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THE GREAT LAKES EDUCATION PROGRAM: AN EVALUATION OF PROGRAM IMPACTS ON PARTICIPANTS' PARENTS/GUARDIANS

By

Michelle L. Niedermeier

A THESIS

Submitted to
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1999

ABSTRACT

THE GREAT LAKES EDUCATION PROGRAM:
AN EVALUATION OF PROGRAM IMPACTS ON PARTICIPANTS' PARENTS/GUARDIANS

By

Michelle L. Niedermeier

The focus of this research was to measure the secondary impacts (ripple effects) of the Great Lakes Education Program (GLEP) on participants' parents/guardians one school year post-GLEP experience. A self-administered survey was developed from ten pre-existing instruments to measure parents' Great Lakes knowledge, attitudes toward the Great Lakes, and responsible behavioral intentions. The study design included contacting parents of 458 students from eight schools in Macomb County, Michigan. An overall response rate of 39% was achieved. Parents of participants scored significantly higher on the behavioral intentions scale than did parents of non-participants. No differences were found on the knowledge test or attitudes scale. Parents/guardians who had volunteered with the GLEP scored higher in knowledge and positive behavioral intentions regarding the Great Lakes than did non-volunteers. Recommendations include creating and maintaining a database of participants in order to conduct further longitudinal evaluations, and developing elements (i.e., take home sheets) to encourage and foster even greater parental involvment.

To my friends and family for their constant
love and support.
To my husband, who reminded me to eat the elephant
in small bites.

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Special thanks to Anne Williamson and Amy Nevala for their previous GLEP evaluations and their frequent words of encouragement. Many members of the MSU Department of Fisheries and Wildlife (too many to mention in fear of forgetting someone) also deserve special recognition for their assistance during this project and their friendship throughout the years.

I would also like to thank my dog, Tala, who remained loyal despite the lack of attention and the strange hours. Finally, my love and thanks to my husband Keith for his guidance, patience, support and love.

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INTRODUCTION

Problem Area: The Great Lakes Education Program

The Great Lakes Education Program (GLEP) was developed by local staff representing Michigan State University Extension (Macomb County) and the Michigan Sea Grant College Program to provide Great Lakes classroom and multi-disciplinary environmental education (EE) experiences for elementary students in Macomb County, Michigan. The program targets fourth grade students, because Michigan's fourth grade science and social studies content standards and benchmarks for curriculum include an emphasis on state resources (Michigan Department of Education, 1996).

The GLEP provides a multi-disciplinary introduction to historical, geographical, physical, biological, and cultural aspects of the Great Lakes. The program consists of three segments: classroom based pre-cruise education activities, an educational cruise aboard a modified Great Lakes fishing vessel on the local watershed (the Clinton River and Lake St. Clair), and classroom based post-cruise education activities. The vessel-based educational experience includes eight learning stations directed by cruise leaders. The pre- and post-cruise classroom activities are part of the GLEP's written curriculum and are used to enhance the learning experience. The overall goal of the GLEP is to educate youth by developing ecological literacy, understanding, and

stewardship of Great Lakes resources and issues (Williamson, 1996). This is consistent with the superordinate goal of EE which has been defined as follows,

> ...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 quality of the environment
> (Hungerford and Volk, 1990, p. 13).

Within EE, at state, national, and international levels, four major goal levels of EE have been organized into a curriculum framework and were developed to help educators achieve the superordinate goal with learners (Hungerford, Peyton, & Wilke, 1980). Goal Level I strives to provide the learner with sufficient foundations in ecological knowledge. Goal Level II seeks to help the learner understand the interdependency of all things which may be influenced by the actions of an individual or a group. In Goal Level III, knowledge and skills are developed to allow the learner to investigate and evaluate environmental issues and solutions. Finally, the development of skills is guided in Goal Level IV for the learner to take positive environmental action. Ultimately, each level seeks to guide the learner to achieve or maintain a relationship between quality of life and quality of the environment (Hungerford & Volk, 1990; Hungerford, Peyton, & Wilke, 1980; Tbilisi Intergovernmental Conference on Environmental Education, 1978.)

Challenges within Environmental Education

Environmental Education has had a definitional problem since its conception, with experts disagreeing on its name as well as purpose. Throughout its history, education about or using local environments has variously been called nature study, conservation education, outdoor education, and even more specifically, resource-use education, population education, or marine-and-aquatic education (Environmental Education and Training Partnership, 1997b, c, d). The superordinate goal and goal levels I-IV were created in response to the apparent lack of focus and loose organization of EE (North American Association for Environmental Education, 1998).

In part because of EE's past definitional problems, skeptics have often questioned the accuracy and sources of EE materials and the effectiveness of EE programs. Some fear that material and information used is outdated or promotes the agendas of activist groups or industries. Linda Knight, an earth-science teacher in Houston said, "These are, in each case, put forward as materials that are 'unbiased,' but the companies do have vested interests" (West, 1993, p. 1).

Another challenge within EE is how to fit it within school curricula. School districts in several states have developed "mandates to infuse environmental education into the curriculum" (West, 1993, p. 1). These mandates may benefit teachers by providing them with accurate materials instead of each teacher relying on information provided by

questionable sources or having to piece together materials that may be unreliable or biased. Environmental education programs such as Project Learning Tree, Project WILD, and Project WET, have been developed as interdisciplinary educational materials to aid teachers with infusion (United States Environmental Protection Agency, 1998d).

The U.S. Environmental Protection Agency (EPA) is also working to combat public concern, about EE quality. The EPA has designed a program to aid the public in making responsible environmental decisions by providing access to quality EE information and materials. The program provides training and the methodology needed for the implementation of quality EE programs (United States Environmental Protection Agency, 1998b). This may also benefit the youth who may gain a deeper understanding of environmental issues and the relationship between quality of life and quality of the environment. In addition, EE may contribute to the efforts of sustainable development (quality of life and quality of environment) by linking conservation and economic development, and by promoting the positive steps taken to minimize the impacts of ecosystems (United States Environmental Protection Agency, 1998c).

Within EE, another major challenge has been that program evaluations to determine effectiveness are often overlooked. Evaluations may not be implemented for several reasons, including insufficient money or time, a lack of professional evaluators, or the lack of provisions and planning to conduct

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evaluations (Stufflebeam, 1975). It has frequently been noted that a lack of evaluation hinders the credibility of EE proponents and programs (Iozzi, 1989; Keen, 1991; Lewis, 1981/82; Linke, 1981; Lucko, Disinger, & Roth, 1982). Evaluations must be completed to provide concrete evidence as to program impacts, outcomes, or accomplishments (Bennett, 1989; Boyle, 1981; Cookson, 1996; Flor, 1991 in Williamson 1996), and to inform programmers of successful strategies to improve programs and measure efforts (Environmental Education and Training Partnership, 1997a). Some examples of innovative program design and evaluation have proven useful in understanding program impacts and in improving programs (e.g., Blanchard & Monroe, 1990, and Project WILD, 1996).

It is the aim of this thesis to provide an evaluation of the GLEP as a popular EE program. Two evaluations of the GLEP have so far been completed. The first evaluation (Williamson, 1996) assessed direct program impacts on fourth grade students. Williamson found that youth exhibited a significant increase in Great Lakes knowledge after participating in the GLEP vessel experience. Girls attitudes toward the Great Lakes after the GLEP were significantly more positive than their attitudes had been previously; no significant changes were found in boys' attitudes. Lastly, no significant changes were demonstrated in participants' behavioral intentions regarding the Great Lakes after participating in the GLEP cruise.

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The second study of the GLEP evaluated educators' participation in the GLEP (Nevala, 1997). Nevala found that 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 revealed that their knowledge level was low in most GLEP topics, including fisheries, aquatic plants, calcium in water, geography of Lake Huron and Lake St. Clair, shipboard knot-tying, carbon dioxide, plankton, navigation, pH levels, cultural aspects of the Great Lakes, and dissolved oxygen. Following the GLEP training and experience, educators' self-assessment of post-cruise comfort levels in teaching some topics, including calcium in water, navigation, and shipboard knot-tying, were still relatively low, suggesting the need for additional educator training.

Study Problem Focus

My evaluation of the GLEP focuses on the secondary impacts ("ripple effects") of the program on the parents/guardians of participants. To date, the secondary impacts on parents/guardians that may result from their youth's participation in an EE program have not been well documented.

Family members' importance has, however, been documented in marketing research. Family consumer research has shown the importance of family members' influences on the purchases of products and services. The "influencers" have been defined by

Melson (1980, p. 183) as "family members who provide information and advice concerning the selection of a product or service." McNeal (1965) found that more than fifty percent of the mothers of seven to nine year olds asked their children for advice in certain purchasing decisions. Munn (1968 as cited in Ferber, 1977, p. 92) stated similarly that "nine of ten parents reported they were influenced by their children in the choice of specific branded products." Several studies have shown that youth develop consumer attitudes and behaviors from multiple sources such as school, peers, parents/guardians, and mass media; youth learn to persuade their parents to purchase their wants (Ferber, 1977; Munn, 1968; Newspaper Publishers Bureau, 1967 as cited in Melson, 1980; Sherman & Delener, 1987; Delener & Schiffman, 1988.) Marketing and family consumer research thus shows that youth can influence the attitudes and decisions of their parents/guardians. In this evaluation of the GLEP, I propose to examine whether youth also influence their parents/guardians with respect to changes in knowledge, attitudes and responsible behavioral intentions regarding the Great Lakes resources as a result of the GLEP. This research can then help to see if youth affect parents' environmental stewardship knowledge, attitudes, and behaviors in general.

Problem Statement

The Great Lakes Education Program (GLEP) has been well received by students, teachers, and volunteers. However,

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there has been no evaluation of the secondary impacts ("ripple effects") of the program on participants' families. Thus, the focus of this research is to measure indirect effects of the GLEP experience on participants' parents'/guardians' knowledge, attitudes and responsible behavioral intentions regarding the Great Lakes and their resources.

Research Question and Hypotheses

My overall research question is to assess the impacts of youth participation in the Great Lakes Education Program (GLEP) on participants' parents'/guardians' knowledge, attitudes, and responsible behavioral intentions regarding the Great Lakes resource. I will assess the secondary impacts ("ripple effect") by looking at changes in three domains: knowledge, attitudes, and behavior.

Objective 1: To determine whether secondary impacts exist in parents/guardians as a result of their youth's participation in the GLEP.

Hypothesis 1a: Parents/Guardians with participating youth will report greater knowledge (water conservation, recycling, water and air pollution, animal habitats, Great Lakes geography, fish biology, botany, exotic and native species, food chains, and Great Lakes history) of the Great Lakes resource than will parents/guardians without participating youth.

Hypothesis 1b: Parents/Guardians with participating youth will report more positive attitudes toward the Great Lakes resource than will parents/guardians without participating youth.

Hypothesis 1c: Parents/Guardians with participating youth will report more frequent positive behaviors (water conservation, recycling, minimizing pollution, advocacy, and taking Great Lakes vacations) toward the Great Lakes resource than will parents/guardians without participating youth.

Objective 2: To determine whether parent/guardian volunteerism with the GLEP results in greater secondary impacts as compared with participants' parents/guardians who are not GLEP volunteers.

Hypothesis 2a: Participants' parents/guardians who acted as a volunteer will display greater knowledge (water conservation, recycling, water and air pollution, animal habitats, Great Lakes geography, fish biology, botany, exotic and native species, food chains, and Great Lakes history) compared to participants' parent/guardian who did not volunteer.

Hypothesis 2b: Participants' parents/guardians who acted as a volunteer will report more positive attitudes compared to participants' parent/guardian who did not volunteer.

Hypothesis 2c: Participants' parents/guardians who acted as a volunteer will report more frequent positive behaviors (water conservation, recycling, minimizing pollution, advocacy, and taking Great Lakes vacations) compared to participants' parent/guardian who did not volunteer.

Objective 3: To investigate the relationships among Great Lakes knowledge, attitudes, and behavior.

Hypothesis 3a: Levels of knowledge, attitudes toward the Great Lakes, and participation in stewardship behaviors will be positively correlated.

In addition to these major research objectives, it is important to gather much-needed descriptive data on parents/guardians' self-perceptions of impacts of the GLEP on youth and families. The following hypotheses are also considered in this study:

- Participants' parents/guardians who acted as GLEP volunteers will report greater support of youth's future interests (occupational) in the Great Lakes than non-volunteer parents/guardians.

- Participants' parents/guardians who acted as GLEP volunteers will report more frequently that the GLEP is

influential on youth's educational achievement (Great Lakes ecology and water quality issues) and personal development (interest in and awareness and appreciation of the Great Lakes, ecology, and water quality) than non-volunteer parents/guardians.

•Participants' parents/guardians who acted as GLEP volunteers will report more frequently that they are more aware of water quality issues than non-volunteer parents/guardians.

•Participants' parents/guardians who acted as GLEP volunteers will report more frequent participation in family consumerism water behaviors (angling and water sports) than non-volunteer parents/guardians.

•Participants' parents/guardians who acted as GLEP volunteers will report more frequent participation in family Great Lakes tourism behaviors than non-volunteer parents/guardians.

LITERATURE REVIEW

History of Environmental Education

Environmental Education (EE) has been part of formal education for almost a century, although its name and focus have changed depending on its associated movement as it had its roots in many fields of study.

The first movement was termed "Nature Study" and was developed during the late 1800s. It was a part of early childhood education in rural one-room schoolhouses until the 1920s (Brice, 1972 as cited in Disinger, 1983, Environmental Education and Training Partnership, 1997d). This movement provided students with exploratory outdoor educational experiences. The next movement, called Conservation Education, began in the early 1900s to help people understand the basic importance of conserving natural resources (Environmental Education and Training Partnership, 1997d). The Outdoor Education movement in the 1920s used the resources from outside the classroom for the purposes of education. It is believed that the school camping movement grew from the importance of outdoor education (Roth, 1978 as cited in Disinger, 1983).

The modern environmental education movement grew out of a concern for the environment, as foul-smelling rivers and smog-covered cities became harder to ignore. EE was also a result of environmental problems brought to light by people

such as Rachel Carson in her book Silent Spring, published in 1962, and the environmental movement starting with the first Earth Day in 1970. From these many fields of study come many and varied definitions of EE.

A widely accepted definition of EE was developed in 1975 at a United Nations Educational, Scientific, and Cultural Organization (UNESCO) meeting in Belgrade, Yugoslavia. It states:

> The goal of environmental education is to develop a world population that is aware of, and concerned about the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones. (United Nations Educational, Scientific and Cultural Organization and the United Nations Environmental Programme, 1976, p. 2).

Following the UNESCO meeting, the world's first intergovernmental conference on environmental education was held in 1978. At this meeting the Tbilisi Declaration was adopted. It outlined five categories of objectives for environmental education: awareness, knowledge, attitudes, skills, and participation. First, awareness may help individuals become sensitive to the environment and its problems, while imparting knowledge helps individuals gain experience and understanding of the environment and its problems. Guiding the formation of attitudes helps individuals develop values and concern for the environment. Encouraging and guiding the development of skills provides individuals the tools needed for solving environmental

problems, and encouraging and promoting participation in action provides the opportunity to become actively involved in working toward resolutions of environmental problems (Tbilisi Intergovernmental Conference on Environmental Education, 1978).

Overall, the 1980s were a period of slow growth for EE, partly due to the prevailing political climate. However, national curricula, such as Project WILD and Project Learning Tree, were being developed, evaluated, revised and disseminated through tested training workshops (Project WILD, 1996).

In 1990, the U.S. Congress enacted Public Law 101-619 (PL 101-619), known as the National Environmental Education Act (NEEA). NEEA was created to increase public understanding of the natural environment, and to advance and develop environmental education and training. The mandates of the NEEA were to be accomplished by the federal government through the Environmental Protection Agency (EPA) by the establishment of the Office of Environmental Education (OEE) (United States Environmental Protection Agency, 1998a). The OEE was established to work with federal and state agencies, institutions, not-for-profit educational and environmental organizations, and private sector interests to provide for environmental education and training programs, education grants, internships and fellowships, education awards, and an Education Advisory Council and Task Force (National

Environmental Education Act, 1990, United States Environmental Protection Agency, 1998b).

In 1993, twelve federal agencies participated in an interagency review of federal EE programs. Based on the Belgrade Charter and the Tbilisi Declaration these agencies agreed that "environmental education should increase public awareness and knowledge about environmental issues as well as provide the public with the skills necessary to make informed decisions and the motivation to take responsible actions" (FCCSET, 1993 as cited in The National Environmental Education Advisory Council Report to Congress, 1998, p. 3).

Despite the efforts of the United Nations, federal agencies and non-federal programs, EE has not been well integrated into education reform and improvement (Ramsey, Hungerford, & Volk, 1992). The goal of kindergarten through twelfth grade (K-12) education reform is to improve learning. Some of the approaches reformers advocate to achieve this goal include using new approaches to teaching and learning, greater accountability and assessment of progress in improving learning, developing better problem solving and critical-thinking skills in students, and strengthening core subject areas such as math, science, and geography (United States Environmental Protection Agency, 1998b, d). K-12 education reform should be a means to implement EE curriculum because EE draws on many disciplines and topics such as science, math, history, geography, citizenship, and career development. With EE integrated into various subject areas,

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it would less likely be subject to funding cuts and more likely be a focus of teacher training, be subject to curriculum expansion to include people of varying age groups and cultures, and be subject to more intensive evaluations on quality and effectiveness of curriculum.

History of Environmental Education in Michigan

In 1971, the Task Force on Goals of Michigan Education met and established the following goal:

> Michigan education must develop within each individual the knowledge and respect necessary for the appreciation maintenance, protection, and improvement of the physical environment.
> (Environmental Education Guidelines, 1973, p. 3)

Throughout the 1970s, guidelines for EE were developed and disseminated in Michigan. The Michigan Department of Natural Resources (MDNR) aided EE's progress through its division of Information and Education (I & E). This progress was slowed in the 1980s with the election of a new legislature and other leadership in Michigan.

In June, 1990 The MDNR and the Michigan Board of Education hosted a meeting to discuss the state's role in integrating EE into the educational system. At this meeting an Environmental Education Citizens' Advisory Committee (EECAC) was formed. The function of this committee was to guide the MDNR and the Michigan Board of Education in integrating EE into schools' curricula. The EECAC submitted a report to the Michigan State Board of Education and the

Michigan Natural Resources Commission (Rustem, 1993). This report contained a statement of EE mission, an EE goal statement, rationale and interpretation of the goal, EE objectives, and suggestions for EE implementation and evaluation. Even though EE in Michigan lacks centralized leadership and coordination, the report described the amount and types of EE activities and programs currently occurring in the state. Most EE programs in Michigan have been assembled using a variety of materials, because there is no formal state-mandated EE curriculum (Michigan Department of Education 1996).

The 1992 Michigan EECAC recommended the following to achieve implementation of EE:

1. Coordinate efforts and resources
2. develop and implement comprehensive K-12 EE programming
3. provide sources of adequate and stable funding
4. institutionalize EE as an important mission in Michigan with support of state and private organizations
5. monitor and evaluate Michigan's implementation of EE.

(Environmental Education Citizens' Advisory Committee, 1992, p. 11)

Unfortunately, there have been many obstacles to achieving these recommendations. One of the biggest obstacles in developing EE in Michigan concerns the structure of Michigan's school systems. Most of the control over schools in Michigan is concentrated within the local school districts, which would make implementing a statewide mandate of EE difficult (Cox & Wilson, 1993). Related to this is an

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already overburdened curriculum and local school districts' pressures to have students perform well on the Michigan Education Assessment Program (MEAP). Another obstacle is the lack of concern that individuals have about environmental issues that go beyond their own personal needs (Environmental Education Citizens' Advisory Committee, 1992). Finally, it has been suggested that financial stability, at the national and state levels, is a must for EE to be successfully integrated. Alternative strategies of integrating EE will require time to develop and to train teachers prior to implementation.

Michigan Public Act 310 (PA 310) was approved in July 1994. It is described as:

> AN ACT to promote environmental education in the state; to provide for an environmental education coordinator within the department of natural resources; and to prescribe the powers and duties of certain state agencies and officials.
> (Environmental Education Act, 1994, p. 1)

The purpose of PA 310 was to help develop Michigan citizens' understanding of the natural environment. According to this act, residents of Michigan should understand the connections among human beings, air, land, water, and all other living beings, and should be able to make informed decisions regarding natural resources. PA 310 also provided for the appointment of a coordinator of environmental education in the MDNR. The coordinator's responsibilities included things such as: providing technical assistance to schools and educators, assisting educators and students of EE in sources

of funding, assisting the MDNR in implementing statewide EE strategies, supporting professional development programs for educators, and assisting in the integration of EE into curriculum objectives in Michigan's elementary and secondary schools. The Environmental Education Act allowed the MDNR director to establish a statewide environmental education advisory committee, to be composed of a broad representation of members. Unfortunately, the MDNR Division of I & E had been dissolved.

In the mid 1990s, the MDNR was split into two agencies: MDNR and the Department of Environmental Quality (DEQ). Both of these agencies initially lacked an office for information and education. By 1996, MDEQ named an Environmental Education coordinator, and MDNR reestablished its office of Information and Education and hired a Chief of this Office.

