ: Arizona Fish and Game.
- Bennett, D. (1989). Four steps to evaluating environmental education learning experiences. *The Journal of Environmental Education*, 20(2), 14-21.
- Bethel, L. J. and Hord, S. M. (1982). Preparing teachers to teach environmental science: An evaluation of a National Science Foundation (NSF) program. Paper presented at the Annual Meeting of the American Educational Research Association, New York, NY (ERIC Document Reproduction Service, ED 216 866).
- Bissell, S. J. (1992). *Evaluation of Project WILD delivery activities in Colorado*. Colorado Division of Wildlife (unpublished report).
- Borg, W. R. and Gall, M. D. (1983). *Educational research: An introduction*. New York, NY: Longman, Inc.
- Boyle, P. (1981). *Planning Better Programs*. New York, NY: McGraw-Hill Book Co., p. 226.
- Bozardt, D. A. (1975/76). Professor of Science Education, College of Education, Oakland University, Rochester, Michigan. Series of interviews.
- Brinkerhoff, R. O., Brethower, D. M., Hluchyi, T. and Nowakowski, J. R. (1983). *Program evaluation: A practitioner's guide for trainers and educators sourcebook*. Boston, MA: Kluwer-Nijhoff Publishing.

- Brody, M. and Koch, H. (1989). An assessment of 4th-, 8th-, and 11th-grade students' knowledge related to marine science and natural resource issues. *The Journal of Environmental Education*, 21(2), 16-26.
- Brody, M. (1995). Development of a curriculum framework for water education for educators, scientists, and resource managers. *The Journal of Environmental Education*, 26(4), 18-29.
- Cantrell, D. C. (1986). *A statewide survey of Project WILD in Ohio: Final Report*. Ohio Department of Natural Resources, Office of Public Information and Education.
- Cantrell, D. C. (1987). *A case study analysis of curriculum implementation as exemplified by Project WILD in one midwestern state*. Doctor of Philosophy Dissertation. Ohio State University.
- Campbell, J., Moyers, B., and Flowers, B. S. (Ed.). (1990). *The power of myth*. 1st Anchor Books (Ed.), New York, NY: Anchor Books.
- Charles, C. (1986). *Project WILD survey of use and needs*. Bethesda, MD: Project WILD National Office.
- Cookson, P. S. (1989). How do we recruit and retain program participants? In P. S. Cookson (Ed.), *Recruitment and retention of adult students*. San Francisco, CA: Jossey-Bass.
- Cox, A. and Wilson, R. (1993). *Options for Michigan environmental education*. Lansing, MI: State Senate Majority Policy Office.
- Cummings, S. L. (1976). *Environmental education: A market survey*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA, 19-23. (ERIC Document Reproduction Service, ED 124415)
- Dann, S. L. (1992). *Discussion guide for focus groups on fishing recruitment used with Michigan resident anglers licensed in 1991-1992*. East Lansing, MI: Michigan State University, Department of Fisheries and Wildlife.
- Dann, S.L. and Kozma, L. (1994). GLEP Proposal. *Development of a transferable, multidisciplinary vessel-based, experiential education model*. East Lansing, MI: Michigan State University, Michigan Sea Grant Program.

- Dillman, D. A. (1978). *Mail and telephone surveys: The total design method*. New York, NY: John Wiley & Sons.
- Dixon, D. O. (1996). *Commitment to environmental stewardship and environmental education among educators in the New York Lake Ontario Basin*. Master of Science Thesis. Ithaca, NY: Cornell University.
- Dunne, M. L. (1992). *A preliminary survey of use of Project WILD/Aquatic WILD by urban teachers*. New Jersey Division of Fish, Game & Wildlife.
- Elkind, D. (1990). What teens can teach younger children. *Parents Magazine*, p. 20.
- Elshoff, D. (1997). Project WILD Coordinator. East Lansing, MI: Michigan State University. Personal communications.
- Evans, N. (1994). *Experiential learning for all*. New York, NY: Cassell.
- Farnsworth, M. (1989). *A study of environmental education: Attitudes and practices among teachers at the secondary level*. Department of Elementary and Secondary Education Graduate Seminar Paper. Southwest Missouri State University.
- Fisher, M.R. (1996). *Estimating the effect of Nonresponse bias on angler surveys*. Transactions of the American Fisheries Society. 125: 118-126.
- Fleming, M. L. (1983). *Project WILD Evaluation: Final report of field test*. Bethesda, MD: Project WILD National Office.
- Fleming, M. L. (1991). *A study of Project WILD's impact on the students of exemplary teachers*. Bethesda, MD: Project WILD National Office.
- Flor, R. (1991). An introduction to research and evaluation in practice. *The Journal of Experiential Education*, 14(1), 36-39.
- Fortner, R. (1991). The scope of research in marine and aquatic education. *Environmental Communicator*, July/August, p. 5.
- Gifford, R., Hay, R., and Boros, K. (1983). Individual differences in environmental attitudes. *Journal of Environmental Education*, 14(2), 19-23.
- Gigar, B. D. (1993). *Project WILD Aquatic (K-6 aquatic education program) research summary*. Iowa Department of Natural Resources.