In May 1997, in order to address stalled progress of EE in Michigan, an EE Roundtable conference was convened by 60 EE leaders from throughout the state. The purpose of this conference was to outline issues, concerns, goals, and objectives, and to develop a timeline for the implementation of EE throughout Michigan. To date, this roundtable has continued its work on the implementation of EE goals and objectives throughout Michigan.

The Great Lakes Education Program

The Great Lakes Education Program's (GLEP) curriculum is related to the definition of marine and aquatic education, which is:

> ...that part of the total educational process which 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 & Schaadt, 1977 as cited in Fortner 1991, p. 303).

The GLEP has grown from a pilot season of four classes in 1989, to a program which has involved a total of more than 14,000 students, teachers, parents, and community volunteers from southeast Michigan (S. Stewart, personal communication, March 1999). The GLEP combines formal education in the classroom guided by GLEP curriculum with non-formal education activities outside of the classroom on the GLEP cruise experience.

The GLEP was designed to educate youth to develop ecological literacy, understanding, and stewardship of the Great Lakes resources and issues (Williamson, 1996). The GLEP was also designed to provide learners with experiential or hands-on learning on an educational cruise aboard a modified Great Lakes fishing vessel on the local watershed (the Clinton River and Lake St. Clair) and the Great Lakes.

Experiential education creates in the learner a sense of personal responsibility (National Environmental Education Advisory Council, 1998). It encourages learners to be

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actively engaged in their own learning process through investigation (United States Environmental Protection Agency, 1998d). Environmentally literate and responsible citizens are empowered and motivated to act to ensure environmental quality.

The GLEP curriculum core model was developed with three sequential and complementary teaching elements to be implemented within one school year (Williamson, Stewart, Dann, Kozma, & Swinehart, 1998). It was not designed to be a one-time learning experience. GLEP consists of pre-cruise classroom learning activities, the cruise, and post-cruise classroom learning activities. The pre- and post-cruise activities are important in creating a long-term effect in the learners' Great Lakes knowledge and stewardship. GLEP teaching themes include: water, land, life, and people; these themes were designed to help teachers integrate the GLEP into their curricula. The activities are correlated with state education standards, which in turn, relate to the Michigan Education Assessment Program (MEAP) (Williamson, et al. 1998, United States Environmental Protection Agency, 1998d). The themes of water, land, life, and people also relate to PA 310 in that, according to the law, all residents of Michigan should be able to understand the connections among these themes.

This GLEP program model is unique among the several vessel-based (or shipboard) education programs within the

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Great Lakes region and among the hundreds of similar programs nationally. Its unique features include:

- focus on the local watersheds within the program content,
- targeting of local schools and students within local watersheds,
- locally planned and implemented through a task force composed of program stakeholders,
- inclusion of local partners as funders and volunteers, and
- encouragement of parents/guardians as volunteers.

In general, the GLEP is also unique among EE programs because it is a community-based experiential program, fostered by the County branch of MSU Extension, a family-oriented program provider.

Impacts on the Family and Family Decision Making Processes

The GLEP was designed to depend on community and parent volunteers to guide students at the learning stations during the shipboard experience. Both teachers and shipboard volunteers are required to attend training sessions prior to their GLEP cruises. It is possible that the program not only impacts the participants and volunteers, but also the parents/guardians and other members of participants' families, producing a community-wide ripple effect of positive EE outcomes. This ripple effect may occur because

the program's curriculum is used throughout the year, and parents and community members are involved.

To date, the secondary impacts on parents/guardians that may result from their youth's participation in an EE program have not been well documented. Marketing research and family consumer research, however, have shown the importance of family members' influences on individuals' purchases of products and services.

The family has traditionally been defined as "two or more persons related by blood, marriage, or adoption who reside together" (Schiffman & Lazar Kanuk, 1994, p. 349), or more specifically as "any group of people living together who share resources, function interdependently, and have commitment over time" (Paolucci, 1977 as cited in Bristor, 1990, p. 47). The family is often viewed as a unit or a system. Bristor suggests that the family is "...usually the social system that nurtures the individual and governs the interrelationships that occur in the individual's environment" (1990, p. 29). Since there are these relationships among family members, there is the potential for the transfer of EE related knowledge, attitudes, and behaviors. For example, it is generally agreed that attitudes are learned (Schiffman & Lazar Kanuk, 1994). These attitudes are often a result of a direct experience with or exposure to family members, peers, admired individuals, or mass media. Related to attitudes are the behaviors they commonly reflect. Sometimes behaviors may appear inconsistent with an attitude.

This may be in part due to a changing attitudes, as attitudes are not necessarily permanent (Schiffman & Lazar Kanuk).

The National Environmental Education Advisory Council Report to Congress in 1998 proposes that as children become involved in EE problem solving and action activities, they will take these issues home and discuss them with their parents, therefore increasing parents' involvement in, awareness of, and understanding of environmental issues. One example exists of a youth education program that has been shown to impact parents' behaviors and awareness of wildlife laws (Blanchard & Monroe, 1990). The Quebec-Labrador Foundation developed an education program, The Marine Bird Conservation Project, targeted at youth in an effort to control the illegal harvest of seabirds and eggs in a community with a semi-subsistence lifestyle in the Lower North Shore of the Gulf of St. Lawrence in Quebec. Youth from the community participated in an experiential conservation program that focused on seabird biology, sanctuary etiquette and wildlife laws. The curriculum presented information using local dialects and norms on biological and human factors impacting the breeding success of seabirds. Youth participants in the program displayed an increase in knowledge and greater concern about seabirds after the experience (Hallowell, 1985, as cited in Blanchard & Monroe, 1990, p. 110). Many youth returned for several summers after their initial participation to volunteer with the program; others were trained and became paid staff members. Printed

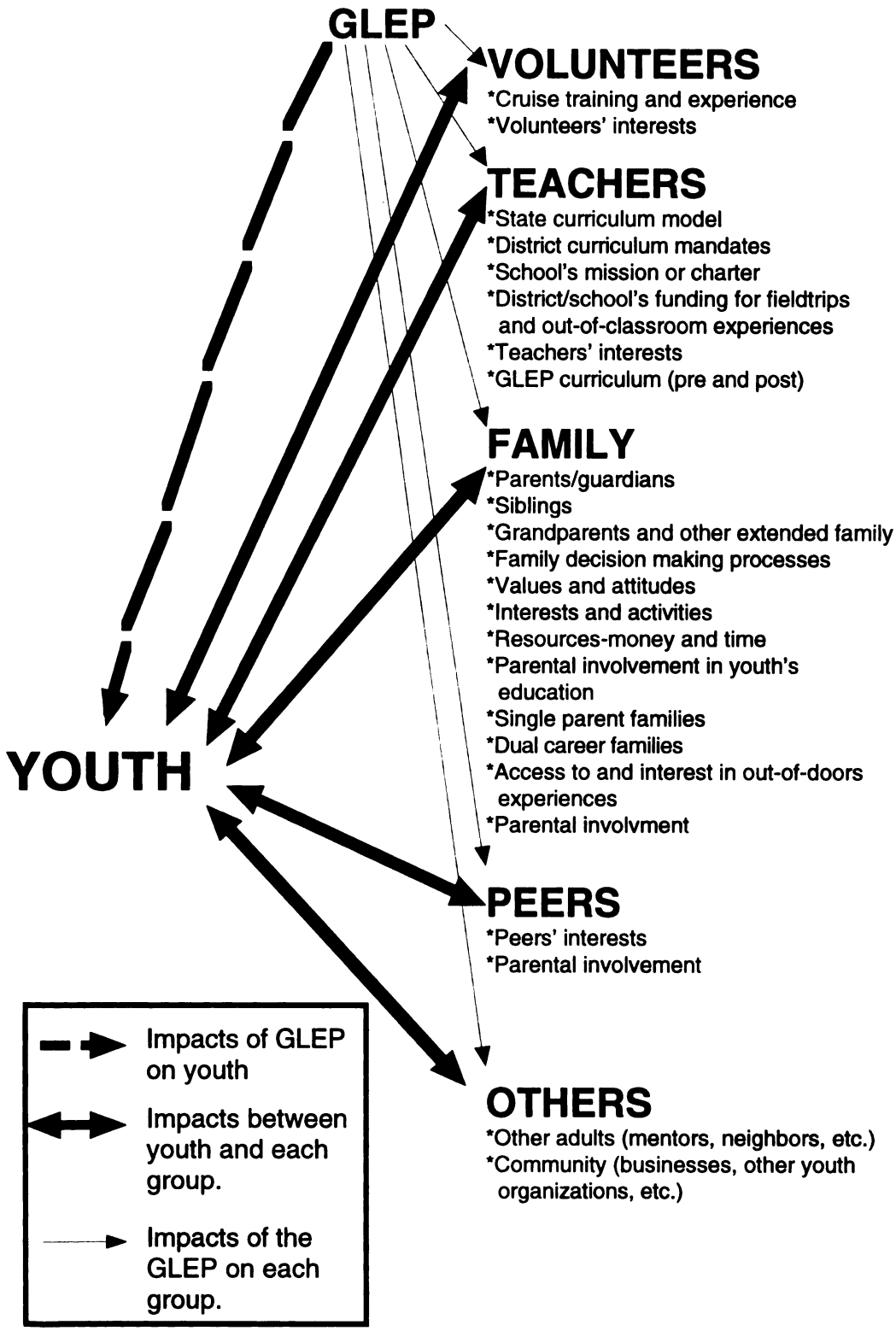
materials were gradually introduced to the community using colloquial names for the birds, illustrations and cartoons, and recognizable place names. As a result of using local dialects and norms and by targeting the youth of the community, parents became actively involved in the program. Follow-up surveys of adults in the community showed "...significant changes in local knowledge of wildlife law, attitudes toward hunting and regulations, and level of harvest of birds and eggs" (Blanchard & Monroe, 1990, p. 112).

Outside of the family unit, there are many other groups that may impact youth and their families. Families or individuals within the family may spend time with peers, clubs, neighborhood associations, special interest groups, gangs, churches, and work groups and in turn may be influenced in decision making processes by these groups (Paolucci, Hall, & Azinn, 1977).

To illustrate some of the possible indirect effects youth participating in the GLEP may have on others, we can draw upon both family consumer research and EE (Figure 1). There are five groups of people that may be part of a network of potential indirect impacts of GLEP within the community; these groups include the GLEP volunteers, teachers, family, peers, and others. The thick-lined arrows show the indirect impacts of GLEP on youth and then on each group. The thin-lined arrows demonstrate potential impacts of the GLEP on volunteers, teachers, family, peers, and others. The dashed

arrow shows the direct impact of GLEP on youth participants' knowledge, attitudes and behaviors. Additionally, there are other influences on each group (listed below each group heading). For example, families are influenced by the knowledge, attitudes, and behaviors of parents/guardians, siblings, grandparents, and other extended family members. Family decision making processes may also be influenced by the interests of members and by other lifestyle choices, such as single-parenthood or dual-career parenthood.

Figure 1. Network of potential, indirect impacts of community-based EE programs such as GLEP



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Theories of Change (Knowledge, Attitudes, and Behavior)

The processes of attitude and behavior formation and change, within the context of consumer behavior, have been researched in order to study strategic marketing questions. This research is then used by companies to better target new products to different audiences. In addition, researchers have investigated attitude and behavior formation and changes in regard to environmental literacy, and participation.

In order to understand the relationships among knowledge, attitudes, and behavior and how values and beliefs impact these relationships, we must first understand the meanings of the words. Knowledge can be described as known facts that have been gained through experience or study. An attitude has been defined as "a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935 as cited in Horowitz & Bordens, 1995, p. 228). An attitude may also be described as the interconnections of thoughts, feelings, behavioral intentions and behaviors related to the object of the attitude (Zimbardo & Leippe, 1992). Behaviors are the actions or reactions of persons in response to external or internal stimuli. Values, what a person perceives to be important, and beliefs, what a person perceives to be true, can impact a person's behaviors.

It is important for educators and program planners to understand the relationships among knowledge, attitudes, and

behavior and how they may affect one another in order to effectively plan lessons and programs. It is also important to understand how changes in behavior can be achieved, especially in terms of positive environmental stewardship behaviors. In order to understand these basic relationships, researchers have developed several theories.

The Theory of Reasoned Action (Fishbein & Ajzen, 1975) is one theory that is often cited in discussions of attitudes and behaviors, even recreational stewardship behaviors (Fishbein & Manfredo, 1992, p. 371). This theory explains relationships among beliefs, attitudes, intentions, and behavior. Fishbein and Ajzen claim that people are thoughtful creatures and are aware of their attitudes and behavior. The link between attitudes and behavior may be demonstrated in different ways, and it is therefore necessary to look at many different kinds of specific behavior to understand the true relationships between general attitudes and behavior (Horowitz & Bordens, 1995).

Ajzen and Fishbein, 1980, also developed the Theory of Planned Behavior. This theory assumes that the best predictor of a person's behavior is the person's intention to act. The intention to act is influenced by three factors: the person's attitudes toward the behavior, the norms of friends and family, and the person's perceived ability to control the behavior. It can be argued, therefore, that how a person perceives the importance of significant others (e.g., peers

and family) can influence a behavior, even if that behavior contradicts the person's own attitudes.

While the Theory of Reasoned Action and the Theory of Planned Behavior show a flow from changes in attitude leading to changes in behavior, social psychological researchers have demonstrated theories that flow from changes in behavior leading to changes in attitudes. The first theory is cognitive dissonance (Festinger, 1957). This can be described as an unpleasant state that results when an attitude and a behavior are in conflict. Behaving inconsistently with our attitudes is unpleasant. Therefore, we are motivated to reduce the dissonance and achieve psychological balance by changing our attitudes or by changing our behavior. For example, in respect to this thesis, perhaps parents/guardians began taking used motor oil to an approved waste collection site only after their son/daughter participated in the GLEP. This behavior may have been inconsistent with their attitude, but in order to reach a cognitive balance they decided that since they were making the effort to recycle household toxic waste, it must be important to them, thus changing their attitude toward recycling household toxic waste.

The second theory is called Self-Perception Theory (Bem, 1972). This theory asserts that "people observe their own behavior and assume that their attitudes must be consistent with that behavior" (Horowitz & Bordens, 1995, p. 293). One common example of this might be, "I said it, I must have meant it." Or in terms of this thesis, perhaps

parents/guardians participated in water conservation behaviors only after their son/daughter participated in the GLEP. When they were asked questions about water conservation behaviors (i.e. "I am willing to turn off the water when I brush my teeth") they assessed what they did (turn off the water) and assumed that their attitudes (water conservation is important to me) must be consistent with that behavior. Therefore, when we report our attitudes, it is merely an interpretation of our behavior.

These theories can be related directly to explaining potential ripple effects of youths' GLEP participation on adults. Youth participants may be unable to explain to their parents/guardians why (based on knowledge) something positive should be done as an environmental stewardship behavior; they may only be able to stress the importance (i.e. based on attitudes) of doing something (i.e. the behavior). If youth are able to influence their parents/guardians to change a behavior (recycle and conserve water) then in turn, according to the theories of cognitive dissonance and self-perception, a change in attitude (it is important to recycle and conserve water) in the parents/guardians may result.

METHODS

Development of Evaluation Instrument

I evaluated potential effects of The Great Lakes Education Program (GLEP) on parents/guardians using a self-administered, descriptive survey. The survey was developed using items from ten different questionnaires. These instruments include: the survey used in a follow-up study of the 4-H Great Lakes Natural Resources Camp (Suvedi & Dann, 1992), a Survey of NatureLink Families (Siemer & Brown, 1997), Great Lakes Education Program (GLEP) Survey (Williamson, 1996), Coral Reef Classroom Student Survey (Kelly, 1995), Inland Seas Education Association Student Post-Trip Evaluation (Schultz, 1994), Wildlife Education Survey-4th Grade (Gilchrist, 1989/90), Marine Education Knowledge Inventory (Hounshell & Hampton, 1982), Children's Wildlife Perception Survey (Wong-Leonard, 1992), Water and Aquatic Life (Stout, Herd, & Haverland, 1989), and Survey of Oceanic Attitudes and Knowledge (SOAK) (Fortner & Mayer, 1983),.

Williamson (1996) developed her survey by pooling items from these instruments into a large database. Then, she matched GLEP objectives to fourth grade content standards and benchmarks as reported in Michigan's Essential Goals and Objectives for Science Education (K-12) (1991) and Michigan Core Curriculum Content and Standards (1994). Knowledge

questions from the item pool were matched to GLEP objectives and benchmarks in an attempt to assure content validity of the instrument. Experience, attitude and behavioral intention questions were also selected from the item pool and edited to relate specifically to the GLEP. For this study, these questions and those from other studies (especially Siemer & Brown, 1997, and Suvedi & Dann, 1992) were further adapted to be appropriate for the parents/guardians of participants.

The survey consisted of eight sections (Appendix H-2). It was requested that the one parent/guardian who was the most familiar with their son or daughter's GLEP experiences was to complete the survey. Section A was to be answered only by parents/guardians of students who had participated in the GLEP. It consisted of Yes/No questions related to their family's outdoor and Great Lakes experiences before the youths' GLEP participation. Section B consisted of Yes/No questions related to the family's outdoor experiences over the past six months, and was to be answered by all respondents. The respondents whose son or daughter participated in the GLEP did so in the fall of 1997 or spring of 1998. Therefore, Section A related to pre-GLEP experiences of participants' parents/guardians only, and Section B related to post-GLEP experiences for participants' parents/guardians or experiences during the past six months for non-participants' parents/guardians.

The first half of section C and all of section D measured parents'/guardians' attitudes toward the Great Lakes

and the environment and was to be answered by all respondents. The first of these, section C-Attitudes about the Great Lakes, was composed of semantic differential items with adjective pairs describing the Great Lakes, with a scale ranging from 1-6; this attitude scale was adapted from the SOAK survey (Fortner & Mayer, 1983). The second set of attitude questions, section D-Attitudes about the Environment used a 5-point Likert scale with possible responses of strongly agree, agree, neutral, disagree, and strongly disagree (Siemer & Brown, 1997).

I measured parents' intentions to perform positive environmental behaviors using forced categorical responses of True, Maybe, or False in the second half of Section C, intentions/feelings, (Leeming, Dwyer, & Bracken, 1995, Williamson, 1996). Section E, environmental actions, also measured parents' intentions to perform positive environmental behaviors using a 5-point Likert-type scale with possible responses of never, almost never, sometimes, often, and always (Siemer & Brown, 1997).

Section F was designed to assess the knowledge of respondents in regards to the Great Lakes and even more specifically, the GLEP. This section was comprised of 13 questions with multiple choice answers (Fortner & Mayer, 1983, Williamson, 1996).

Additional questions in section G were asked to understand respondents' backgrounds; this section was to be answered by all respondents. Section H was designed to assess

the impacts of the GLEP on participants and their families, based on the self-reported perceptions of their parents/guardians.

Survey Design

According to Dillman (1978), other researchers have demonstrated that there are many aspects of survey design that must be considered in order to maximize response rates. Things to consider include but are not limited to: the color of the paper, length of the questionnaire, composition of the cover letter, and offers of incentives. Dillman suggests "...researchers assumed that respondent behavior is primarily a reaction to particular aspects of mail questionnaire studies, rather than a reaction to the whole" (p. 7). He suggests that the decision to respond is most likely based on the overall, visible evaluation of the study to the prospective respondents. Therefore, I considered the appearance of the survey instrument in terms of size, shape (booklet), weight, color of paper, cover design, question order, and layout. The wording and organization of the cover letter were also carefully crafted.

There are no agreed upon requirements for pre-testing a survey (Dillman, 1978, p. 155). I submitted the preliminary survey instrument to a panel of six expert reviewers, including university researchers and extension professionals, to see whether potential respondents would understand and be

able to complete the survey questions. Reviewers' comments were considered and revisions were made.

Study Methods

School districts were unable to provide me with the names, addresses, and phone numbers of students and their parents/guardians (S. Stewart, personal communication, summer 1998). Since I was unable to contact the parents/guardians of participants directly, I needed an alternative to face-to-face interviews, phone surveys, and standard mail surveys to implement this study. My study design alternative came from an adaptation of the "total design method (TDM)" for a mail survey (Dillman, 1978). The TDM was constructed by bringing together past research about techniques for effective mail survey methods. Dillman suggests that the procedures of the TDM, when followed, can overcome some of the deficiencies and problems of mail surveys and may result in a response rate of 50% to 75%, although these response rates are still usually lower than those of similar studies using face-to-face interviews.

The Michigan State University Committee on Research Involving Human Subjects approved all research methodology (Appendix A). Methodologies were considered to assess fifth, sixth, and seventh graders' parents/guardians' reactions to GLEP (Appendix B). However, only the fifth grade classrooms were selected for this study (Appendix F). Fourth grade classrooms who had participated the cruise experience during

the fall cruise season of 1998 were not considered for this study because they were only three to four months post-GLEP experience.

For many reasons I rejected the goal of assessing longer-term program impacts by contacting levels at or above sixth grade. GLEP participants who would now be in sixth or seventh grade were dispersed among many middle and junior high schools (Appendix B). Surveying these students would have required great effort and expense, yet response rates probably would have been low and survey costs high. For example, attempting to contact seventh graders would have entailed contacting 26 middle schools and 13 junior highs. Within these 39 schools there were 6,892 seventh grade students with an estimated 3,493 GLEP participants. Therefore, my study methods focused on the parents/guardians of fifth grade students in Macomb County in school districts with GLEP participation.

Teachers' and/or schools' permission for survey distribution was attained in cooperation with Michigan State University Extension (MSUE) staff located in Macomb County (Appendix C). There are 23 public school districts in Macomb County; as of the spring 1998, 13 (57%) districts had schools that have participated in the GLEP at one time or another since 1991. I classified each school within GLEP participating districts as either a participating or a non-participating school. Within participating schools there had been fourth grade participation in the GLEP during the 1997-

1998 school year. The non-participating schools consisted of fifth grade classrooms within schools that have never participated in the GLEP.

I examined estimates of GLEP participation (1995-1998) (Appendix D-1), current school enrollments in elementary, middle, and junior high schools (Appendix D-2, D-3,and D-4), and school districts' general characteristics (urban, suburban, or rural) within all GLEP participating districts (Appendix E). Based on these examinations, I decided to contact four school districts, which included 16 separate schools with 38 classrooms and 962 students (Appendix F). These school districts were chosen because they were representative of all GLEP participating districts based on their classification as an urban, suburban, or rural district (Appendix E), and for means of efficiency in survey distribution based on estimated school enrollment numbers (Appendix D-4). Unfortunately, the timing of the implementation of my study coincided with the Michigan Education Assessment Program (MEAP) test battery, which fifth grade students in Macomb County were scheduled to take at the beginning of February, 1999. Some teachers and principals were reluctant to participate in my study since they perceived it might take time away from classroom instruction and studies in preparation for the MEAP. Of the 16 schools that I contacted, only 8 agreed to participate; therefore, the study methods were adjusted to include only 8 schools with 19 classrooms and 458 students (Appendix G). The schools

within this adjusted study were matched so there was one GLEP participating school and one non-participating school within each of the four districts.

Survey Implementation

To implement this study, I scheduled school visits with each teacher. I agreed to present a classroom activity on Great Lakes careers and opportunities. I used the activity "Fisheries Careers Scavenger Hunt" from The Life of The Lakes (Dann, 1994). In return, teachers agreed to administer the survey.

During the school visit, I explained the survey implementation process to teachers, discussing survey boxes which contained all the needed items and which were labeled with directions and dates for distribution. Survey boxes were organized with the following items in the order they were to be used: survey packet for distribution on the day of my visit, reminder letter to be sent home one week after my visit, additional survey packets for distribution three weeks after my visit (Appendix H), large envelopes with pre-paid postage for multiple survey packet returns, a poster and marker to chart classroom survey returns, fish bobbers and fish trading cards for each student when a completed survey was returned to the teacher, and a poster of Michigan fishes for the classroom when a 75% survey return rate was achieved.

After completing the activity with the students, I explained to them that I needed their help. I showed the

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students the survey packet (Appendix H-1, H-2) and its contents and explained that I needed them to take the envelope home to their parents for completion and then bring it back to their teachers. I explained to the class the incentives and gifts each student would receive when a completed survey was returned to their teacher, and the gifts the classroom would receive upon a 75% survey return rate or a 95% survey return rate (fish posters, or sets of fish fact sheets and Great Lakes posters). I also showed students a chart that could be displayed in the classroom so that they could track their survey return efforts. Each teacher was to distribute a survey packet (Appendix H) to each student to take home to his or her parent or guardian on the day of the classroom visit.

Each survey packet sent home with students included a cover letter to parents/guardians (Appendix H-1), a survey (Appendix H-2), and an envelope in which the completed survey was to be returned to the teacher. The cover letter explained the importance of the survey, guaranteed confidentiality of responses, explained that study participation consent is given by returning the completed survey, and appealed for parents' prompt response. Those who returned the survey within two weeks would be entered into a drawing (Appendix H-3) for an incentive prize of a free bass fishing trip for one adult and one child. As an incentive for the students to encourage their parents to complete the survey, fish trading

cards and fishing bobbers were given to each student when a completed survey was returned.

The survey instrument was a ten-page survey which took approximately 15 minutes to complete. A reminder letter (Appendix I) was to be distributed by teachers to parents/guardians through the students one week after the original survey distribution. Teachers were supplied with large envelopes with prepaid postage to return multiple survey packets to the Department of Fisheries and Wildlife at Michigan State University. Additional copies of the survey packets, with a revised cover letter (Appendix J), were left with the teachers at the time of the school visits. This revised cover letter again explained the importance of the survey, guaranteed confidentiality of responses, explained that study participation consent is given by returning the completed survey, and appealed for parents' prompt response by indicating that the classroom would receive a special gift when 95% of the students had returned a completed survey. Participating teachers were to ask each student to take another copy of the survey home only if he or she had not returned his or her parent's completed survey (Table 1).

Table 1

Survey Distribution Timeline

School*	Class-room*	Original Survey Distribution	Scheduled Reminder Letter Distribution by Teachers	Scheduled Survey Redistribution
1	1	01/11/99	01/18/99	02/01/99
1	2	01/11/99	01/18/99	02/01/99
2	3	02/17/99	02/24/99	03/10/99
2	4	02/17/99	02/24/99	03/10/99
2	5	02/17/99	02/24/99	03/10/99
3	6	01/19/99	02/09/99	02/26/99
3	7	01/19/99	02/09/99	02/26/99
3	8	01/19/99	02/09/99	02/26/99
4	9	01/15/99	01/22/99	02/05/99
4	10	01/15/99	01/22/99	02/05/99
5	11	01/15/99	01/22/99	02/05/99
5	12	01/15/99	01/22/99	02/05/99
6	13	01/15/99	01/22/99	02/05/99
6	14	01/15/99	01/22/99	02/05/99
7	15	02/24/99	03/03/99	03/17/99
7	16	02/24/99	03/03/99	03/17/99
7	17	02/24/99	03/03/99	03/17/99
8	18	02/24/99	03/03/99	03/17/99
8	19	02/24/99	03/03/99	03/17/99

*See Appendix G for schools and classrooms that are represented by the above numbers.

Phone messages were left for the teachers on the average of two times a week beginning approximately five weeks after each classroom visit. These messages were to remind teachers to return the surveys and also to help with any questions that may have arisen as a result of the visit or the survey. Phone calls were placed at different times of the day (morning, lunch time, and dismissal time) in hopes that a teacher might be available to come to the phone. The message also contained two phone numbers (school and home) where I might be reached should they require assistance.

Approximately seven weeks after each classroom visit I began making phone calls in order to understand survey non-response. I left messages requesting that the teachers return my call as soon as possible. These calls were also made at varying times of day and made about three times a week. On March 15 a thank you/reminder letter (Appendix K) was sent to all of the teachers.

Data Analysis

I used the Statistical Package for Social Sciences (SPSS) software version 8.0 for data analysis (SPSS, 1997). A research intern assisted me with data entry into an SPSS spreadsheet. Scales were created on some of the sections within the survey and Cronbach's Alpha was used to assess scale reliability. Using the same SPSS software, I calculated summary statistics and scale scores, and I performed t-tests, Mann-Whitney U tests and chi-square statistics.

For the purpose of analysis, the 13-question knowledge section with multiple choice answers was treated like a test. Correct answers were scored with a value of one point and then summed to yield an overall knowledge score that ranged from zero to 13 points. Missing and incorrect answers were scored as zero.

Two sections of the survey were designed to assess the attitudes of parents/guardians. In order to analyze the raw scores of the questions in section C-Attitudes about the Great Lakes, the semantic differential items were recoded so that all responses would be in the same direction, with responses ranging from very negative views to very positive views. The attitude scores ranged from one to six, with the more negative responses receiving a one and the more positive answers receiving a six. Missing answers were considered as "system missing values," and these cases with missing answers were excluded from the analysis. Responses were then summed to yield an overall attitude score that ranged from seven to 42. Cronbach's Alpha was calculated to assess the reliability of the scale (Alpha = .7011).

Responses to the attitude questions in Section D-Attitudes about the Environment, were recoded so that they ranged from one to five, with the more negative responses receiving a one and the more positive answers receiving a five. Missing answers were considered as "system missing values," and these cases with missing answers were excluded from the analysis. Responses were then summed to yield an

overall attitude score that ranged from nine to 45. Cronbach's Alpha was conducted to examine the reliability of the scale (Alpha = .9303).

Two sections of the survey were related to Great Lakes behavioral intentions. For the purposes of analysis, responses to each question in the second half of Section C-Intentions/Feelings, were recoded so that the behavior scores ranged from one to three, with the more negative responses receiving a one and the more positive answers receiving a three. Missing answers were considered as "system missing values," and these cases with missing answers were excluded from the analysis. Responses were then summed to yield an overall attitude score that ranged from eight to 42. Cronbach's Alpha was conducted for reliability of the scale (Alpha = .6723).

Responses to the 12 questions in section E-Environmental Actions, ranged from one to five, with the more negative responses receiving a one and the more positive answers receiving a five. Missing answers were considered as "system missing values," and these cases with missing answers were excluded from the analysis. Responses were then summed to yield an overall behavior score that ranged from twelve to 60. Cronbach's Alpha was conducted to determine reliability of the scale (Alpha = .8263).

The impacts of the GLEP on participants and their families were assessed using four questions (Appendix H, Section H). The responses to these questions were recoded so

that they ranged from one to five, with the more negative responses receiving a one and the more positive answers receiving a five. Missing answers were considered as "system missing values," and these cases with missing answers were excluded from the analysis. Positive responses (strongly agree and agree) were lumped and were reported using the percentages of participants who agreed. Cronbach's Alpha was conducted to determine reliability of the scale (Alpha = .8558).

RESULTS

Response Rates

Teachers representing 19 classrooms agreed to assist in this study, and a total of 458 fifth graders in these classrooms received surveys to take home to their parents/guardians (Table 2). For the purposes of this study, each of these 19 classrooms was classified as either a participating or a non-participating group. Participating groups consisted of fifth grade classrooms within schools that had fourth grade participation in the GLEP during the 1997-1998 school year. Non-participating groups consisted of fifth grade classrooms within schools that have never participated in the GLEP. Among the study classrooms, there was a total of 220 fifth graders in the participating groups, and 238 fifth grade students in the non-participating groups (Table 3).

A total of 178 usable surveys were returned by parents/guardians, thus the overall response rate was 39% (Tables 2, 3). One survey was deemed unusable, because the parent wrote a note on it stating that the child had completed the survey. Within classroom response rates varied from 0% to 79% (Table 2). From nine of the classrooms, parent/guardian response rates were 50% or greater (Table 2).

Table 2

Response Rates by Classroom

Classroom	Classification of Study Groups*	# of 5th Graders	# of Usable Surveys**	% of Overall Response Rate
1	Participating	30	9	30
2	Participating	15	10	67
3	Non-part.	26	13	50
4	Non-part.	26	9	35
5	Non-part.	26	7	27
6	Non-part.	26	0	0
7	Non-part.	27	0	0
8	Non-part.	9	6	67
9	Non-part.	24	19	79
10	Non-part.	11	7	64
11	Non-part.	31	19	61
12	Non-part.	32	24	75
13	Participating	30	10	33
14	Participating	30	20	67
15	Participating	25	0	0
16	Participating	25	9	36
17	Participating	25	0	0
18	Participating	20	6	30
19	Participating	20	10	50
Totals	9 Participating 10 Non-part.	458	178	39

*The study groups were classified as either participating groups (fifth grade classrooms within schools that had fourth grade participation in the GLEP during the 1997-1998 school year) or non-participating (Non-part.) groups (fifth grade classrooms within schools that have never participated in the GLEP.)

Table 2 (continued)

**One survey was deemed unusable because the student completed the survey.
Note. See Appendix G for the names of the schools represented by each classroom number.

Seventy-four completed surveys were returned from participating groups, and 104 from non-participating groups (Table 3).

Table 3

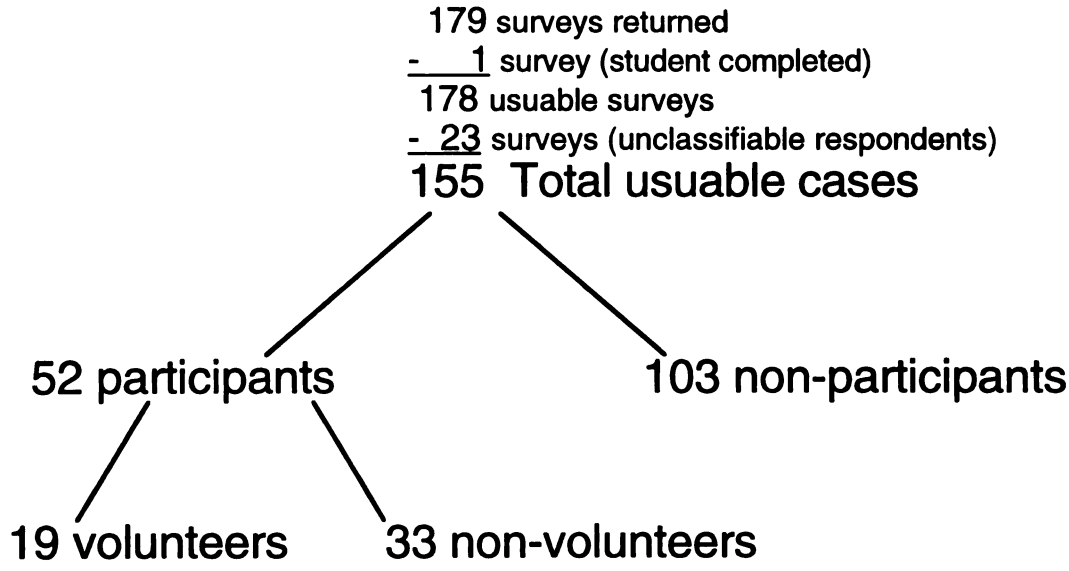
Overall Response Rates

Responses Received From Each Group	# of 5th Graders Contacted	# of Usable Surveys Returned	% of Overall Response Rate
Participating Groups	220	74	34
Non-Participating Groups	238	104	44
Totals	458	178	39

Of the 74 responses from participating groups, 22 were received from parents/guardians of GLEP non-participants; of the 104 responses from non-participating groups, one was received from a parent/guardian of a GLEP participant. For the purposes of this study, these 23 respondents were considered "unclassifiable." These cases were deleted because I could not determine whether the youth was actually a member of a participating or a non-participating classroom, based only on parents/guardians' responses to the question about the youths' participation in the GLEP's shipboard field trip. It is possible that these youth were ill on the day of the GLEP field trip but had participated in classroom-based GLEP learning; or, perhaps these youth had transferred to a different school. Therefore, in the overall respondent pool and for the purposes of analysis, there were 52 participants (those whose son or daughter participated in the GLEP's shipboard field trip during fourth grade) and 103 non-participants (those whose son or daughter did not participate in the GLEP's shipboard field trip) (Figure 2).

Responding parents/guardians who were classified as participants were further categorized as either volunteers (those who assisted/chaperoned on the GLEP shipboard field trip) or non-volunteers. Among the 52 participants, 19 parents/guardians reported that they had volunteered with the GLEP shipboard field trip (Figure 2).

Figure 2. Breakdown of survey responses and total number of usable cases.



Results of Non-respondent Follow-up Attempts

In order to understand possible reasons for non-response from classrooms with low or no response, I attempted to contact all teachers for a brief telephone interview (Appendix L). Only two teachers responded, representing four out of the 19 classrooms, and resulting in a 21% response rate to the telephone survey. One teacher, representing two classrooms, responded after only two attempts for contact, and the second teacher responded after three attempts. It was at this time that I interviewed them briefly about survey returns.

Teachers' responses included these reasons for students'/parents' non-response: "...not out of the ordinary for this group. They are not good at remembering to return anything," "...there is a lack of responsibility that trickles down from their parents," "school is not a top priority for the students or their parents". I left approximately eight phone messages per teacher over a three week period for the remaining 15 teachers who never returned my call.

Demographic and Background Characteristics of Respondents

Survey respondents were asked four closed-ended questions regarding background characteristics. Additional questions were asked about the respondents': participation in activities/hobbies related to the Great Lakes (Table 4),

membership in environmental or conservation organizations, highest level of education completed (Table 5), and gender.

Nearly fifty percent of all respondents reported that they regularly participate in activities/hobbies related to the Great Lakes. Overall, there was no statistically significant differences between the participants' (52% reported participation) and non-participants' (48% reported participation) self-reported participation in activities/hobbies related to the Great Lakes.

Respondents' possible different Great Lakes and outdoor experiences during the past six months were also assessed. There was a statistically significant difference between participants and non-participants on two variables; participants more frequently reported having been on a motorboat, and having gone hiking (Table 4).

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Table 4

Great Lakes and other Outdoor Experiences during the Last Six Months

Question**	% with YES Answers		χ^2	df	p
Fished	Part.	64.0	0.975	1	0.323
	Non-part.	55.6			
Visited Great Lakes	Part.	86.0	2.033	1	0.154
	Non-part.	76.0			
Fished Great Lakes	Part.	52.0	3.343	1	0.067
	Non-part.	36.4			
Activities	Part.	42.0	3.300	1	0.069
	Non-part.	27.3			
Zoo	Part.	58.0	0.161	1	0.689
	Non-part.	54.5			
Nature	Part.	70.0	0.535	1	0.465
	Non-part.	64.0			
Aquarium	Part.	30.0	0.284	1	0.594
	Non-part.	34.3			
Camped	Part.	52.0	0.083	1	0.773
	Non-part.	49.5			
TV	Part.	88.2	0.111	1	0.739
	Non-part.	90.0			
Books or Magazines	Part.	86.0	3.771	1	0.052
	Non-part.	71.7			
Sail, Kayak or Canoe	Part.	30.0	1.077	1	0.299
	Non-part.	24.6			
Motorboat	Part.	62.0	4.096	1	0.043*
	Non-part.	44.1			
Hiked	Part.	62.0	8.631	1	0.003*
	Non-part.	56.6			
Parks	Part.	94.4	2.799	1	0.094
	Non-part.	75.8			

*$p < .05$.
**For actual question, see Appendix H-2, Survey Section B.

Table 4 (continued)

Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

Respondents were asked if they belong to any environmental or conservation organizations; 9% reported that they do belong to an environmental or conservation organization, and 91% reported they do not. Overall, there was no statistically significant difference between participants (6% reported membership) and non-participants (11% reported membership) on the question of memberships in environmental or conservation organization.

Some parents/guardians (69%) reported that their highest level of education included some college study (Table 5). However, most of the respondents (81%) reported not having a four year college degree. One hundred eleven of the parents/guardians who returned usable surveys were female (71.6%), while only 41 were male (26.5%). Three respondents did not answer this question (1.9%).

Table 5

Respondents' Levels of Education

Highest Level of Education Completed	Number of Respondents	% of all Respondents
Elementary School	3	1.9
High School	44	28.4
Some College	51	32.9
Associates Degree or Trade School	25	16.1
Bachelors Degree	22	14.2
Advanced Degree	7	4.5
Missing Cases	3	1.9
Totals	155	100.0

Comparisons of GLEP Parent/Guardian Participants, Non-participants and Volunteers

Knowledge Test Results

The knowledge score of all respondents was generally very high, with more than 70% (109/153) of respondents correctly answering at least 77% (10/13) of the questions. With regard to Great Lakes and aquatic knowledge, I observed no statistically significant differences between responding parent/guardian participants and non-participants (Table 6). (For differences between parent/guardian participants and non-participants on each item in the knowledge test, see Appendix M, Table M-1.) However, the knowledge scores of parent/guardian volunteers were found to be statistically significantly higher than the scores of non-volunteering parents/guardians (Table 6). (For differences between parent/guardian volunteers and non-volunteers on each item in the knowledge test, see Appendix M, Table M-2.) Because the number of cases in the parent/guardian volunteers and non-volunteers groups were small, Mann Whitney U tests were also performed (Appendix M, Table M-11). Results were similar to those observed with the t-test.

Table 6

Knowledge Test Results

Parent/Guardian Respondent Groups	n	M	SD	t 2-tailed	p
Participants.	52	10.67	2.49	-1.222	0.224
Non-participants	101	10.13	2.67		
Volunteers	19	11.63	1.50	-2.178	0.034*
Non-volunteers	33	10.12	2.79		

*$p < .05$.

Note. Maximum score on the knowledge test was 13.00.

Attitude Scale Results

Two attitude scales, Attitudes about the Great Lakes and Attitudes about the Environment, were developed to assess any possible differences among the respondents. Attitudes were generally positive among all respondents in regard to the Great Lakes and the environment.

With regard to the first scale, Attitudes about the Great Lakes, I observed no statistically significant differences between responding parent/guardian participants and non-participants (Table 7). (For differences between parent/guardian participants and non-participants on each item in this attitude scale, see Appendix M, Table M-3.) The score of parent/guardian volunteers was also compared to that of non-volunteers on the scale of attitudes about the Great Lakes. No statistically significant differences were found (Table 7). (For differences between parent/guardian volunteers and non-volunteers on each item in this attitude scale, see Appendix M, Table M-4.) Because the number of cases in the parent/guardian volunteers and non-volunteers groups were small, Mann Whitney U tests were also performed (Appendix M, Table M-11). Results were similar to those observed with the t-test.