- Gilchrist, S. C. (1990). *Effects of Project WILD on fourth grade students in Wisconsin*. Madison, WI: Wisconsin Department of Natural Resources.
- GLEP (1992). Copy of unfunded 1992 Kellogg Foundation proposal. Mt. Clemens, MI: Michigan Sea Grant Extension.
- GLEP (1993). Pre-Field Learning Activities. Great Lakes/Clinton River education program: Pre-field learning activities. Developed by Stewart, S. R., Livingston, P.D., and Gibb, T. L. Mt. Clemens, MI: Michigan State University.
- GLEP. (1997). *Great Lakes Education Program 1996-97 Program Update*. Macomb County, MI: Michigan Sea Grant Extension.
- Gomon, B. S. (1991). Characteristics and motives of volunteer facilitators of Project WILD in Ohio. Master of Science Thesis. Dayton, OH: The Ohio State University.
- Greene, J. S. (1992). *An evaluation of volunteerism in Project Learning Tree and Project WILD in Texas*. Doctor of Philosophy Dissertation. Texas A&M University.
- Greishop, J. I. (1982). Growing with Master Gardeners. *California Agriculture*, 36(7), 17-19.
- Guba, E. G. (1978). *Toward a methodology of naturalistic inquiry in educational evaluation*. Los Angeles, CA: Center for the Study of Evaluation. (ERIC Document Reproduction Service, ED 164599).
- Guba, E. G. and Lincoln, Y. S. (1981). *The place of values in needs assessment*. Paper presented at the annual meeting of the American Educational Research Association, Los Angeles, CA. (ERIC Document Reproduction Service, ED 199 289).
- Ham, S. H. and Sewing, D. R. (1988). Barriers to environmental education. *Journal of Environmental Education*, 19(2), 17-23.
- Howie, T. R. (1974). Indoor or outdoor environmental education? *Journal of Environmental Education*, 6(2), 32-36.
- Hungerford, H. R. (1975). Myths of environmental education. *Journal of Environmental Education*, 7(2), 21-26.

- In Balance: Doing What's Right for Natural Resources. (1996). Turning out, pitching in. *Times Mirror Magazine Conservation Council*.
- Iozzi, L. (1989). What research says to the educator. Part one: Environmental education and the affective domain. *The Journal of Environmental Education*, 20(3), 3-9.
- Jackson, J. (1994). *A critical evaluation of training workshops for facilitators of Project WILD workshops in New Hampshire for instructing practitioners using these materials*. Master of Education Thesis. Plymouth State College, NH.
- Jensen, D.T. (1992). Environmental education survey for Project WET/WILD: Results of teacher and student responses in the state of North Dakota. Grand Forks, ND: Bureau of Educational Services and Applied Research, University of North Dakota.
- Kennedy, M. M. (1990). *Teachers' subject matter knowledge (Trends and issues paper no. 1)*. Washington, DC: ERIC Clearinghouse on Teacher Education.
- Kolb, D. (1991). Meaningful methods: Evaluation without the crunch. *The Journal of Experiential Education*, 14(1), 40-44.
- Knapp, C. K. (1992). *Lasting lessons: A teacher's guide to reflecting on experience*. Charleston, WV: ERIC Clearinghouse on Rural Education and Small Schools.
- Knowles, M. (1980). *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. (Chicago: Follet), p. 202.
- Kunz, D. E. (1989). *The effects of a Project Learning Tree workshop on pre-service teachers' attitudes toward teaching environmental education*. Unpublished Master of Science Thesis, Pennsylvania State University.
- Lane, J., Wilke, R., Champeau, R., and Sivek, D. (1994). Environmental education in Wisconsin: A teacher survey. *Journal of Environmental Education*, 25(4), 9-17.
- Lemming, F., Dwyer, W. and Bracken, B. (1993). Children's environmental attitude and knowledge scale: Construction and validation. *The Journal of Environmental Education*, 24(4), 8-21.
- Lincoln, Y. S., and Guba, E. G. (1985). *Research, evaluation, and policy analysis: Heuristics for disciplined inquiry*. Kansas, U.S.: (ERIC Document Reproduction Service No. ED 252 966).