The scores of respondents, on the scale of Attitudes about the Environment were compared. No statistically significant differences in attitudes were found between participants' and non-participants' parents/guardians, nor between volunteering and non-volunteering parents/guardians.

(Table 7). (For differences on each item in this attitude scale between parent/guardian participants and non-participants see Appendix M, Table M-5. For differences between parent/guardian volunteers and non-volunteers, see Appendix M, Table M-6.) Because the number of cases in the parent/guardian volunteers and non-volunteers groups were small, Mann Whitney U tests were also performed (Appendix M, Table M-11). Results were similar to those observed with the t-test.

Table 7

Attitude Scale Results

Parent/Guardian Respondent Groups	n	M*	SD	t 2-tailed	p
Scale: Attitudes about the Great Lakes					
Participants	52	35.58	4.65	-0.015	0.988
Non-participants	99	35.57	4.38		
Volunteers	19	36.37	3.80	-0.931	0.356
Non-volunteers	33	35.12	5.07		
Scale: Attitudes about the Environment					
Participants	52	40.23	5.17	0.087	0.931
Non-participants	102	40.30	4.80		
Volunteers	19	41.21	3.98	-1.038	0.304
Non-volunteers	33	39.67	5.72		

Note. Maximum score on the Attitudes about the Great Lakes scale was 42. Maximum score on the Attitudes about the Environment scale was 45.

Behavioral Intentions Results

Two behavioral intention scales, Intentions/Feelings and Environmental Actions, were developed to assess any possible differences among the respondents. Self-reported behavioral intentions were generally high among all respondents in regard to the Great Lakes and the environment.

With regard to the first scale, Intentions/Feelings, I observed no statistically significant differences between responding parent/guardian participants and non-participants (Table 8). (For differences between parent/guardian participants and non-participants on each item in this behavioral intention scale, see Appendix M, Table M-7.) However, a statistically significant difference was found on the score of parent/guardian volunteers compared to that of non-volunteers on the scale of Intentions/Feelings (Table 8). (For differences between parent/guardian volunteers and non-volunteers on each item in this behavioral intention scale, see Appendix M, Table M-8.) Because the number of cases in the parent/guardian volunteers and non-volunteers groups were small, Mann Whitney U tests were also performed (Appendix M, Table M-11). Results were similar to those observed with the t-test.

Table 8

Behavior Results: Intentions/Feelings

Parent/Guardian Respondent Groups	n	M**	SD	t 2-tailed	p
Part.	51	18.71	2.04	-0.192	0.848
Non-part.	100	18.64	1.98		
Vol.	18	19.61	1.65	-2.452	0.018*
Non-vol.	33	18.21	2.09		

*p < .05.
**Maximum score of the intentions/feeling scale was 24.
Note. Part.= Parents/guardians of participants.
Non-part.= Parents/guardians of non-participants.
Vol. = Parents/Guardians who volunteered.
Non-vol. = Non-volunteering parents/guardians

In regard to the second behavioral intention scale, Environmental Action, scores of participants' parents/guardians were statistically significantly different from (higher than) the scores of non-participants' parents/guardians (Table 9). (For differences between parent/guardian participants and non-participants on each item in this behavioral intention scale, see Appendix M, Table M-9.) However, using the scale of environmental action, behavior scores of parent/guardian volunteers were shown not to be statistically significantly different from parent/guardian non-volunteers (Table 9). (For differences between parent/guardian volunteers and non-volunteers on each item in this behavioral intention scale, see Appendix M, Table M-10.) Because the number of cases in the parent/guardian volunteers and non-volunteers groups were small, Mann Whitney U tests were also performed (Appendix M, Table M-11). Results were similar to those observed with the t-test.

Table 9

Behavior Scale Results: Environmental Action

Parent/Guardian Respondent Groups and Variable	n	M	SD	t 2-tailed	p
Participants	51	42.96	7.10	-2.356	0.020*
Non-participants	99	40.21	6.59		
Volunteers	19	44.00	7.42	-0.802	0.426
Non-volunteers	32	42.34	6.95		

*$p < .05$.

Note. Maximum score on the environmental action scale was 60.

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Relationships of Knowledge, Attitudes and Behavioral Intentions

To demonstrate the relationships among knowledge, attitudes and behavioral intentions, the scales created to assess these were each correlated with one another. The results of these correlations demonstrate a positive relationship between each of the scales (Table 10).

Table 10

Correlation Matrix of Knowledge, Attitudes, and Behavioral Intentions

Measure	1	2	3	4	5
1. Great Lakes and Aquatic Knowledge	1				
2. Attitudes about the Great Lakes	0.233	1			
3. Attitudes about the Environment	0.240	0.383	1		
4. Intentions/ Feelings	0.341	0.335	0.646	1	
5. Environmental Action	0.220	0.167	0.434	0.433	1

Note. All correlations are statistically significant $p < .05$, 2-tailed.

Additional Findings

The numbers of respondents that were classified as either volunteers (n=19) or non-volunteers (n=33) were relatively small. Generally, these sample sizes are too small for analysis using parametric statistics. However, some of the findings might provide insight into the differences between parent/guardian volunteers and non-volunteers (Tables 11, 12, 13, 14 and 15). For example, parent/guardian volunteers appear to be more avid Great Lakes and outdoor enthusiasts than non-volunteers. Additionally, 84% of volunteers reported that they would support their son or daughter's decision to pursue a career related to the Great Lakes.

The questions in Survey Section H were used to measure participants' parents/guardians' self-reported attitudes related to the overall importance and worth of the GLEP experience (Table 11). Responses that were Strongly Agree or Agree were considered as positive or agreeing responses.

Table 11

Descriptions of Parent/Guardians' Assessment of GLEP's Impacts on Youth and Self

Question	% of Participants Agreeing		Overall % of Participants Agreeing
Attitudinal			
GLEP worthwhile[1]	Vol.	100.0	94.2
	Non-vol.	90.9	
GLEP overall influential[2]	Vol.	68.4	74.9
	Non-vol.	65.6	
Parent/Guardian more aware of water quality[3]	Vol.	89.5	74.5
	Non-vol.	65.6	

[1]For actual question, see Appendix H-2, Survey Section H, Question 1

[2]For actual questions used to create the scale for this assessment, see Appendix H-2, Survey Section H, Questions 2-5

[3]For actual question, see Appendix H-2, Survey Section H, Question 6

Note. Vol. = Parent/Guardian volunteers.
Non-vol. = Non-volunteering parents/guardians

Survey Section A was used to measure the experiences of respondents before their son/daughter's GLEP experience. Specific questions within this section were designed to assess family consumerism or water-related behaviors (Table 12).

Table 12

Descriptions of Parent/Guardians Volunteers and Non-Volunteers, and All Respondents (Pre-GLEP)

Question	% of Participants with YES responses		Overall % of Respondents with YES responses
Fished[1]	Vol.	94.7	86.5
	Non-vol.	81.1	
Fished Great Lakes[2]	Vol.	78.9	73.0
	Non-vol.	69.7	
Sail, Kayak, or Canoe[3]	Vol.	68.8	54.1
	Non-vol.	46.9	
Motorboat[4]	Vol.	84.2	78.8
	Non-vol.	75.8	

[1]For actual question, see Appendix H-2, Survey Section A, Question 1
[2]For actual question, see Appendix H-2, Survey Section A, Question 3
[3]For actual question, see Appendix H-2, Survey Section A, Question 11
[4]For actual question, see Appendix H-2, Survey Section A, Question 12
Note. Vol. = Parent/Guardian volunteers.
Non-vol. = Non-volunteering parents/guardians

Survey Section B was used to measure the experiences of respondents during the past six months. Specific questions within this section were designed to assess family consumerism or water-related behaviors (Table 13).

Table 13

Descriptions of Parent/Guardians Volunteers and Non-Volunteers, and All Respondents (Post-GLEP)

Question	% of Participants with YES responses		Overall % of Respondents with YES responses
Fished[1]	Vol.	66.7	64.0
	Non-vol.	62.5	
Fished Great Lakes[2]	Vol.	50.0	52.0
	Non-vol.	53.1	
Sail, Kayak, or Canoe[3]	Vol.	61.1	30.0
	Non-vol.	12.5	
Motorboat[4]	Vol.	61.1	62.0
	Non-vol.	62.5	

[1]For actual question, see Appendix H-2, Survey Section B, Question 1

[2]For actual question, see Appendix H-2, Survey Section B, Question 3

[3]For actual question, see Appendix H-2, Survey Section B, Question 11

[4]For actual question, see Appendix H-2, Survey Section B, Question 12

Note. Vol. = Parent/Guardian volunteers.
Non-vol. = Non-volunteering parents/guardians
The above Questions are post-GLEP experiences for participants
The above Questions are experiences during the past six months for non-participants.

Survey Section A was used to measure the experiences of participants before their son/daughter's GLEP experience. Specific questions within this section were designed to assess family tourism behaviors (Table 14).

Table 14

Descriptives of Parent/Guardian Volunteers and Non-volunteers Tourism Behaviors (Pre-GLEP)

Question		% with YES Responses	Overall % of Participants with YES Responses
Visit Great Lakes[1]	Vol.	100.0	94.2
	Non-vol.	90.9	
Camped[2]	Vol.	84.2	69.2
	Non-vol.	60.6	
Hiked[3]	Vol.	89.5	71.1
	Non-vol.	60.6	
Visit parks[4]	Vol.	100.0	100.0
	Non-vol.	100.0	

[1]For actual question, see Appendix H-2, Survey Section A, Question 2
[2]For actual question, see Appendix H-2, Survey Section A, Question 8
[3]For actual question, see Appendix H-2, Survey Section A, Question 13
[4]For actual question, see Appendix H-2, Survey Section A, Question 14
Note. Vol. = Parent/guardian volunteers
Non-vol. = Non-volunteering parents/guardians

Survey Section B was used to measure the experiences of respondents during the past six months. Specific questions within this section were designed to assess family tourism behaviors (Table 15).

Table 15

Descriptives of Parent/Guardian Volunteers and Non-volunteers Tourism Behaviors (Post-GLEP)

Question	% with YES Responses		Overall % of Participants with YES Responses
Visit Great Lakes[1]	Vol.	94.4	86.0
	Non-vol.	81.3	
Camped[2]	Vol.	77.8	52.0
	Non-vol.	37.5	
Hiked[3]	Vol.	88.9	62.0
	Non-vol.	46.9	
Visit parks[4]	Vol.	94.4	82.3
	Non-vol.	75.8	

[1]For actual question, see Appendix H-2, Survey Section B, Question 2

[2]For actual question, see Appendix H-2, Survey Section B, Question 8

[3]For actual question, see Appendix H-2, Survey Section B, Question 13

[4]For actual question, see Appendix H-2, Survey Section B, Question 14

Note. Vol. = Parent/guardian volunteers
Non-vol. = Non-volunteering parents/guardians
The above Questions are post-GLEP experiences for participants
The above Questions are experiences during the past six months for non-participants.

DISCUSSION AND RECOMMENDATIONS

Ripple Effects of the GLEP

Overall, the findings of this study were mixed. However, keeping in mind the limitations of the study design, some interesting results were observed. In general, all respondents scored high on the knowledge test. However, this should not be surprising, because the questions used in this section were based on questions originally designed to measure fourth graders' knowledge about the Great Lakes.

One interesting result was related to the knowledge section. The knowledge test scores for parent/guardian volunteers were statistically significantly higher than those of non-volunteers ($p < .05$.). The average total test score for volunteers ($M = 11.63$) was also somewhat higher than the score of parent/guardian participants ($M = 10.67$). Parents/guardians of non-participants and non-volunteers scored nearly the same on the knowledge test. This may therefore demonstrate a small impact that the GLEP may have on the knowledge of volunteering parents/guardians of participants. It is, however, possible that these parents/guardians of participants who volunteered already had an interest in the Great Lakes, and therefore their knowledge was already high.

Generally, the responses to the Attitudes about the Great Lakes and Attitudes about the Environment scales were

high. All respondents also reported generally high (positive) behavioral intentions regarding Great Lakes stewardship. These findings might imply that those who took the time to complete the survey already had an interest in the Great Lakes and the out-of-doors. Therefore the actual differences between the groups (parents/guardians of participants and non-participants, parent/guardian volunteers and non-volunteers) were difficult to assess, given the limitations of this study design.

Also of interest were the findings related to behavioral intentions. Parents/guardians of participants and parent/guardian volunteers reported more positive behavioral intentions toward the Great Lakes and the environment than did non-participants and non-volunteers. It is plausible that parents/guardians of participants, especially those who volunteer with the GLEP, are already more interested in these issues and more frequently demonstrate positive behaviors than do parents/guardians of non-participants. These self-reported positive behavioral intentions, according to the theory of cognitive dissonance (Festinger, 1957) and the self-perception theory (Bem, 1972), might, in turn, have some influence on environmental attitudes. GLEP may have impacted behaviors, especially some specific concrete water conservation behaviors which fourth graders learned through the program. However, these impacts may not have been enough to influence adults' complex attitudes and value systems, especially considering respondents already had generally

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favorable attitudes. In summary, these findings may also represent the small ripple effect the GLEP may have had on parents/guardians of participants and parent/guardian volunteers.

Recommendations For the GLEP

The first recommendation for the GLEP is to develop and maintain databases on participants and their families (names, addresses, school attending). If further research regarding the long-term effects on GLEP participants and their families is to be successful, more effective means of record keeping must first be established. Investigations into how other programs (i.e., Drug Awareness and Resistance Education-DARE, or Head Start) are able to track their participants over long periods of time would prove useful to the GLEP's future evaluations. For instance, it might be practical to begin gathering names and addresses of students and families when the parent/guardian signs the permission slip for the shipboard field trip. This could help to establish a program-related link to parents by creating a database that would allow for periodic mailings of a newsletter and for updates in participants' addresses.

Another recommendation is to strengthen working relationships with participating and non-participating schools' principals. This may aid in gaining access to the schools for further assessment of the long-term effects of the GLEP. If GLEP staff further enhance their working

relationships with principals and teachers of grade levels other than just fourth, perhaps this would serve to promote a more appropriate longitudinal study design (i.e. pre-testing third grade students and their parents/guardians, testing GLEP participants in the students' fourth grade year, and post-testing students and their parents/guardians in post-GLEP grades to assess the long-term impacts of the GLEP on participants and their families).

One last set of recommendations concerns developing ways of increasing parent/guardian volunteerism. Some of the results of my research have implied that parent/guardian volunteers scored higher on the knowledge test and scored higher than non-volunteers on scales of stewardship behavioral intentions. Again, establishing even stronger working relationships within schools and classrooms to promote the GLEP as a "family" experience and not just something for the youth might assist in encouraging volunteerism. The promotion of a GLEP family experience may begin with an invitation to visit a GLEP boat or experience a GLEP cruise at a "parents' night" event or during a discussion at parent/teacher conferences. Involving parents/guardians is not always easy, partly due to the commitments parents/guardians have to employment outside of the home, especially in single-parent or dual-career households. In these cases, take-home pages provided by the GLEP, based on GLEP curriculum and activities, and developed for family completion may serve to introduce the family to

some of the GLEP-related information. Another possibility to increase parent/guardian involvement may be to develop incentives for involvement such as contests, raffles, or GLEP-sponsored events (e.g., organizing a year-end party for parent/guardian volunteers and their families).

Research Limitations

One potential limitation of this study was that I relied on the parents/guardians to self-report their GLEP related knowledge, attitudes, and stewardship behaviors, as well as their Great Lakes experiences both before and after the GLEP. A pre-test/post-test study design was not conducted due to a lack of time, money, and resources. In addition, I did not conduct a pilot study using this survey instrument; this too, might be considered a limitation. However, my survey was developed using 10 pre-existing instruments, some of which have been tested previously for reliability and validity. Future research should utilize methodological insights gained from this thesis and should include a pilot test with a refined and revised survey and a pre-test/post-test study design.

Further limitations of this research are related to the difficulties in tracking GLEP participating students. At this time, the GLEP staff does not maintain databases with the names or addresses of participating students. Nor do they maintain databases of the junior highs, middle schools, or high schools which these students may eventually attend. Only

the names of participating teachers, the schools where they teach, and the estimated numbers of students attending the GLEP shipboard field trip are kept on file. It was difficult, therefore, to select districts, schools, and classrooms for this study. Much work first needed to be done to estimate the numbers of GLEP alumni in various grade levels, and to identify the schools these students may currently be attending. Methodologies were considered to assess fifth, sixth, and seventh graders' parents/guardians (Appendix B). The parents/guardians of fifth grade students were selected for the highest efficiency of implementation of this study.

Once a grade level was chosen, districts were selected and schools were chosen in the GLEP participating districts. One strength of my research design was that districts were selected only after the general characteristics of all GLEP participating districts were known, so that the sample might accurately represent all possible types of districts (urban, suburban, and rural) within the GLEP population.

Another study limitation was due to the difficulty in obtaining a response from selected schools. Half of the 16 schools I contacted refused to participate in the study. These eight schools refused because of a scheduling conflict with the MEAP test battery for fifth grade students. This reduced my study sample from an estimated 962 respondents to 458 possible respondents. Although 458 possible respondents is less than half of the size of the original study design, it may still be considered a substantial sample size.

Furthermore, the eight schools remaining in the study, still represented the four chosen districts based on their descriptions as an urban, suburban, or rural school district.

Due to the limitations of working with elementary students in public schools, I was unable to completely follow the Total Design Method (TDM) for survey administration, as recommended by Dillman (1978). Dillman suggests that the procedures of his TDM, when followed, can overcome some of the deficiencies and problems of mail surveys, such as low response rates. Since the GLEP does not maintain databases on its student participants, and because school districts were unable to provide me with the names and addresses of students and their parents/guardians, I was unable to directly mail the surveys to the respondents. The survey instrument had to pass through many hands before returning to Michigan State University, Department of Fisheries and Wildlife. Therefore, there may have been difficulties in survey distribution, collection, and return. In spite of the directions that were left with teachers for distribution, collection, and return, I was unable to monitor these steps. Survey non-response may be partly attributed to this.

Teachers, who had agreed to participate in this study, may be just one of the possible reasons for non-response. Some teachers may have not completed their commitment to this study (e.g., returned surveys) or responded to my phone calls because the study design lacked a personal incentive for the teacher (Dillman, 1978). Incentives were provided for the

students, families, and classrooms, but no specific incentives were provided for teachers to work toward achieving high classroom response rates. Another possible explanation for the lack of teacher commitment, was that the classroom incentive (poster of Michigan Fishes) for a 75% within-class response rate was left with each teacher at the time of the visit rather than mailed when the teacher fulfilled his/her commitment. Therefore, if future studies are conducted requiring the help of teachers, I would recommend providing teachers with more attractive and personal incentives. I would also recommend securing the approval and cooperation from school administrators to assist in monitoring teacher participation.

It was expected that the parents/guardians of GLEP participants would have had a higher overall response rate than the parents/guardians of non-participants; this was expected since parents/guardians of participants would probably have a strong interest in the study as a result of being involved with the GLEP (Dillman, 1978, p. 27). However, response rates from non-participants were higher than from GLEP participants (i.e. 44% from non-participating and 34% from participating school groups). Although it is unclear why non-participating groups had a higher return rate than participating groups, this may be related to why differences between parents/guardians of participants and of non-participants were not observed. For example, it seems plausible that non-participants who made the effort to return

the survey already had a higher than average interest in the Great Lakes and the environment. Additionally, all respondents were probably the most avid and enthusiastic regarding the Great Lakes as is evident by their responses to questions regarding involvement in Great Lakes activities (refer to Table 4). Therefore, had a higher response rate been achieved, greater differences between groups (participants and non-participants, and volunteers and non-volunteers) might have been observed.

Another possible effect on the observed results may have been caused by the smaller than expected response rates. In order to use some statistical tests (e.g., t-tests), assumptions must be met. In the case of parent/guardian volunteers (n=19) and non-volunteers (n=33), there was question as to whether the assumptions were met. A non-parametric test, the Mann Whitney U, was performed and the same results as from the t-tests were observed (Appendix M-11). In this case, therefore, the t-test was robust to the violations of its assumptions.

In an attempt to assess reasons for non-response, I conducted a brief phone interview with teachers (Appendix L). I left teachers up to eight messages over a three week period and at varying times of the day, with two phone numbers where I could be reached. Of the 19 teachers participating in the study, only two returned my call. The two teachers who returned my call answered the questions on behalf of all participating teachers from their schools. One of these

teachers represented a school that had a 0% response rate. When I asked her about this, she replied that she had lost all of the pre-paid postage envelopes and my phone number, but that she had approximately 12 surveys to return to me. To date, I have not received a response to this telephone survey from 15 teachers representing six schools.

Of the teachers who did respond, their descriptions of reasons for parents'/guardians' non-responses (Appendix L) are consistent with a recent opinion survey report put forth by the organization, Public Agenda (1999). This organization examined the opinions of 1,000 public school teachers from across the country using focus groups and one-on-one interviews. Responding teachers consistently complained about students who are lazy, disrespectful, and unmotivated. These teachers also attributed these poor behaviors to the parents and to a lack of parental involvement in their children's education.

Parent involvement is a term with varying definitions (Public Agenda, 1999). Some teachers responded that it means getting more parents involved in school government and in academic areas such as curriculum development. For others, parent involvement relates to the traditional roles of parents as chaperones on field trips and as school volunteers. Still other teachers relate parental involvement to what happens, or does not happen at home. Eighty-one percent of teachers cite as a serious problem "parents who refuse to hold their kids accountable for their behavior or

academic performance." In addition, 83% of teachers reported that "Parents who fail to set limits and create structure at home for their kids..." contribute to serious problems for the students in the classroom and in developing skills needed in life (Public Agenda, 1999, p. 25).

Another attribute of parental involvement is related to the gender of the parent/guardian. My study showed that 70% of respondents were female, while only 27% were male. This finding is consistent with other studies in noting the differences that exist in the gender of the parent whom is involved at school. According to the Public Agenda report (1999), mothers are more likely than fathers to help at school and in the classroom (64% of mothers surveyed reported helping at school compared with only 47% of fathers).

Conclusion

GLEP, like many other programs, purports to affect families as well as youth participants through its community-based design. This research has identified ways the GLEP and associated evaluations could be strengthened. Further research needs to be done to assess the effects of EE programs beyond participants. The limitations of this study should be avoided in order to strengthen future research and evaluations. Recommendations for further research assessing the ripple effects of educational programming will help aid in the development and evaluation of efforts targeted toward youth and parents/guardians, families, and peers.

APPENDICES

APPENDIX A

Project Approval by the University Committee on Research Involving Human Subjects (UCRIHS)

MICHIGAN STATE
UNIVERSITY

November 4, 1998

TO: Shari L. Dann
11B Natural Resources

RE: IRB#: 95-510
TITLE: MULTI-DISCIPLINARY, VESSEL-BASED ENVIRONMENTAL EDUCATION: AN EVALUATION OF THE GREAT LAKES EDUCATION PROGRAM
REVISION REQUESTED: 10/22/98
CATEGORY: 1-B
APPROVAL DATE: 10/29/98

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.

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.
UCRIHS Chair

DEW:db

cc: Michelle L. Niedermeier

OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES
University Committee on Research Involving Human Subjects (UCRIHS)
Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX 517/353-2976

The Michigan State University IDEA is institutional Diversity Excellence in Action

MSU is an affirmative action

APPENDIX B

Methodologies Considered to Assess Fifth, Sixth and Seventh Graders' Parents'/Guardians' Reactions to GLEP

Method Option: Recontact Fifth Grade Students

Participation in Fall 1997 or Spring 1998

Positives

*Fifth grade students are still in elementary school buildings

*Teachers may be familiar with GLEP and this may ease the distribution and collection of the survey

*Only one year post-GLEP

*School districts have many elementary schools, may ease the selection process to match on participating school with one non-participating school

Negatives

*Students are still in elementary school buildings, which would increase the number of schools that must be visited to reach enough students

*No comparison group exists within the same buildings; this could increase the numbers of schools that must be visited to reach non-participants

*Numbers of participants remaining in the district or elementary schools is unknown because they are not tracked

Method Option: Recontact Sixth Grade Students

Participation in Fall 1996 and Spring 1997

Positives

*Students may be "pooled" in middle schools

-may provide access to comparison group

-fewer schools to visit

*Teachers are not tired of hearing about the GLEP and might be open to a brief interruption

Negatives

*Sixth graders may be in middle school or still in elementary school buildings depending on the district

-might increase travel

*Students are two years post-GLEP, retention of knowledge, etc. might be an issue

*Teachers/Principals may be unfamiliar with program and not willing to help with distribution/collection of surveys

*Numbers of participants remaining in districts is unknown because they are not tracked

*Large numbers of surveys would need to be distributed

*Classroom incentives would be difficult to set-up because students are not in a self-contained classroom

Method Option: Recontact Seventh Grade Students

Participation in Fall 1995 and Spring 1996

Positives

*Students in middle or junior high schools

-fewer schools to visit, students are "pooled" from different elementary schools

-possible access to a comparison group within the same building

*Teachers are not tired of hearing about the GLEP and may be open to a brief interruption

Negatives

*Students are three years post-GLEP

*Teachers/Principals may be unfamiliar with program and not willing to help with distribution/collection of surveys

*Numbers of participants remaining in districts is unknown because they are not tracked

*Large numbers of surveys would need to be distributed

*Classroom incentives would be difficult to set-up because students are not in a self-contained classroom

APPENDIX C

Appendix C-1: Letters to GLEP Participating Principals

(Note: Letters sent under Stewart's signature were presented on MSU Extension-Macomb County letterhead; letters sent under Niedermeier's signature were prepared on MSU Department of Fisheries and Wildlife letterhead.)

November 12, 1998

Dear Principal X:

I am the Director of the Great Lakes Education Program, which is cosponsored by the Michigan Sea Grant College Program and Michigan State University Extension. I am contacting you to ask for the involvement of your 5th grade teachers and students in a research effort intended to improve our educational efforts in the future.

The Great Lakes Education Program has, since 1991, provided classroom and vessel-based education focusing on Great Lakes resources to more than 17,500 4th grade students from Macomb County. Last school year, some or all of your 4th grade classes participated in our program, which consists of three elements: classroom-based pre-cruise educational activities, an educational cruise on the Clinton River and Lake St. Clair, and classroom-based post-cruise educational activities.

At this time we would like to follow-up with the students who participated in the Great Lakes Education Program last year, and who would now be in your 5th grade classes. We would like to provide your students with a short (30 minute) lesson on Great Lakes Careers, after which we would like to distribute survey packets to the 5th grade teachers. Teachers would distribute a survey packet to each student to take home to his or her parent or guardian. Each packet includes a cover letter to parents/guardians, a survey, and an envelope in which the completed survey is to be returned to the teacher. Teachers would distribute a fish identification card and other incentives to each student returning a completed survey. Returned surveys will be mailed back to Michigan State University in an envelope with pre-paid postage. Classrooms will receive a special prize when a percentage (80-95%) of the students return a completed survey.

This research is intended to provide us with a means to assess students' understanding of and interest in Great Lakes resources and careers, and will allow us to improve future Great Lakes Education Program efforts.

I would appreciated it if you would ask your 5th grade teachers to call my office and let us know when they would best be able to set aside 30 minutes so that we can present this program to all the 5th grade classes. **Please call Jill Dion back at 810-466-8700 (Mondays, Tuesday, and Thursdays) with your response.**

Thank you for your time and consideration.

Sincerely,

Stephen R. Stewart
District Extension Sea Grant Agent
Director-Great Lakes Education Program

December 22, 1998

Dear Principal X:

In November 1998 you received the attached letter from Steve Stewart, district Extension Sea Grant Agent.

As a follow-up to your school's participation in the Great Lakes Education Program we are offering to make a short guest presentation in the 5th grade classrooms on Great Lakes science and social studies related careers. In addition to the presentation we would like to send home a survey for parents to complete (please see attached letter.)

Now that the busy holiday season is over for you and your teachers, **please contact me at 517-432-5037 as soon as possible** to schedule a time for our visit. If we don't hear form you by January 6, 1999, we will try once again to reach you by phone.

Thank you for your time and consideration.

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant
Michigan State University

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C-2: Letters to Non-participating Principals

(Note: Letters sent under Stewart's signature were presented on MSU Extension-Macomb County letterhead; letters sent under Niedermeier's signature were prepared on MSU Department of Fisheries and Wildlife letterhead.)

November 12, 1998

Dear Principal X:

I am the Director of the Great Lakes Education Program, which is cosponsored by the Michigan Sea Grant College Program and Michigan State University Extension. I am contacting you to ask for the involvement of your 5th grade teachers and students in a research effort intended to improve our educational efforts in the future.

The Great Lakes Education Program has, since 1991, provided classroom and vessel-based education focusing on Great Lakes resources to more than 17,500 4th grade students from Macomb County. Last school year, some or all of your 4th grade classes participated in our program, which consists of three elements: classroom-based pre-cruise educational activities, an educational cruise on the Clinton River and Lake St. Clair, and classroom-based post-cruise educational activities.

Although none of your students participated in the Great lakes Education Program last year, we would like to involve your 5th grade classes in our program assessment as part of our control group. We would like to provide your students with a short (30 minute) lesson on Great Lakes Careers, after which we would like to distribute survey packets to the 5th grade teachers. Teachers would distribute a survey packet to each student to take home to his or her parent or guardian. Each packet includes a cover letter to parents/guardians, a survey, and an envelope in which the completed survey is to be returned to the teacher. Teachers would distribute a fish identification card and other incentives to each student returning a completed survey. Returned surveys will be mailed back to Michigan State University in an envelope with pre-paid postage. Classrooms will receive a special prize when a percentage (80-95%) of the students return a completed survey.

This research is intended to provide us with a means to assess students' understanding of and interest in Great Lakes resources and careers, and will allow us to improve future Great Lakes Education Program efforts.

I would appreciated it if you would ask your 5th grade teachers to call my office and let us know when they would best be able to set aside 30 minutes so that we can present this program to all the 5th grade classes. **Please call Jill Dion back at 810-466-8700 (Mondays, Tuesday, and Thursdays) with your response.**

Thank you for your time and consideration.

Sincerely,

Stephen R. Stewart
District Extension Sea Grant Agent
Director-Great Lakes Education Program

December 22, 1998

Dear Principal X:

In November 1998 you received the attached letter from Steve Stewart, district Extension Sea Grant Agent.

Although your school had not participated in the Great Lakes Education Program we would like to make a short guest presentation in the 5th grade classrooms on Great Lakes science and social studies related careers. In addition to the presentation we would like to send home a survey for parents to complete (please see attached letter.)

Now that the busy holiday season is over for you and your teachers, **please contact me at 517-432-5037 as soon as possible** to schedule a time for our visit. If we don't hear form you by January 6, 1999, we will try once again to reach you by phone.

Thank you for your time and consideration.

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant
Michigan State University

APPENDIX D

APPENDIX D-1

GLEP Participation 1995-1998 by School, District and Classroom

5	4	Eppler	25		25
6	4	Eppler		24	24

Table D-1

GLEP Participation 1995-1998 by School, District and Classroom

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Utica											
Plumbrook	1	4	Heritage, Jeanette		30						30
Morgan	1	4	Malow, Shelby		27		31		30		88
	2	4	Malow, Shelby		30		31		?		61+?
	3	4	Malow, Shelby		30		24				54
	4	4	Malow, Shelby				24				24
Oakbrook	1	4	Heritage			28		28	34		90
	2	4	Heritage			29		28	33		90
	3	4	Heritage					24			24
	4	4	Heritage					25			25
Flickinger	1	4	Eppler			30				25	55
	2	4	Eppler			30		30		25	85
	3	4	Eppler			30				25	55
	4	4	Eppler					30			30
	5	4	Eppler					25			25
	6	4	Eppler							24	24

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Utica Continued											
DeKeyser	1	4	Davis			30		55		25	110
	2	4	Davis			30					30
Rose Kidd	1	4	Jeanette			25		30			55
	2	4	Jeanette			25		30			55
Schuchard	1	4	Jeanette					25			25
	2	4	Jeanette					26			26
Ewell	1	4	Malow, Shelby						24		24
	2	4	Malow, Shelby						24		24
Walsh	1	4								30	30
	2	4								30	30
	3	4								30	30
	District Cohort Totals				117	257	90	356	175	175	
						374		446		350	1170

190	35	67	292

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Romeo											
Washington	1	4		Powell, Romeo				33		24	57
	2	4		Powell, Romeo				33		24	57
	3	4		Powell, Romeo						24	24
Crosswell	1	4		Powell, Romeo				26	26		52
	2	4		Powell, Romeo				26	26		52
	3	4		Powell, Romeo				26	26		52
	District Cohort Totals				0	0	0	144	78	72	
						0		144		150	294
Fraser											
Eisenhower	1	4	Richards		33		35		67		135
	2	4	Richards		23						23
	3	4	Richards		33						33
Mark Twain	1	4	Richards		27	23					50
	2	4	Richards		27	24					51
	District Cohort Totals				143	47	35	0	67	0	
						190		35		67	292

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Royal Oak											
Oakridge	1	4		Keller (as of F98)	29		23		24		76
Longfellow	2	4		Keller (as of F98)			26				26
	3	4		Keller (as of F98)					27		27
	District Cohort Totals				29	0 29	49	0 49	51	0 51	129
Lakeview											
Harmon	1	4		Jefferson	30		27		25		82
	2	4		Jefferson	30		26		25		81
	District Cohort Totals				60	0 60	53	0 53	50	0 50	163

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Anchor Bay											
Sugarbush	1	4	K-8		23		?		30		53+?
	2	4	K-8		27		?		30		57+?
	3	4	K-8		27		?				27+?
	4	4	K-8						30		30
Lottie Schmidt	1	4	K-8			27					27
	2	4	K-8			27					27
	3	4	K-8			28		32			60
	4	4	K-8					31			31
Dean Naldrett	1	4	K-8			26					26
Lighthouse	1	4	K-8					30			30
	2	4	K-8		25			30			55
	3	4	K-8		?			30			30+?
	4	4	K-8		27			23			50
	5	4	K-8		24			25			49
	6	4	K-8		26			30			56
	7	4	K-8		?						?
District Cohort Totals					179	108	?	231	90	0	
						287		231		90	608+?

| | | |

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
South Lake											
Avalon	1	4	South Lake			20		28			48
	2	4	South Lake			27				28	55
	3	4	South Lake			26					26
Koepsell	1	4								25	25
	2	4								26	26
	3	4								25	25
	District Cohort Totals				0	73	0	28	0	104	
						73		28		104	205
Van Dyke											
Carlson	1	4	Lincoln			29		28		29	57
	District Cohort Totals				0	29	0	28	0	29	
						29		28			57
Center Line											
Roose	1	4		Wolfe		27		24			51
	District Cohort Totals				0	27	0	24	0	0	
						27		24		0	51

		Central		
4	4	South, Central	25	25

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Warren											
Hatherly	1	4								29	29
	2	4								30	30
	3	4								31	31
	District Cohort Totals				0	0	0	0	0	90	
						0		0		90	90
L'Anse Creuse											
Donald Yacks	1	4		South		32		30		30	92
	2	4		South		30		30		30	90
	3	4		South		32		30		29	91
Atwood	1	4		North		35		28			63
	2	4		North		35		28			63
	3	4		North				28			28
Green	1	4		North		28					28
	2	4		North		30					30
	3	4		North				27			27
	4	4		North				28			28
	5	4		North				28			28
Lobbestael	1	4		South, Central		31		25			56
	2	4		South, Central		31					31
	3	4		South, Central		31					31
	4	4		South, Central				25			25

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
L'Anse Creuse cont'd					F95	S96	F96	S97	F97	S98	
Lobbestael cont'd	5	4		South, Central				26			26
Marie Graham	1	4		Central		35		10			45
	2	4		Central		35		10			45
	3	4		Central				10			10
Tenniswood	1	4		South, Central		35		33			68
	2	4		South, Central		35		33			68
	3	4		South, Central				33			33
Higgins	1	4		North, Central				31			31
	2	4		North, Central				32			32
	3	4		North, Central				31			31
South River	1	4		Central				35			35
	2	4		Central				35			35
	3	4		Central				27			27
	District Cohort Totals				0	455	0	637	0	89	
						455		637		89	1181

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Chippewa Valley											
Cherokee	1	4		Seneca, Iroquois		30		27		25	82
	2	4		Seneca, Iroquois		30		27		25	82
	3	4		Seneca, Iroquois		30		27			57
	4	4		Seneca, Iroquois		30		28			58
Huron	1	4		Wyandot		30					30
	2	4		Wyandot				27			27
	3	4		Wyandot		30		26			56
	4	4		Wyandot		30		27			57
Ojibwa	1	4		Iroquois, Seneca		15					15
	2	4		Iroquois, Seneca		15		27			42
	3	4		Iroquois, Seneca				27			27
	4	4								25	25
	5	4								25	25
	6	4								25	25

2	4							30	30	
District Cohort Totals		0	73	28	0	0	60			
			73		28		60			161

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
Chippewa Valley cont'd					F95	S96	F96	S97	F97	S98	
Mohawk	1	4		Iroquois		30		30		30	90
	1	4		Iroquois		29		30		30	89
	2	4		Iroquois		28		29		30	88
	3	4		Iroquois		29					29
	4	4		Iroquois				11			11
	5	4								30	30
	District Cohort Totals				0	356	0	343	0	245	
						356		343		245	944
Roseville											
Pierce	1	4								26	26
Huron Park	1	4								26	26
	District Cohort Totals				0	0	0	0	0	52	
						0		0		52	52
Ferndale											
Taft	1	4	Best	Coolidge		31					31
Jackson	1	4	Best			21					21
	2	4	Best			21					21
Harding	1	4		Coolidge			28				28
Wilson	1	4								30	30
	2	4								30	30
	District Cohort Totals				0	73	28	0	0	60	
						73		28		60	161

Table D-1, continued

DISTRICT/ ELEM SCHOOL	CLASS-ROOM	GRADE	JUNIOR HIGH	MIDDLE SCHOOL	NUMBERS OF STUDENTS PARTICIPATING IN THE GLEP						TOTALS
					F95	S96	F96	S97	F97	S98	
Grosse Point											
Defer	1	4		Pierce					30		30
	2	4		Pierce	23				30		53
	3	4		Pierce	23						23
	4	4		Pierce	23						23
Maire	1	4								33	33
	2	4								34	34
	District Cohort Totals				69	0	0	0	60	67	
						69		0		127	196
Warren Woods											
Briarwood	1	4								30	30
	2	4								30	30
	District Cohort Totals				0	0	0	0	0	60	
						0		0		60	60

APPENDIX D-2

Current Student Enrollment in Middle and Junior High Schools within GLEP Program Area

Note. School enrollment numbers are based on projected figures (1998) or school districts' final pupil count figures (1996-1997) (Michigan Education Directory, 1998).

Current Student Enrollment in Middle and Junior High Schools within GLEP Program Area

District # of JH/MS	JH or MS	School Enrollment	Est.Number of GLEP Part. (now in 6th &/or 7th grade)
Utica	Junior High		
7	Davis	599	60
	Eppler	677	90
	Heritage	521	57
	Jeannette	980	80
	Malow	1235	44
	Shelby	754	43
		4766 (7th & 8th)	374

374/4766 = 0.078 (8% of the school population participated in the GLEP)

Approximately 14-16% of 7th grade population at participating JH*

Romeo	Middle School		
2	Romeo	700	72
	Powell	700	72
		1400 (6, 7, & 8th)	144

144/1400 = 0.10 (10% of the school population participated in the GLEP)

Approximately 13-15% of 6th and 7th grade population at participating MS*

Fraser	Junior High		
1	Richards	749 (7th & 8th)	190

190/749 = 0.25 (25% of the school population participated in the GLEP)

Approximately 50% of 7th grade population at participating JH*

***Assumptions**

*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)

*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

Appendix D-2 Continued

District # of JH/MS	JH or MS	School Enrollment	Est. Number of Part. (now in 6th &/or 7th grade)
Royal Oak 3	Middle School Keller	1133 (6, 7, & 8th)	78

78 / 1133 = 0.068 (7% of the school population participated in the GLEP)

Approximately 10% of 6th and 7th grade population at participating MS*

Lakeview 1	Middle School Jefferson	674 (6, 7, & 8th)	113

113 / 674 = 0.167 (17% of the school population participated in the GLEP)

Approximately 25% of 6th and 7th grade population at participating MS*

Anchor Bay 1	Middle School Anchor Bay	1100 (6, 7, & 8th)	518

518 / 1100 = 0.47 (47% of the school population participated in the GLEP)

Approximately 71% of 6th and 7th grade population at participating MS*

***Assumptions**

*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)

*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

Appendix D-2 Continued

District # of JH/MS	JH or MS	School Enrollment	Est. Number of Part. (now in 6th &/or 7th grade)
SouthLake	Junior High		
1	South Lake	376 (7th & 8th)	73

73/376 = 0.194 (19% of the school population participated in the GLEP)

Approximately 39% of 7th grade population at participating JH*

VanDyke	Junior High		
1	Lincoln	600 (7th & 8th)	29

29/600 = 0.048 (5% of the school population participated in the GLEP)

Approximately 10% of the 7th grade population at participating JH*

CenterLine	Middle School		
1	Wolfe	614 (6, 7 & 8th)	51

51/614 = 0.08 (8% of the school population participated in the GLEP)

Approximately 12% of the 6th and 7th grade population at participating MS*

***Assumptions**

*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)

*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

Appendix D-2 Continued

District # of JH/MS	JH or MS	School Enrollment	Est. Number of Part. (now in 6th &/or 7th grade)
Warren	Middle School		
6	Beer	593	0
	Carleton	536	0
	Carter	664	0
	Flynn	455	0
	Fuhrmann	444	0
	Grissom	462	0
		3154 (6, 7, & 8th)	0

0 / 3145 = 0.0 (0% of the school population participated in the GLEP)

Approximately 0% of the 6th and 7th grade population at participating MS*

L'Anse Creuse			
3	Middle School		
	North	772	326
	South	675	399
	Central	698	329
		2145(6, 7, & 8th)	1054

1054 / 2145 = 0.49 (49% of the school population participated in the GLEP)

Approximately 74% of the 6th and 7th grade population at participating MS*

***Assumptions**

*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)

*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

Appendix D-2 Continued

District # of JH/MS	JH or MS	School Enrollment	Est. Number of Part. (now in 6th &/or 7th grade)
Chippewa Valley			
4	Middle School		
	Iroquois	790	216
	Seneca	710	313
	Wyandot	580	170
		2080(6, 7, & 8th)	699

699 = 0.336 (34% of the school population participated in the 2080 GLEP)

Approximately 50% of the 6th and 7th grade population at participating MS*

Roseville	Junior High		
2	Roseville	904	0
	Eastland	504	0
		1408	0

0 = 0.0 (0% of the school population participated in the 1408 GLEP)

Approximately 0% of the 6th and 7th grade population at participating MS*

***Assumptions**

*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)

*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

Appendix D-2 Continued

District # of JH/MS	**JH or MS**	**School Enrollment**	**Est. Number of Part. (now in 6th &/or 7th grade)**
Ferndale	Junior High		
1	Best	354(7th &8th)	57
	Middle School		
1	Coolidge	362(6, 7, & 8th)	44
		716	101

101 / 716 = 0.14 (14% of the school population participated in the GLEP)

Approximately 32% of 7th grade population at participating JH*
Approximately 18% of 6th and 7th grade population at participating MS*

Grosse Point			
3	Middle School		
	Pierce	579(6, 7, & 8th)	69

69 / 579 = 0.119 (12% of the school population participated in the GLEP)

Approximately 18% of 6th and 7th grade population at participating MS*

Warren Wood			
1	Middle School		
	Warren Woods	670 (6, 7, & 8th)	0

0 / 670 = 0.0 (0% of the school population participated in the GLEP)

Approximately 0% of the 6th and 7th grade population at participating MS*

***Assumptions**
*Junior Highs' populations are divided equally between 7th and 8th grade. (7th grade population=8th grade population.)
*Middle Schools' populations are divided equally among 6th, 7th, and 8th grade. (6th grade population=7th grade population=8th grade population.)