- Lisowski, M., and Disinger, J. (1991). The effect of field-based instruction on student understandings of ecological concepts. *The Journal of Environmental Education*, 23(1), 19-23.
- Mahoney, E.M., Jester, D.B., and Jamsen, G.C. (1991) *Travel and Tourism in Michigan: A Statistical Profile*. Travel, East Lansing, MI: Tourism, and Recreation Resource Center, Michigan State University. 307-343
- Malarney, M. J. (1992). *Training multi-generational volunteers in environmental issues: A study of the GET-GEM groundwater education training program*. Master of Science Thesis. East Lansing, MI: Michigan State University, Department of Fisheries and Wildlife.
- Mathis, D. (1997). Summit issues its call to service. April 21. The Detroit Free Press, p. A1.
- McCune, B. F. and Nelson, C. (1995). *Recruiting and managing volunteers in libraries: A how-to-do-it manual*. New York, NY: Neal-Schuman Publishers, Inc.
- Meehan, D. B., and Berta, S. (1993). *Developing a Volunteer Program for Public Environmental Education*. Pullman, WA: Washington State University, Cooperative Extension Service.
- Merriam-Webster's Collegiate Dictionary (1996). (10th ed.). Springfield, MA: Merriam-Webster.
- Microsoft Corporation (1995). Getting results with Microsoft Office for Windows 95. Redmond, WA: Version 7.0. (Computer Program).
- Middleton, M. (1995). *A survey of leaders of Michigan's stream and river organizations*. East Lansing, MI: Michigan State University, Department of Fisheries and Wildlife.
- Milkent, M. M., Irby B. N., and Story, L. E. (1979). *Teachers and marine education: A marine survey* (Rep. No. MASGP-79-005). Hattiesburg, MS: University of Southern Mississippi, Department of Science Education.
- Mulligan, J. and Griffin, C. (Eds.). (1992). *Empowerment through experiential learning: Explorations of good practice*. London: Kogan Page.
- Murnighan, K. J., Kim, J. W., and Metzger, A. R. (1993). The volunteer dilemma. *Administrative Science Quarterly*, 18, 515-538.

- Nathan, J. and Kielsmeier, J. (1991). The sleeping giant of school reform. *Phi Delta Kappa*. June 1991, 739-742.
- Norusis, M. J. (1993). SPSS for windows: Base system user's guide release 6.0. (Computer Program). Chicago, IL: SPSS Inc.
- Patton, M.Q. (1987). How to use qualitative methods in evaluation. Newberry Park, CA: Sage Publications.
- Peyton, R. B. (1977). *An assessment of teachers' abilities to identify, teach, and implement environmental action skills*. Doctoral Dissertation. Carbondale, IL: Southern Illinois University.
- Pitman, B. J. (1996). *Project WILD: A summary of research findings from 1983-1995*. Bethesda, MD: Project WILD National Office.
- Project WET. (1995). *Project WET activity guide*. Bozeman, MT: The Watercourse at Montana State University and Western Regional Environmental Education Council.
- Project WILD. (1992). *Project WILD activity guide*. The Western Regional Environmental Education Council, Inc.
- Rakow, S. J. (1984). Development of a conceptual structure for aquatic education and its application to existing aquatic curricula and needed curriculum development. *The Journal of Environmental Education*, 19(1), 25-30.
- Ritz, W. C. (1977). Involving teachers in environmental education. *Journal of Environmental Education*, 8(3), 40-47.
- Robinson, R. D. (1979). Conducting Evaluation: Instructional improvement. *An Introduction to Helping Adults Learn and Change*. Milwaukee, WI: Omnibook.
- Rogers, T. F. (1976). Interviews by telephone and in person: Quality of responses and field performances. *Public Opinion Quarterly*, 40, 51-56.
- Rouse, S. B., and Clawson, B. (1992). Motives and incentives of older adult volunteers: Tapping an aging population for youth development workers. *Journal of Extension*, 30(3).
- Rupert, J. (1995). *Take a friend fishing program survey*. East Lansing, MI: Michigan State University, Department of Fisheries and Wildlife.