APPENDIX D-3

Current Student Enrollment in Elementary Schools within GLEP Program Area

Current Student Enrollment in Elementary Schools within GLEP Program Area

District	Elementary School	Total # of 5th Graders	GLEP Part. School
Utica`	Morgan	54+13*	Yes
	Oakbrook	58	Yes
	Flickinger	93	Yes
	DeKeyser	49	Yes
	Ewell	46+14*	Yes
	Walsh	52	Yes
		352 youth in participating schools	
	Beck Centennial	120	No
	Browning	47+10*	No
	Burr	50	No
	Collins	54	No
	Crissman	93	No
	Dresden	54	No
	Ebeling	71	No
	Graebner	54	No
	Harvey	79	No
	Havel	77	No
	Magahay	54+9*	No
	Monfort	81	No
	Plumbrook	51	No-not in F97/S98
	Roberts	95	No
	Rose Kidd	55	No-not in F97/S98
	Schuchard	75	No-not in F97/S98
	Schwarzkoff	85	No
	Switzer	89	No
	West Utica	77+12*	No
	Wiley	88	No
	Memor	54	No
		970 youth in non-participating schools	

1322 total 5th grade students in Utica

*5th/6th grade splits-did not count 6th graders in totals

Romeo	Washington	71	Yes
	Crosswell	75	Yes
		146 youth in participating schools	
	Amanda Moore	76	No
	Hamilton Parsons	91	No
	Indian Hills	85	No
		252 youth in non-participating schools	

398 total 5th grade students in Romeo

Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
Fraser	Eisenhower	67	Yes
		67 youth in participating schools	
	Disney	52	No
	Dooley	40	No
	Edison	60	No
	Emerson	51	No
	Mark Twain	42	No-not in F97/S98
	Salk	64	No
		309 youth in non-participating schools	
	376 total 5th grade students in Fraser		
Royal Oak	Oakridge	66	Yes
	Longfellow	22	Yes
		88 youth in participating schools	
	Franklins	22	No
	Northwood	53	No
	Oakland	45	No
	Parker	36	No
	Starr	55	No
	Twain	41	No
	Upton	33	No
	Whittier	73	No
		358 youth in non-participating schools	
	446 total 5th grade students in Royal Oak		
Lakeview	Harmon	75	Yes
		75 youth in participating schools	
	Ardmore	75	No
	Greenwood	50	No
	Princeton	30	No
		155 youth in non-participating schools	
	230 total 5th grade students in Lakeview		

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Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
AnchorBay	Sugarbush	80	Yes
		80 youth in participating schools	
	Lottie Schmidt	79	No-not in F97/S98
	Dean Naldrett	72	No-not in F97/S98
	Lighthouse	closed for const.	No-not in F97/S98
	Great Oaks	66	No
	Maconce	81	No
		298 youth in non-participating schools	
	378 total 5th grade students in AnchorBay		
Southlake	Avalon	40	Yes
	Koepsell	37	Yes
		77 youth in participating schools	
	Elmwood	59	No
	Pare	26	No
		85 youth in non-participating schools	
	162 total 5th grade students in Southlake		
Van Dyke	Carlson	28	Yes
		28 youth in participating schools	
	Harding	39	No
	Kennedy	30	No
	Lincoln	52	No
	Little	38	No
	McKinley	57	No
	Thompson	38	No
	Washington	33	No
		287 youth in non-participating schools	
	315 total 5th grade students in Van Dyke		

Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
Center Line			
		0 youth in participating schools	
	Crothers	43	No
	Miller	58	No
	Peck	55	No
	Roose	67	No-not in F97/S98
		223 youth in non-participating schools	
	223 total 5th graders in Center Line		
Warren	Hatherly	80	Yes
		80 youth in participating schools	
	Angus	63	No
	Black	48	No
	Cromie	74	No
	Fillmore	79	No
	Green Acres	85	No
	Hardwood	54	No
	Holden	77	No
	Jefferson	77	No
	Lean	93	No
	Siersma	71	No
	Susick	59	No
	Thorpe	56	No
	Wilde	63	No
	Wilkerson	67	No
	Willow Woods	81	No
		1047 youth in non-participating schools	
	1127 total 5th graders in Warren		

Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
L'Anse Creuse			
	Yacks	90	Yes
		90 youth in participating schools	
	Chesterfield	69	No
	Atwood	127	No-not in F97/S98
	Green	78	No-not in F97/S98
	Lobbestael	72	No-not in F97/S98
	Marie Graham	93	No-not in F97/S98
	Tenniswood	73	No-not in F97/S98
	Higgins	113	No-not in F97/S98
	South River	67	No-not in F97/S98
		692 youth in non-participating schools	
	782 total 5th graders in L'Anse Creuse		
Chippewa Valley			
	Cherokee	107	Yes
	Ojibwa	70	Yes
	Mohawk	118	Yes
		295 youth in participating schools	
	Clinton Valley	92	No
	Erie	81	No
	Fox	102	No
	Huron	91	No-not in F97/S98
	Miami	93	No
	Ottawa	74	No
	Cheyenne	61	No
		594 youth in non-participating schools	
	889 total 5th graders in Chippewa Valley		

Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
Roseville	Pierce	29	Yes
	Huron Park	86	Yes
		115 youth in participating schools	
	Alumni	63	No
	Arbor	21	No
	Dort	43	No
	Eastland	21	No
	Fountain	60	No
	Kaiser	58	No
	Lincoln	38	No
	Patton	34	No
		338 youth in non-participating schools	
		453 total 5th graders in Roseville	
Ferndale	Wilson	52	Yes
		52 youth in participating schools	
	Harding	35	No-not in F97/S98
	Jackson	44	No-not in F97/S98
	Jefferson	36	No
	Roosevelt	60	No
	Taft	59	No-not in F97/S98
	Washington	26	No
		260 youth in non-participating schools	
		312 total 5th graders in Ferndale	
Grosse Point			
	Defer	71	Yes
	Maire	70	Yes
		141 youth in participating schools	
	Ferry	97	No
	Kerby	69	No
	Mason	62	No
	Monteith	83	No
	Poupard	70	No
	Richard	62	No
	Trombly	58	No
		501 youth in non-participating schools	
		642 total 5th graders in Grosse Point	

Appendix D-3 Continued

District	Elementary School	Total # of 5th Graders	GLEP Part. School
Warren Woods			
	Briarwood	68	Yes
		68 youth in participating schools	
	Pinewood	61	No
	Westwood	89	No
		150 youth in non-participating schools	
	218 total 5th graders in Warren Woods		

APPENDIX D-4

Estimates of District Information on GLEP School Participation for 5th Graders
1 Year Post (Fall 97/Spring 98)

Table D-4

Estimates of District Information on GLEP School Participation for 5th Graders 1 Year Post (Fall 97/Spring 98)

District	# of 4th graders who part'd F97/S98	# of 5th graders in part'ing schools	Est. # of 5th graders in part'ing schools	# of 5th graders in non-part'ing schools	Total # of 5th graders	# of non-part schools F97/S98	# of part schools F97/S98	Part since
Utica	350	352	2	970	1322	21	6	F95
Romeo	150	146	0	252	398	3	2	S97
Fraser	67	67	0	309	376	6	1	F95
Royal Oak	51	88	37	358	446	8	2	F95
Lake-view	50	75	25	155	230	3	1	F95
Anchor Bay	90	80	0	298	378	5	1	F95
South-lake	104	77	0	85	162	2	2	S96
Van Dyke	29	28	0	287	315	7	1	S96
Center Line	0	0	0	223	223	4	0	S96
Warren	90	80	0	1047	1127	15	1	S98

D-4 Continued

District	# of 4th graders who part'd F97/S98	# of 5th graders in part'ing schools	Est. # of 5th graders in part'ing schools	# of 5th graders in non-part'ing schools	Total # of 5th graders	# of non-part schools F97/S98	# of part schools F97/S98	Part since
L'Anse Creuse	80	90	10	692	782	8	1	S96
Chipp-ewa Valley	245	295	50	594	889	7	3	S96
Rose-ville	52	115	63	338	453	8	2	S98
Fern-dale	60	52	0	122	312	7	1	S96
Grosse Point	127	141	14	501	642	7	2	F95
Warren Woods	60	68	8	150	218	2	1	S98

Note. Numbers in columns 4 (Est. # of 5th graders in part'ing schools) and 5 (# of 5th graders in non-part'ing schools) added together equal an estimated total number of non-participants in participating districts.

For example: Warren Woods
8 + 150 = 158 There is an estimated 158 non-participating students in Warren Woods.

Numbers in columns 7 (# of non-part schools F97/S98) and 8 (# of part schools F97/S98) added together equal the total number of elementary schools in each district.

For example: Warren Woods
2 + 1 = 3 There are 3 elementary schools in Warren Woods.

APPENDIX E

Characteristics of School Districts within GLEP Program Area

District	**Category**
Utica	Urban, fringe of large city
*Romeo	Rural, small town, non-farm
Fraser	Urban, fringe of large city
Royal Oak	Urban, fringe of large city
*Lakeview	Urban, fringe of large city
Anchor Bay	Urban, fringe of large city
*Southlake	Urban, fringe of large city
Van Dyke	Urban, fringe of large city
Center Line	Urban, fringe of large city
Warren	Urban, fringe of large city
L'Anse Creuse	Urban, fringe of large city
Chippewa Valley	Urban, fringe of large city
Roseville	Urban, fringe of large city
Ferndale	Urban, fringe of large city
Grosse Point	Urban, fringe of large city
*Warren Woods	Urban, fringe of large city

*Districts chosen for sample.

School district data and categories are based on information from the web site of the Michigan Department of Education (www.state.mi.us/dmb/mic/data/educ/sddb/data/)

APPENDIX F

Districts and Schools Chosen and Not Chosen for this Study

GLEP Participating Schools Chosen for Study

District	**School**	**Est. Number of Students**
Lakeview	Harmon Elementary	45
Warren Woods	Briarwood Elementary	60
Southlake	Avalon Elementary	40
	Koepsell Ed. Center	37
Romeo	Washington Elementary	71
	Crosswell Elementary	75
		Total = 328

GLEP Non-Participating Schools Chosen for Study

District	**School**	**Est. Number of Students**
Lakeview	Greenwood Elementary	35
	Ardmore Elementary	75
	Princeton Elementary	30
Warren Woods	Pinewood Elementary	63
	Westwood Elementary	89
Southlake	Elmwood Elementary	62
	Pare Elementary	26
Romeo	Amanda Moore Elementary	78
	Indian Hills Elementary	85
	Hamilton Parsons Elem.	91
		Total = 634

GRAND TOTAL = 962

Appendix F Continued

Disticts with Glep Participation Not Chosen for the Sample

District	Schools	GLEP Participation in F97/S98 (yes or no)	Why district not chosen
Utica	Plumbrook	no	***Only 22% of Elem. schools (6/27) in Utica part. in the GLEP. *Only 27% of all 5th graders in Utica are in part. schools.**
	Morgan	yes (30)	
	Oakbrook	yes (67)	
	Flickinger	yes (99)	
	DeKeyser	yes (25)	
	Rose Kidd	no	
	Schuchard	no	
	Ewell	yes (48)	
	Walsh	yes (90)	
	Beck Centennial	no	
	Browning	no	
	Burr	no	
	Collins	no	
	Crissman	no	
	Dresden	no	
	Ebeling	no	
	Graebner	no	
	Harvey	no	
	Havel	no	
	Magahay	no	
	Monfort	no	
	Roberts	no	
	Schwarzkoff	no	
	Switzer	no	
	West Utica	no	
	Wiley	no	
	Memor	no	
Fraser	Eisenhower	yes (67)	***Only 14% of Elem. schools (1/7) in Fraser part. in the GLEP. *Only 18% of all 5th graders in Fraser are in part. schools.**
	Mark Twain	no	
	Disney	no	
	Dooley	no	
	Edison	no	
	Emerson	no	
	Salk	no	

Appendix F Continued

District	Schools	GLEP Participation in F97/S98 (yes or no)	Why district not chosen
Royal Oak	Oakridge	yes (66)	***Only 20% of Elem. schools (2/10) in Royal Oak part. in the GLEP. *Only 20% of all 5th graders in Utica are in part. schools.**
	Longellow	yes (22)	
	Franklins	no	
	Northwood	no	
	Oakland	no	
	Parker	no	
	Starr	no	
	Twain	no	
	Upton	no	
	Whittier	no	
Anchor Bay	Sugarbush	yes (80)	***Only 17% of Elem. schools (1/6) in Anchor Bay part. in the GLEP. *Only 21% of all 5th graders in Anchor Bay are in part. schools.**
	Lottie Schmidty	no	
	Dean Naldrett	no	
	Lighthouse	no	
	Maconce	no	
Van Dyke	Carlson	yes (29)	***Only 13% of Elem. schools (1/8) in Van Dyke part. in the GLEP. *Only 9% of all 5th graders in Van Dyke are in part. schools.**
	Harding	no	
	Kennedy	no	
	Lincoln	no	
	Little	no	
	McKinley	no	
	Thompson	no	
	Washington	no	

Appendix F Continued

District	Schools	GLEP Participation in F97/S98 (yes or no)	Why district not chosen
Center Line	Crothers	no	***Only 0% of Elem schools (0/4) in CenterLine part. in the GLEP. *Only 0% of all 5th graders in CenterLine are in part. schools.**
	Miller	no	
	Roose	no	
	Peck	no	
Warren	Hatherly	yes (80)	***Only 6% of Elem schools (1/16) in Warren part. in the GLEP. *Only 7% of all 5th graders in Warren are in part. schools.**
	Angus	no	
	Black	no	
	Cromie	no	
	Fillmore	no	
	Green Acres	no	
	Hardwood	no	
	Holden	no	
	Jefferson	no	
	Lean	no	
	Siersma	no	
	Susick	no	
	Thorpe	no	
	Wilde	no	
	Wilkerson	no	
	Willow Woods	no	

Appendix F Continued

District	Schools	GLEP Participation in F97/S98 (yes or no)	Why district not chosen
L'Anse Creuse	Yacks	yes (90)	***Only 11% of Elem Schools (1/9) in L'Anse Creuse part. in the GLEP. *Only 12% of all 5th graders in L'Anse Creuse are in part. schools.**
	Atwood	no	
	Green	no	
	Lobbestael	no	
	Marie Graham	no	
	Tenniswood	no	
	Higgins	no	
	South River	no	
	Chesterfield	no	
Chippewa Valley	Cherokee	yes (50)	***Only 30% of Elem schools (3/10) in Chippewa Valley part. in the GLEP. *Only 33% of all 5th graders in Chippewa Valley are in part. schools.**
	Ojibwa	yes (75)	
	Mohawk	yes (120)	
	Clinton Valley	no	
	Erie	no	
	Fox	no	
	Huron	no	
	Miami	no	
	Ottawa	no	
	Cheyenne	no	

Appendix F Continued

District	Schools	GLEP Participation in F97/S98 (yes or no)	Why district not chosen
Roseville	Pierce	yes (26)	***Only 20% of Elem schools (2/10) in Roseville part. in the GLEP. *Only 25% of all 5th graders in Roseville are in part. schools.**
	Huron Park	yes (26)	
	Alumni	no	
	Arbor	no	
	Dort	no	
	Eastland	no	
	Fountain	no	
	Kaiser	no	
	Lincoln	no	
	Patton	no	
Ferndale	Wilson	yes (60)	***Only 13% of Elem. schools (1/8) in Ferndale part. in the GLEP. *Only 17% of all 5th graders in Ferndale are in part. schools.**
	Taft	no	
	Jackson	no	
	Harding	no	
	Grant	no	
	Jefferson	no	
	Roosevelt	no	
	Washington	no	
Grosse Point	Defer	yes (60)	***Only 22% of Elem. schools (2/9) in Grosse Point part. in the GLEP. *Only 22% of all 5th graders in Grosse Point are in part. schools.**
	Maire	yes (67)	
	Ferry	no	
	Kerby	no	
	Mason	no	
	Monteith	no	
	Poupard	no	
	Richard	no	
	Trombly	no	

APPENDIX G

Adjusted Study Sample

GLEP Participating Schools

District	**School**	**Number of Students**
Lakeview	Harmon Elementary	45
Warren Woods	Briarwood Elementary	60
Southlake	Avalon Elementary	40
Romeo*	Crosswell Elementary	75
	Total =	220

GLEP Non-Participating Schools

District	**School**	**Number of Students**
Lakeview	Greenwood Elementary	35
Warren Woods	Pinewood Elementary	63
Southlake	Elmwood Elementary	62
Romeo*	Amanda Moore Elementary	78
	Total =	238

GRAND TOTAL = 458

*Romeo = rural/small town/non-farm district

Appendix G Continued

Adjusted Study Sample Schools and Classrooms Represented by Numbers

District	School	Number	Classroom #s
Lakeview	Harmon Elem.	1	1 & 2
Romeo	Amanda Moore Elem.	2	3, 4 & 5
Southlake	Elmwood Elem.	3	6, 7 & 8
Lakeview	Greenwood Elem.	4	9 & 10
Warren Woods	Pinewood Elem.	5	11 & 12
Warren Woods	Briarwood Elem.	6	13 & 14
Romeo	Crosswell Elem.	7	15, 16 & 17
Southlake	Avalon Elem.	8	18 & 19

APPENDIX H

Survey Packet

APPENDIX H-1

Survey Cover Letter
(Note. Letter was prepared on Michigan State Unversity Department of Fisheries and Wildlife letterhead)

January 11, 1999

Dear Parents and Guardians:

As a part of the Great Lakes Education Program (GLEP) your child has taken part in some classroom learning experiences concerning the Great Lakes. These classroom experiences and the GLEP were developed by Michigan State University Extension and the Michigan Sea Grant College Program to provide Great Lakes educational experiences in the classroom.

Now, in an effort to learn more about families' interests in the Great Lakes, we invite you as a parent, to complete the enclosed survey. Some fourth grade classrooms may have taken part in the shipboard field trip associated with the GLEP. Whether your child participated in this or not, we need your input! We hope you will participate, although it is entirely voluntary. The survey takes only about 10-15 minutes to complete. Please have your child return the survey to his or her teacher in the envelope provided. **Please return the survey by January 23, 1999 in order to be entered in the drawing for a free bass fishing trip for two on Lake St. Clair.**

The information which you provide will be held in confidence and will be used only in comparisons with other responses. Your name will not be associated with your response. The sheet stapled to the back of this survey with your name and other information will be detached and not linked to your survey responses. It will only be used for the purpose of prize distributions. If you would like additional information about this evaluation, please contact Michelle Niedermeier, Graduate Assistant at Michigan State University 517/432-5037, Shari Dann, Assistant Professor of Fisheries and Wildlife at Michigan State University 517/353-0675, or Steve Stewart, District Extension Agent at Macomb County MSU Extension 810/469-6085.

By completing this survey, you are agreeing to participate in the evaluation. Thank you in advance for taking a few minutes to complete this very important survey!

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant

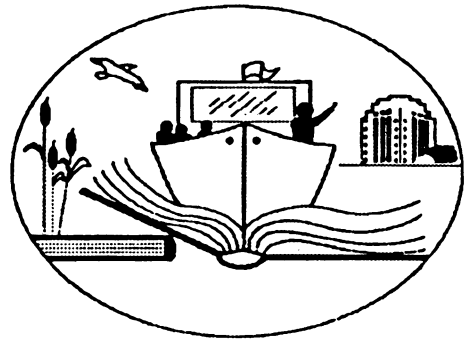
Shari L. Dann
Assistant Professor

Enclosures

APPENDIX H-2

Survey Instrument

Parent/Guardian Great Lakes Survey



MICHIGAN STATE UNIVERSITY EXTENSION

Sea Grant Michigan

Department of Fisheries and Wildlife
Michigan State University
13 Natural Resources Building
East Lansing, MI 48824-1222

As a part of the Great Lakes Education Program (GLEP) your child has taken part in classroom learning experiences concerning the Great Lakes. These classroom experiences and the GLEP were developed by Michigan State University Extension and the Michigan Sea Grant College Program to provide Great Lakes educational experiences.

If you would like additional information about this evaluation, please contact

Michelle Niedermeier, Graduate Research Assistant in Fisheries and Wildlife at Michigan State University 517/432-5037

Shari Dann, Assistant Professor of Fisheries and Wildlife at Michigan State University 517/353-0675

Steve Stewart, District Extension Agent, MSU Extension-Macomb County 810/469-6085

This survey takes only about 10-15 minutes to complete. Please have your child return the survey to his or her teacher in the envelope provided. At that time, your child will receive a small gift of appreciation for returning a completed survey. Please return the survey before March 5, 1999 if you would like to be entered in a drawing for a bass sport fishing trip for one adult and one child on Lake St. Clair with Captain Ron Spitler.

The Great Lakes Education Program (GLEP) was developed to provide Great Lakes classroom and outdoor educational experiences. Some fourth grade classrooms took part in a shipboard field trip associated with the GLEP. During this field trip, fourth graders took a boat trip on the Clinton River and out into Lake St. Clair.

In order to receive the most accurate responses we would like the parent/guardian who is the most familiar with your child's GLEP experiences to respond to this survey.

Please circle the number that corresponds to your answer.

Did your son or daughter participate in the GLEP's shipboard field trip during his or her 4th grade year?

1 YES (Please go to the question below)
2 NO (Please begin with Section B, page 3)
3 NOT SURE (Please begin with Section B, page 3)

If your child did participate in the GLEP, were you a parent/guardian volunteer with the program during the field trip?

1 YES
2 NO
3 NOT SURE

Section A. Experiences BEFORE GLEP Participation

Please circle YES or NO to indicate which activities you and your family have done with your child BEFORE his or her participation in the GLEP in the fourth grade.

Fished?	YES	NO
Visited the Great Lakes or Lake St. Clair?	YES	NO
Fished in one of the Great Lakes or Lake St. Clair?	YES	NO
Participated in activities associated with 4-H, Boy Scouts, or Girl Scouts?	YES	NO
Visited a zoo?	YES	NO
Visited a nature or wilderness center?	YES	NO
Visited an aquarium or Sea World?	YES	NO
Camped?	YES	NO
Watched nature programs on TV about water, the oceans, or the Great Lakes?	YES	NO
Read books or magazines about water, the oceans, or the Great Lakes?	YES	NO
Sailed, kayaked, or canoed?	YES	NO
Been on a motorboat?	YES	NO
Hiked?	YES	NO
Visited local, state or national parks?	YES	NO

Section B. Experiences During the Last Six Months

Please circle YES or NO to indicate which activities you and your family have done <u>with your child(ren) DURING THE PAST SIX MONTHS.</u>

Fished?	YES	NO
Visited the Great Lakes or Lake St. Clair?	YES	NO
Fished in one of the Great Lakes or Lake St. Clair?	YES	NO
Participated in activities associated with 4-H, Boy Scouts, or Girl Scouts?	YES	NO
Visited a zoo?	YES	NO
Visited a nature or wilderness center?	YES	NO
Visited an aquarium or Sea World?	YES	NO
Camped?	YES	NO
Watched nature programs on TV about water, the oceans, or the Great Lakes?	YES	NO
Read books or magazines about water, the oceans, or the Great Lakes?	YES	NO
Sailed, kayaked, or canoed?	YES	NO
Been on a motorboat?	YES	NO
Hiked?	YES	NO
Visited local, state or national parks?	YES	NO

Section C. Your Attitudes about the Great Lakes and Lake St. Clair

In this section there are pairs of words to describe the Great Lakes. The words on the left are the opposite of the words on the right. Between the opposite words there are six numbers. Please circle the number in between the words which comes closest to your feelings about the Great Lakes.

THE GREAT LAKES

EXAMPLE: very big	(1)	2	3	4	5	6	very small

If you feel the Great Lakes are very big, then you would circle number 1 as shown.

very beautiful	1	2	3	4	5	6	very ugly
very fun	1	2	3	4	5	6	very boring
very familiar	1	2	3	4	5	6	very strange
very awful	1	2	3	4	5	6	very nice
very dirty	1	2	3	4	5	6	very clean
very important	1	2	3	4	5	6	very unimportant
very worthless	1	2	3	4	5	6	very valuable

For each sentence below please circle TRUE, MAYBE , or FALSE.

	TRUE This sentence describes me most of the time.	MAYBE This sentence sometimes describes me.	FALSE This sentence hardly ever or never describes me.
I get mad about the damage pollution does to the Great Lakes.	TRUE	MAYBE	FALSE
It upsets me when I see people using too much water.	TRUE	MAYBE	FALSE
To save water, I am willing to turn off the water while brushing my teeth.	TRUE	MAYBE	FALSE
To save water, I am willing to use less water when I bathe.	TRUE	MAYBE	FALSE
I am willing to give money to help clean up the Great Lakes.	TRUE	MAYBE	FALSE
I am willing to write letters asking people to help stop Great Lakes pollution.	TRUE	MAYBE	FALSE
I am willing to pick up litter when at a Great Lakes beach.	TRUE	MAYBE	FALSE
I would support my son/daughter if he/she chose to pursue a career related to the Great Lakes, rivers, lakes, or oceans.	TRUE	MAYBE	FALSE

Section D. Attitudes about the Environment

Please indicate the degree to which you agree or disagree with each statement by circling the appropriate number.

	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
I have a duty to help protect the environment.	1	2	3	4	5
It is important to be considerate of the needs of wildlife where I live.	1	2	3	4	5
It is important to think about how my personal choices might affect the environment.	1	2	3	4	5
I have a duty to see that people of the future have a healthy environment.	1	2	3	4	5
I have a responsibility to my community to make sure the environment stays clean and healthy.	1	2	3	4	5
It is important to show respect for the natural places where wildlife live.	1	2	3	4	5
I have a responsibility to other people to use electricity efficiently.	1	2	3	4	5
It is my responsibility to make sure that people in the future have clean water to drink.	1	2	3	4	5
It is important that people take care of the places where wildlife live.	1	2	3	4	5

Section E. Activities Related to the Environment

Please circle the letter which indicates how often during the past 6 months you, or someone in your family, have done each of the following things.

	Never	Almost Never	Some-times	Often	Always
I bought light bulbs that saved energy in my home.	1	2	3	4	5
When there was a choice, I bought a less toxic household cleaning product.	1	2	3	4	5
I chose products with the least cardboard, plastic, or Styrofoam packaging.	1	2	3	4	5
I recycled glass jars.	1	2	3	4	5
I bought products that used recycled materials (like recycled paper).	1	2	3	4	5
I looked for information on what I could do to help the environment.	1	2	3	4	5
I sent my motor oil, paint, or chemicals to an approved waste collection site.	1	2	3	4	5
I told friends or co-workers how they can do things to help the environment.	1	2	3	4	5
I turned off lights when no one was using a room.	1	2	3	4	5
I looked for information on what I could do to help improve Lake St. Clair or other lakes.	1	2	3	4	5
At the store, I chose bathroom cleaners without bleach (chlorine).	1	2	3	4	5
I read product labels to see how the products affect the environment.	1	2	3	4	5

7

Section F. Beliefs about the Great Lakes and Lake St. Clair

In this section of the survey please choose the one answer that you believe is the most correct. Please circle the letter in front of your answer.

1. Food, water, cover and space are part of an animal's _____.
   A. nature
   B. habitat
   C. behavior
   D. instinct

2. On the map, which lake in the Great Lakes region is indicated by the number 1?
   A. Lake Superior
   B. Lake Michigan
   C. Lake Erie
   D. Lake Ontario
   E. Lake Huron

3 Which waterway connects the Great Lakes to the Atlantic Ocean?
   A. Lake St. Clair
   B. St. Lawrence Seaway
   C. Lake Superior
   D. Mississippi River.

4. The land area from which a river collects its water is called a _____.
   A. gradient
   B. watershed basin
   C. flood plain
   D. river bottom

5. What do fish need to live?
   A. a place to hide
   B. food
   C. the correct water temperature
   D. enough space to swim
   E. all of the above

6. Which is a plant that lives in water?
   A. ivy
   B. minnow
   C. sunflower
   D. algae
   E. mushroom

7. What could acid rain do to a lake?
   A. cause fewer fish to hatch from eggs
   B. hurt some types of plants and animals
   C. make the water more acidic
   D. change the numbers of plants and animals
   E. all of the above

8. Why is it suggested that people eat Great Lakes fish only once in a while?
   A. Fish from the Great Lakes cost more than other fish.
   B. Since very few fish live in the Great Lakes, people should eat only a few of them.
   C. Some fish from the Great Lakes have pollutants inside them.
   D. Fish from the Great Lakes spoil faster than fish from rivers and oceans.
   E. Most fish from the Great Lakes do not taste very good.

9. Which food chain is in the right order?
   A. water insects -> water plants -> fish -> people
   B. water insects -> fish -> water plants -> people
   C. water plants -> water insects -> fish -> people
   D. people -> water plants -> fish -> water insects
   E. fish -> people -> water insects -> water plants

10. Marshes may be disappearing because _____.
   A. high sea level is making the oceans and Great Lakes grow larger
   B. marsh water is draining out into the oceans
   C. people are filling in the marshes to make more land
   D. there is less rain to fill the marshes
   E. marshes naturally mature into forests

11. What is a D.O. test used to measure?
    A. algae in the water
    B. plankton in the water
    C. oxygen in the water
    D. ozone in the water
    E. carbon dioxide in the water

12. Which food chain is in the right order?
    A. water insects -> water plants -> fish -> people
    B. water insects -> fish -> water plants -> people
    C. water plants -> water insects -> fish -> people
    D. people -> water plants -> fish -> water insects
    E. fish -> people -> water insects -> water plants

13. Plankton are _____.
    A. schools of fast moving fish
    B. tiny floating plant and animal life
    C. non-living substances in the water
    D. materials for making wooden boats
    E. types of nets used on fishing vessels

Section G. Background Information

The information which you provide will be held in confidence. Your responses will be used only in comparison to what other people think. Your name will not be associated with your response.

Please circle the number that corresponds to your response.

Do you regularly participate in any activities/hobbies related to the Great Lakes, such as fishing or boating?

1 No

2 Yes (If yes, please list)

_____

_____

Do you belong to any environmental or conservation organizations, such as The Sierra Club or MUCC?

1 No

2 Yes (If yes, please list)

_____

_____

Please circle the number that represents the highest level of education you have completed.

1 Elementary school

2 High School or equivalent

3 Some college

4 Associates degree or Trade school

5 Bachelors degree

6 Advanced degree (Masters, Ph.D., MBA)

If you circled any number from 3 to 6, what was your college major?

_____

_____

Are you: 1 Male

2 Female

If your child DID participate in the GLEP's shipboard field trip during his or her 4th grade year, please complete the next two pages. ⟶ ⟶ ⟶ ⟶ ⟶

If your child DID NOT participate in the GLEP's shipboard field trip during his or her 4th grade year, please stop now. Thank you for completing this survey!

Section H. Importance of the GLEP

To the best of your recollection, please answer the following questions. Please circle the number that corresponds to your answer.

Do you think your child's participation with the GLEP's shipboard field trip was worthwhile?

1 YES
2 NO
3 NOT SURE

Please indicate the extent to which the GLEP's shipboard field trip helped improve your child's knowledge and skills in the following aspects.

	STRONGLY AGREE	AGREE	UNDECIDED	DISAGREE	STRONGLY DISAGREE
The GLEP increased my child's knowledge about the Great Lakes, ecology, and water quality issues.	1	2	3	4	5
The GLEP improved my child's personal interest in the Great Lakes and ecology.	1	2	3	4	5
The GLEP increased my child's awareness and appreciation of the Great Lakes.	1	2	3	4	5
My child is more aware of water quality because of the GLEP.	1	2	3	4	5
I am more aware of water quality because of my child's participation in the GLEP.	1	2	3	4	5

Has your family adopted any new environmentally sound practices as a result of your child's participation in the GLEP?

1 YES

2 NO

3 NOT SURE

If YES, please indicate what they are.

_____

_____

If you have any questions about this survey or any other comments about the GLEP that were not covered in the questionnaire, please provide them in the space below.

_____

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR COMPLETING THIS SURVEY!

Drawing Entry Form

Please have your child return the survey to his or her teacher in the envelope provided. If it is returned by January 23, 1999 you will be entered in the drawing for a bass sport fishing trip for one adult and one child on Lake St. Clair with Captain Ron Spitler.

If you would like additional information about this evaluation, please contact

Michelle Niedermeier, Graduate Research Assistant in Fisheries and Wildlife at Michigan State University 517/432-5037
Shari Dann Assistant Professor of Fisheries and Wildlife at Michigan State University 517/353-0675
Steve Stewart, District Extension Agent, MSU Extension-Macomb County 810/469-6085.

The information which you provide will be held in confidence. This sheet will not linked to your survey responses. It will only be used for the purpose of prize distributions.

Please Print

Name _____

Address _____

_____

Phone _____

APPENDIX I

Reminder Letter
(Note. Letter was prepared on Michigan State Unversity Department of Fisheries and Wildlife letterhead)

January 18, 1999

Dear Parents and Guardians:

One week ago your son or daughter brought home a survey that will evaluate the impacts of The Great Lakes Education Program (GLEP). Many thanks if you already completed and returned the survey.

If you have not returned the form, please take a few minutes to do it today. Your cooperation is essential, although your participation is voluntary. If by some chance you did not receive the survey, another copy may be obtained from your son or daughter's teacher. If you would like additional information about this evaluation, please contact Michelle Niedermeier, Graduate Assistant at Michigan State University 517/432-5037, Shari Dann, Assistant Professor of Fisheries and Wildlife at Michigan State University 517/353-0675, or Steve Stewart, District Extension Agent at Macomb County MSU Extension 810/469-6085.

Thanks again for your help!

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant

Shari L. Dann
Assistant Professor

APPENDIX J

Revised Cover Letter
(Note. Letter was prepared on Michigan State Unversity Department of Fisheries and Wildlife letterhead)

February 1, 1999

Dear Parents and Guardians:

Three weeks ago your son or daughter brought home a survey that will evaluate the impacts of The Great Lakes Education Program (GLEP). As a part of the GLEP your child has taken part in some classroom learning experiences concerning the Great Lakes. These classroom experiences and the GLEP were developed by Michigan State University Extension and the Michigan Sea Grant College Program to provide Great Lakes educational experiences in the classroom.

Now, in an effort to learn more about families' interests in the Great Lakes, we invite you as a parent, to complete the enclosed survey. Some fourth grade classrooms may have taken part in the shipboard field trip associated with the GLEP. Whether your child participated in this or not, we need your input! We hope you will participate, although it is entirely voluntary. The survey takes only about 10-15 minutes to complete. Please have your child return the survey to his or her teacher in the envelope provided. **Your son or daughter's classroom will receive a special gift if 95% of the students return a completed survey by February 12, 1999.**

The information which you provide will be held in confidence and will be used only in comparisons with other responses. Your name will not be associated with your response. If you would like additional information about this evaluation, please contact Michelle Niedermeier, Graduate Assistant at Michigan State University 517/432-5037, Shari Dann, Assistant Professor of Fisheries and Wildlife at Michigan State University 517/353-0675, or Steve Stewart, District Extension Agent at Macomb County MSU Extension 810/469-6085.

By completing this survey, you are agreeing to participate in the evaluation. Thank you in advance for taking a few minutes to complete this very important survey!

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant

Shari L. Dann
Assistant Professor

Enclosures

APPENDIX K

Letter to Teachers
(Note. Letter was prepared on Michigan State Unversity Department of Fisheries and Wildlife letterhead)

March 23, 1999

Fifth Grade Teachers
Pinewood Elementary
14411 Bade
Warren, MI 48093

Dear Fifth Grade Teachers,

I would like to thank you for allowing me to come into your classroom to present an activity on Great Lakes careers to your fifth graders. I would also like to thank you for your assistance with survey distribution and return. As a graduate student, working with a thesis deadline, your participation has been greatly appreciated!

Please do not hesitate to call if you have any questions or require assistance on any aspect of my visit or study. I can be reached at home (517)371-2961 or at school (517)432-5037.

Thank you for your cooperation!

Sincerely,

Michelle L. Niedermeier
Graduate Research Assistant

APPENDIX L

Non-respondent Follow-up Phone Interviews with Teachers

Interview Questions

1. Do you have any knowledge or insight as to why surveys were not returned? (forgetfulness, refusals)

Classrooms 1 and 2
Not out of the ordinary for this group, this year. They are not good at remembering to return anything.

Classrooms 11 and 12
I have been teaching since 1964 and have seen a steady decline in students. They are very bad about returning anything. We strive for 100% on everything we do and we are very disappointed in the (survey) returns.

2. Is there anything unique about the students/parents who did return a completed survey?

Classrooms 1 and 2
Students who did return are the more responsible students.

Classrooms 11 and 12
I have "haves" and "have nots". Kids that returned, are kids that return.

3. Do you feel respondents are representative of the students and therefore the parents in your classroom or school?

Classrooms 11 and 12
(The returns) are not representative, it is the top 1/3 of the class and then a couple others. There is a trickle down from their parents, a lack of responsibility. School is not a top priority. Students are used to instant responses and are not willing to wait. I blame video games and TV.

4. Were you able to follow the guidelines of the evaluation protocol (survey distribution, one week later-reminder letter, two weeks later-survey redistribution)? Were you able to use the thermometer chart to track classroom return rates? Were you able to follow through with incentive distribution (bobbers, fish cards)?

Classrooms 11 and 12
We followed the guidelines you gave us. We also reminded them daily on our own. We talked about it, hung up the return chart, passed out the prizes and made a big deal of it.

Classrooms 1 and 2
NOTE: This teacher lost all the return envelopes,the return address, and my phone number. Additional pre-paid postage envelopes were mailed to her. This teacher was out of time and unable to continue the interview.

Classrooms 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, and 19
No response

APPENDIX M

Detailed Results

APPENDIX M-1

Table M-1

Responses of Participants' Parent/Guardian and Non-participants' Parent/Guardian Responses on Knowledge Items

Question*	% with Correct Answers		χ^2	df	p
1. habitat	Part.	88.5	0.228	1	0.633
	Non-part.	90.9			
2. Lake MI map	Part.	96.2	0.725	1	0.394
	Non-part.	92.6			
3. GL to Atlantic	Part.	86.0	3.106	1	0.078
	Non-part.	73.1			
4. watershed	Part.	70.0	0.566	1	0.452
	Non-part.	75.8			
5. fish need	Part.	94.1	0.046	1	0.830
	Non-part.	94.9			
6. algae	Part.	98.0	0.439	1	0.508
	Non-part.	96.0			
7. acid rain	Part.	92.0	0.158	1	0.691
	Non-part.	93.8			
8. fish toxin	Part.	92.2	0.030	1	0.864
	Non-part.	92.9			
9. food chain	Part	80.0	0.014	1	0.906
	Non-part.	79.2			
10. marshes	Part.	92.2	0.560	1	0.454
	Non-part.	88.2			
11. DO	Part.	43.2	0.742	1	0.389
	Non-part.	35.4			
12. order	Part.	79.2	0.308	1	0.579
	Non-part	75.0			

Table L-1 continued

Question*	% with Correct Answers		χ^2	df	p
13. plankton	Part.	92.0	2.665	1	0.103
	Non-part.	81.9			

*For actual knowledge test survey items, see Appendix H, Survey Section F.

Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

APPENDIX M-2

Table M-2

Responses of Parent/Guardian Volunteers and Non-volunteers on Knowledge Items

Question**	% with Correct Answers		χ^2	df	p
1. habitat	Vol.	81.8	3.905	1	0.048*
	Non-vol.	100.0			
2. Lake MI map	Vol.	93.9	1.198	1	0.274
	Non-vol.	100.0			
3. GL to Atlantic	Vol.	89.5	0.307	1	0.579
	Non-vol.	83.9			
4. watershed	Vol.	78.9	1.168	1	0.280
	Non-vol.	64.5			
5. fish need	Vol.	94.7	0.021	1	0.885
	Non-vol.	93.8			
6. algae	Vol.	100.0	0.606	1	0.436
	Non-vol.	96.9			
7. acid rain	Vol.	100.0	2.665	1	0.103
	Non-vol.	87.1			
8. fish toxin	Vol.	94.7	0.279	1	0.597
	Non-vol.	90.6			
9. food chain	Vol.	88.9	1.389	1	0.239
	Non-vol.	75.0			
10. marshes	Vol.	94.7	0.279	1	0.597
	Non-vol.	90.6			
11. DO	Vol.	38.9	0.229	1	0.632
	Non-vol.	46.2			
12. order	Vol.	94.4	4.076	1	0.044*
	Non-vol.	70.0			

Table M-2 continued

Question*	% with Correct Answers		χ^2	df	p
13. plankton	Vol.	100.0	2.665	1	0.103
	Non-vol.	87.1			

* p < .05.
**For actual knowledge test survey items, see Appendix H, Survey Section F.
Note. Vol.= Parents/guardians of participants who volunteered
Non-part.= Parents/guardians of participants who did not volunteer

APPENDIX M-3

Table M-3

Responses of Participants' Parent/Guardian and Non-participants' Parent/Guardian on Attitudes about the Great Lakes

Question*		n	M**	SD	t 2-tailed	p
Beautiful/ Ugly	Part.	52	5.35	0.86	1.016	0.311
	Non-part.	101	5.49	0.77		
Fun/ Boring	Part.	52	5.25	0.90	-0.016	0.987
	Non-part.	101	5.25	0.93		
Familiar/ Strange	Part.	52	4.90	1.21	-1.203	0.231
	Non-part.	100	4.66	1.17		
Awful/ Nice	Part.	52	5.17	0.96	0.651	0.516
	Non-part.	99	5.29	1.13		
Dirty/ Clean	Part.	52	3.65	1.19	1.334	0.184
	Non-part.	99	3.92	1.15		
Important/ Unimportant	Part.	52	5.63	0.84	-1.592	0.114
	Non-part.	100	5.31	1.34		
Worthless/ Valuable	Part.	52	5.62	0.97	1.95	0.846
	Non-part.	99	5.65	0.91		

*For actual survey items, see Appendix H-2, Survey Section C.
**Scores ranged from 1-6, with 6 representing the most positive response.
Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

APPENDIX M-4

Table M-4

Responses of Parent/Guardian Volunteers and Non-volunteers on Attitudes about the Great Lakes

Question*		n	M**	SD	t 2-tailed	p
Beautiful/ Ugly	Vol.	19	5.42	0.84	-0.473	0.639
	Non-vol.	33	5.30	0.88		
Fun/ Boring	Vol.	19	5.42	0.77	-1.035	0.306
	Non-vol.	33	5.15	0.97		
Familiar/ Strange	Vol.	19	4.89	1.15	0.041	0.968
	Non-vol.	33	4.91	1.26		
Awful/ Nice	Vol.	19	5.21	1.13	-0.210	0.834
	Non-vol.	33	5.15	0.87		
Dirty/ Clean	Vol.	19	3.89	1.05	-1.114	0.271
	Non-vol.	33	3.52	1.25		
Important/ Unimportant	Vol.	19	5.79	0.63	-1.008	0.318
	Non-vol.	33	5.55	0.94		
Worthless/ Valuable	Vol.	19	5.74	0.93	-0.679	0.500
	Non-vol.	33	5.55	1.00		

*For actual survey items, see Appendix H-2, Survey Section C.
**Scores ranged from 1-6, with 6 representing the most positive response.
Note. Vol.= Parents/guardians of participants who volunteered
Non-part.= Parents/guardians of participants who did not volunteer

APPENDIX M-5

Table M-5

Responses of Participants' Parent/Guardian and Non-participants' Parent/Guardian on Attitudes about the Environment

Question*		n	M**	SD	t 2-tailed	p
Duty	Part.	52	4.48	0.73	-0.656	0.513
	Non-part.	102	4.40	0.69		
Wildlife needs	Part.	52	4.63	0.63	-0.258	0.797
	Non-part	102	4.61	0.60		
Choices	Part.	52	4.52	0.61	-0.705	0.482
	Non-part.	102	4.44	0.67		
Future	Part.	52	4.50	0.70	-0.174	0.862
	Non-part.	102	4.48	0.64		
Community	Part.	52	4.31	0.70	0.723	0.471
	Non-part.	102	4.39	0.68		
Respect	Part.	52	4.65	0.65	0.517	0.606
	Non-part.	102	4.71	0.56		
Electricity	Part.	52	4.27	0.72	-0.481	0.631
	Non-part.	102	4.21	0.80		
Water	Part.	52	4.25	0.74	1.240	0.216
	Non-part.	102	4.40	0.71		
Habitat	Part.	52	4.62	0.66	0.530	0.597
	Non-part.	102	4.67	0.51		

*For actual survey items, see Appendix H-2, Survey Section D.
**Scores ranged from 1-5, with 5 representing the most positive response.
Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

APPENDIX M-6

Table M-6

Responses of Parent/Guardian Volunteers and Non-volunteers on Attitudes about the Environment

Question*		n	M**	SD	t 2-tailed	p
Duty	Vol.	19	4.74	0.56	-1.981	0.053
	Non-vol.	33	4.33	0.78		
Wildlife needs	Vol.	19	4.74	0.45	-0.890	0.378
	Non-vol	33	4.58	0.71		
Choices	Vol.	19	4.52	0.51	-0.063	0.950
	Non-vol.	33	4.53	0.67		
Future	Vol.	19	4.45	0.61	-0.613	0.543
	Non-vol.	33	4.58	0.75		
Community	Vol.	19	4.32	0.67	-0.063	0.950
	Non-vol.	33	4.30	0.73		
Respect	Vol.	19	4.79	0.42	-1.139	0.260
	Non-vol.	33	4.58	0.75		
Electricity	Vol.	19	4.42	0.69	-1.162	0.251
	Non-vol.	33	4.18	0.73		
Water	Vol.	19	4.32	0.67	-0.481	0.630
	Non-vol.	33	4.21	0.78		
Habitat	Vol.	19	4.79	0.76	-1.456	0.152
	Non-vol.	33	4.52	0.42		

*For actual survey items, see Appendix H-2, Survey Section D.
**Scores ranged from 1-5, with 5 representing the most positive response.
Note. Vol.= Parents/guardians of participants who volunteered
Non-part.= Parents/guardians of participants who did not volunteer

APPENDIX M-7

Table M-7

Responses of Participants' Parent/Guardian and Non-participants' Parent/Guardian on Intentions/Feelings

Parent/Guardian Respondent Groups and Variable**	n	M	SD	t 2-tailed	p
Part.-Mad	52	1.13	0.34	-0.832	0.407
Non-part.-Mad	102	1.09	0.32		
Part.-Upset	52	1.56	0.67	1.235	0.219
Non-part.-Upset	102	1.69	0.58		
Part.-Teeth	52	2.87	0.34	-1.552	0.123
Non-part.-Teeth	102	2.75	0.50		
Part.-Bathe	52	2.71	0.57	-2.193	0.030*
Non-part.-Bathe	102	2.48	0.64		
Part.-Money	52	2.10	0.60	1.295	0.197
Non-part.-Money	101	2.22	0.52		
Part.-Letter	51	1.94	0.70	-0.005	0.996
Non-part.-Letter	101	1.94	0.69		
Part.-Litter	52	2.62	0.57	0.516	0.607
Non-part.-Litter	101	2.66	0.53		
Part.-Career	52	2.92	0.27	-1.153	0.251
Non-part.-Career	102	2.84	0.46		

*$p < .05$.
**For actual question, see Appendix H-2, Survey Section C, page 5
Note. Part.= Parents/guardians of participants.
Non-part.= Parents/guardians of non-participants.
Maximum score of each question in the intentions/feeling section was 3
3 = TRUE, This sentence describes me most of the time
2 = MAYBE, This sentence sometimes describes me
1 = FALSE, This sentence hardly ever or never describes me

APPENDIX M-8

Table M-8

Responses of Parent/Guardian Volunteers and Non-volunteers on Intentions/Feelings

Parent/Guardian Respondent Groups and Variable**	n	M	SD	t 2-tailed	p
Vol.-Mad	19	1.05	0.23	1.311	0.196
Non-vol.-Mad	33	1.18	0.39		
Vol.-Upset	19	1.37	0.60	1.570	0.123
Non-vol.-Upset	33	1.67	0.69		
Vol.-Teeth	19	2.79	0.42	1.211	0.232
Non-vol.-Teeth	33	2.91	0.29		
Vol.-Bathe	19	2.89	0.46	-1.791	0.079
Non-vol.-Bathe	33	2.61	0.61		
Vol.-Money	19	2.26	0.65	-1.537	0.131
Non-vol.-Money	33	2.00	0.56		
Vol.-Letter	18	2.06	0.87	-0.854	0.397
Non-vol.-Letter	33	1.88	0.60		
Vol.-Litter	19	2.79	0.42	-1.716	0.092
Non-vol.-Litter	33	2.52	0.62		
Vol.-Career	19	2.84	0.37	1.676	0.100
Non-vol.-Career	33	2.97	0.17		

*p < .05.
**For actual question, see Appendix H-2, Survey Section C, page 5
Note. Vol. = Parents/Guardians who volunteered.
Non-vol. = Non-volunteering parents/guardians
Maximum score of each question in the intentions/feeling section was 3
3 = TRUE, This sentence describes me most of the time
2 = MAYBE, This sentence sometimes describes me
1 = FALSE, This sentence hardly ever or never describes me

APPENDIX M-9

Table M-9

Responses of Participants' Parent/Guardian and Non-participants' Parent/Guardian on Environmental Actions

Question*		n	M***	SD	t 2-tailed	p
Light bulbs	Part.	52	3.69	0.83	0.092	0.927
	Non-parts	102	3.71	0.89		
Cleaning Products	Part.	52	4.02	0.91	-2.138	0.034**
	Non-part.	102	3.69	0.92		
Packaging	Part.	51	3.40	1.04	-0.061	0.952
	Non-part.	102	3.39	0.89		
Glass	Part.	52	4.35	1.03	-0.713	0.477
	Non-part.	102	4.21	1.21		
Purchased Recycled	Part.	52	3.96	0.77	-0.424	0.673
	Non-part.	101	3.91	0.66		
Information	Part.	52	3.02	0.96	-1.630	0.103
	Non-part.	101	2.77	0.83		
Waste Collection	Part.	52	4.38	0.97	-3.432	0.001**
	Non-part.	99	3.65	1.38		
Told Friends	Part.	52	2.81	1.19	-1.521	0.130
	Non-part.	101	2.54	0.91		
Turned off Lights	Part.	52	4.73	0.49	-1.594	0.113
	Non-part.	102	4.54	0.79		
Info. help	Part.	52	2.50	1.04	-1.808	0.073
	Non-Part.	101	2.22	0.84		
No bleach	Part.	52	2.88	0.92	-0.766	0.445
	Non-part.	102	2.75	1.03		
Read Labels	Part.	52	2.98	1.00	-0.460	0.646
	Non-part.	101	2.90	1.02		

*For actual survey items, see Appendix H-2, Survey Section E.
** $p < .05$.
***Scores ranged from 1-5, with 5 representing the most positive response.
Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

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APPENDIX M-10

Table M-10

Responses of Parent/Guardian Volunteers and Non-volunteers on Environmental Actions

Question*		n	M***	SD	t 2-tailed	p
Light bulbs	Vol.	19	3.47	0.96	1.458	0.151
	Non-vol.	33	3.82	0.73		
Cleaning Products	Vol.	19	3.84	0.90	1.057	0.296
	Non-vol.	33	4.12	0.93		
Packaging	Vol.	19	3.53	0.90	-0.706	0.484
	Non-vol.	33	3.31	1.12		
Glass	Vol.	19	4.58	0.96	-1.247	0.218
	Non-vol.	33	4.21	1.05		
Purchased Recycled	Vol.	19	4.21	0.71	-1.818	0.075
	Non-vol.	33	3.82	0.77		
Information	Vol.	19	3.47	0.96	-2.753	0.008**
	Non-vol.	33	2.76	0.87		
Waste Collection	Vol.	19	4.32	1.06	0.384	0.703
	Non-vol.	33	4.42	0.94		
Told Friends	Vol.	19	3.21	1.08	-1.901	0.063
	Non-vol.	33	2.58	1.20		
Turned off Lights	Vol.	19	4.74	0.45	0.067	0.947
	Non-vol.	33	4.73	0.52		
Info. help	Vol.	19	2.74	1.10	-1.255	0.215
	Non-vol.	33	2.36	0.99		
No bleach	Vol.	19	3.00	1.05	-0.682	0.499
	Non-vol.	33	2.82	0.85		
Read Labels	Vol.	19	2.89	1.05	0.467	0.642
	Non-vol.	33	3.03	0.98		

*For actual survey items, see Appendix H-2, Survey Section E.
** $p < .05$.
***Scores ranged from 1-5, with 5 representing the most positive response.
Note. Part.= Parents/guardians of participants
Non-part.= Parents/guardians of non-participants

Table M-11

Mann Whitney U Nonparametric Test on Knowledge, Attitude, and Behavioral Intention Scales: Parent/Guardian Volunteers and Non-volunteers

Scale	Respondent Group	N	Mean Rank	Sum of the Ranks	Z 2-tailed	p
Knowledge	Vol.	19	32.39	615.50	-2.182	0.029*
	Non-vol.	33	23.11	762.50		
Attitudes about the Great Lakes	Vol.	19	28.37	539.00	-0.679	0.497
	Non-vol.	33	25.42	839.00		
Attitudes about the Environment	Vol.	19	28.63	544.00	-0.785	0.433
	Non-vol.	33	25.27	834.00		
Intentions/ Feelings	Vol.	18	32.53	585.50	-2.353	0.019*
	Non-vol.	33	22.44	740.50		
Environmental Action	Vol.	19	27.79	528.00	-0.664	0.507
	Non-vol.	32	24.94	798.00		

*p < .05.

Note. Vol. = Parents/Guardians who volunteered.
Non-vol. = Non-volunteering parents/guardians.

REFERENCES

REFERENCES

Ajzen, I. & Fishbein, M. (1980). Understanding attitudes and predicting human behavior. Englewood Cliffs, NJ: Prentice-Hall.

Bem, D.J. (1972). Self-perception theory. In L. Berkowitz (Ed.), Advances in experimental social psychology (Vol. 6). San Diego, CA: Academic Press.

Bennett, D. (1989). Four steps to evaluating environmental education learning experiences. The Journal of Environmental Education,20(2), 14-21.

Blanchard, K.A., & Monroe, M.C. (1990). Effective educational strategies for reversing population declines in seabirds. Paper presented at the 55th North American Wildlife and Natural Resource Conference, pp 108-117.

Boyle, P. (1981). Planning better programs. New York: McGraw-Hill Book Co., p 226.

Bristor, M.W. (1990). Individuals, families and environments. Dubuque, IA: Kendall/Hunt Publishing Company.

Cookson, P. (1996). Program planning for lifelong education. Manuscript submitted for publication.

Cox, A., & Wilson, R. (1993). Options for Michigan Environmental Education. Senate Majority Policy Office, Lansing, MI.

Dann, S. (1994). The life of the lakes, A guide to Great Lakes fishery educational materials. Fisheries Careers Scavenger Hunt (Extension Bulletin E-2441;MICHU-SG-93-401, 23-24). East Lansing, MI: Michigan State University Extension.

Delener, N., & Schiffman, L.G. (1988). Family decision making: The impact of religious factors. In G. Frazier et al. (Ed.), 1988 AMA Educators' Proceedings (pp. 80-83). Chicago: American Marketing Association.

Disinger, J. (1983). Environmental education's definitional problem. Information Bulletin #2 ERIC Clearinghouse for Science, Mathematics and Environmental Education, 1-8.

Dillman, D.A. (1978). Mail and Telephone Surveys: The Total Design Method. New York, NY: John Wiley & Sons.

Environmental Education Act, 13.19 Michigan Statutes Annotated. §§ 299-31-34 (1994).

Environmental Education and Training Partnership (March 1997a). Understanding evaluations of environmental education (Number 12). U.S. Environmental Protection Agency and the North American Association for Environmental Education.

Environmental Education and Training Partnership (March 1997b). Environmental education: can it be defined? (Number 14). U.S. Environmental Protection Agency and the North American Association for Environmental Education.

Environmental Education and Training Partnership (April 1997c). Environmental education: as defined by the practitioners (Number 15). U.S. Environmental Protection Agency and the North American Association for Environmental Education.

Environmental Education and Training Partnership (May 1997d). Evolution of environmental education: historical development (Number 16). U.S. Environmental Protection Agency and the North American Association for Environmental Education.

Environmental Education Citizens' Advisory Committee. (1992). Report to the Michigan State Board of Education and the Michigan Natural Resources Commission. EECAC Chair: R. Ben Peyton.

Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) Committee on education and training (CET). September 17, 1993. Report of the Ad Hoc Working Group on Environmental Education and Training.

Ferber, R. (1977). Applications of behavioral theories to the study of family marketing behavior. Behavioral models for market analysis: foundation for marketing action, 80-95. Hinsdale, IL: The Dryden Press.

Festinger, L. (1957). A theory of cognitive dissonance. Stanford, CA: Stanford University Press.

Fishbein, M. & Ajzen, I. (1975). Belief, attitude, intention, and behavior: An introduction to theory and research. Reading, MA: Addison-Wesley.

Fishbein, M. & Manfredo, M.J. (1992). A theory of behavior change. M. Manfredo (Ed.), Influencing Human Behavior: theory and applications in recreation, tourism, and natural resources management (pp. 29-50). Champaign, IL: Sagamore Publishing Co.

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, 5.

Fortner, R., & Mayer, V. (1983). Ohio Students knowledge and attitudes about the oceans and Great lakes. Ohio Journal of Science, 83(5), 218-224.

Gilchrist, S. (1989/90). The effect of Project WILD on fourth grade students in Wisconsin. Technical Bulletin, Madison, WI: Wisconsin Department of Natural Resources.

Gilchrist, S. (1993). The impact of Project WILD on fourth grade students in Wisconsin. Habitrends, Spring (10), 5-6.

Horowitz, I.A., & Bordens, K.S. (1995). Social psychology. Mountain View, CA: Mayfield Publishing Company.

Hounshell, P. & Hampton, C. (1982). Marine education knowledge inventory. (Report No. SE-039-188) East Lansing, MI: National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED 222329.)

Hungerford, H., Peyton, R.B. & Wilke, R.J. (1980). Goals for curriculum development in environmental education. Journal of Environmental Education, 11(3), 42-47.

Hungerford, H. & Volk T. (1990). Changing learner behavior through environmental education. The Journal of Environmental Education, 21(3), 8-21.

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.

Keen, M. (1991). The effect of the sunship earth program on knowledge and attitude development. The Journal of Environmental Education, 22(3), 28-32.

Kelly, I. (1995) Coral Reef Classroom Student Survey. Unpublished Report.

Lewis, G. (1981/82). A review of classroom methodologies for environmental education. The Journal of Environmental Education, 13, 12-15.

Leeming, F., Dwyer W., & Bracken B. (1995). Children's environmental attitude and knowledge scale: Construction and validation. The Journal of Environmental Education, 26(3), 22-23.

Linke, R. (1981). Achievements and aspirations in Australian environmental education. The Journal of Environmental Education, 12(2), 20-23.

Lucko, B., Disinger J., & Roth R. (1982). Evaluation of environmental education programs at the elementary and secondary school levels. The Journal of Environmental Education, 13(4), 8-12.

McNeal, J.U. (1965). An exploratory study of the consumer behavior of children. Dimensions of Behavior. New York, NY: Meredith.

Melson, G.F. (1980). The family as consumer. Family and Environment An Ecosystem Perspective, 181-193. Minneapolis, MN: Burgess Publishing Company.

Michigan Department of Education. (1973). Environmental education guidelines. Lansing, Michigan.

Michigan Department of Education. (1996). Michigan Curriculum Framework. Lansing, MI: Michigan State Board of Education.

1998 Michigan Education Directory. Lansing, MI: Lansing Printing Co., 1997.

Michigan State Board of Education. (1991). Michigan essential goals and objectives for science education (K-12). Lansing, MI: Michigan State Board of Education.

Michigan State Board of Education. (1994). Michigan core curriculum content standards (K-12). Lansing, MI: Michigan State Board of Education.

Munn, M. (1968). The effect on parental buying habits of children exposed to children's television programs. Journal of Broadcasting 2, Summer, 253-258; reprinted in Consumer Behavior, Contemporary Research in Action (1971) ed. R.J. Holloway, R.A. Mittelstaedt, and M. Vankatesan. Boston. MA: Houghton Mifflin.

National Environmental Education Act of 1990 (Public Law 101-619).

National Environmental Education Advisory Council. (1998). Report assessing environmental education in the United States and the implementation of the national environmental education act of 1990 (EPA Publication No. 171-R-96-001). Washington, DC: U.S. Government Printing Office.

Nevala, A.E. (1997). An evaluation of educators' participation in the Great Lakes Education Program. Unpublished master's thesis, Michigan State University, East Lansing.

North American Association for Environmental Education. (1998). Environmental education materials: guidelines for excellence (ISBN 1-884008-41-0). Troy, OH.

Paolucci, B., Hall O.A., & Azinn N. (1977). Family decision making: an ecosystem approach. New York, NY: John Wiley and Sons.


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