- Shaw, D. (1993). *Aquatic resources education survey*. University of New Mexico.
- Shomo, A. (1993). *West Virginia Project WILD survey of use*. DNR Wildlife Resources, Charleston, WV.
- Shufflebeam, D. (1975). Evaluation as a community education process. *Community Education Journal*, (March/April) p. 7.
- Shuman, D. K. (1995). *Factors that influence commitment to teaching environmental education: Development and test of a causal model*. Doctoral Dissertation. University of Idaho.
- Shumer, R. (1992). *Service-learning and the power of participation: Schools, communities, and learning*. East Lansing, MI: Michigan State University Service Learning Center.
- Simmons, D. A. (1995). More infusion confusion: A look at environmental education curriculum materials. *Journal of Environmental Education*, (), 15-19.
- Simmons, D. A. (1987/1988). The teacher's perspective of the resident environmental education experience. *Journal of Environmental Education*, 19(2), 35-42.
- Simonson, D. L. (1990). Master Gardeners: Views from the cabbage patch. *Journal of Extension*, 28(2).
- Smith, C. L. (1988). *An assessment of the use and effectiveness of Project WILD (wildlife in learning design) by teachers and youth leaders in Oklahoma*. Doctor of Philosophy Dissertation. Oklahoma State University.
- Standage Accureach, Inc. (1990). *User and non-user assessment study of Project WILD materials*. Bethesda, MD: Project WILD National Office.
- Stewart, S. (1997). GLEP co-director. Mt. Clemens, MI: Michigan Sea Grant Extension. Personal communications.
- Stout, R. J. & Peyton, R. B. (1988). *The need for wildlife education program evaluation: A case study*. Trans. 53rd N. A. Wildlife & Natural Resources Conference.
- Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *Journal of Environmental Education*, 11(4), 20-24.

- TIMSS. (1994). Teacher Questionnaire Population 2 Sciences Booklet 1: Teacher background. *Third International Mathematics and Science Study*.
- Tolson, H. and L. Kozma. (1997). The Maritime Folklife and Historical Resources of Macomb County, MI. Unpublished report. East Lansing, MI: Michigan State University.
- Tomlinson, M. E. (1997). *State of the State survey, Helping others: A profile of Michigan volunteers*. East Lansing, MI: Michigan State University, Institute for Public Policy and Social Research.
- Tudor, M. (1992). *Evaluation of Project WILD: The State of Washington 1984-1992*. Washington Department of Wildlife.
- Tyler, R.W. (1949). *Basic Principals of Curriculum and Instruction*. Chicago, IL: University of Chicago Press.
- U.S. Coast Guard (1990). Boating statistics 1989. Commandment Publication P16754.3. Washington, D.C.: U.S. Coast Guard.
- Van Koevering, T. E., and Sell, N. J. (1983). An analysis of the effectiveness of energy education workshops for teachers. *Science Education*, 67(2), 151-158.
- Vroom V. (1982). *Work and motivation*. Malabar, Florida: Robert F. Krieger.
- Wiens, J. (1996). Volunteers lend new perspectives to field projects. *Fisheries, American Fisheries Society*, 21(3), 37.
- Wilke, B. J., Peyton, R. and Hungerford, H. (1980). *Strategies for the training of teachers in environmental education*. Paris, France: UNESCO.
- Williamson, A. (1996). *The Great Lakes Education Program: An in-depth evaluation of program impacts on fourth grade students*. Master of Science Thesis. East Lansing, MI: Michigan State University,.
- Winans, J. (1994). *Involving volunteers effectively, Part one*. In E. Ely (Ed.), Proceedings: Fourth National Citizens' Volunteer Monitoring Conference, putting volunteer information to use (pp. 3-10). Portland, OR: Portland State University.
- Witten, M. (1997). *Survey of administrators of open-water environmental education programs*. Huntington, VT: University of Vermont, School of Natural Resources.

- Yannone, V. (1985). *Montana Project WILD Survey Results*. Montana Department of Fish, Wildlife, and Parks.
- Young, Thompson, and Thompson. (1995). *A needs analysis for Project WILD's WILD in the City Initiative*. Bethesda, MD: Project WILD National Office.
- Zint, M. (1994). *Science provides opportunities for risk education survey (S.U.R.E.)*. East Lansing, MI: Michigan State University, Department of Fisheries and Wildlife.
- Zosel, D. A. (1988). *Science in Land Resources*. Master of Science Thesis. University of Wisconsin-Madison.





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