

# Environmental Education in Wisconsin: A Teacher Education Approach

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## Introduction

Thank you for the opportunity to visit your beautiful country. You are such a great nation. I am very excited about visiting with your people and learning about environmental education in your country. There is so much in Japan to see and learn about.

In the United States (U.S.), I work in the Wisconsin Center for Environmental Education located at UWSP in the College of Natural Resources is one of the oldest university natural resources programs in the U.S.A. It is over 100 years old. Presently, 2000 students have major areas of study in ecology, wildlife, forestry, soils, water resources, land use planning, and environmental education.

Dr. Randy Champeau, the director of the Wisconsin Center for Environmental Education, was invited to attend this symposium, but prior obligations restricted him from attending. He approached me and asked me to present in his stead. I was very honored to be selected as Dr. Champeau's substitute. I have been with the WCEE since it began in 1990, I have a Master's degree in Environmental Education, and I direct a program within the Wisconsin Center for Environmental Education, called KEEP or the Wisconsin K-12 Energy Education Program.

In this paper, I will provide an overview of the Wisconsin Center for Environmental Education and how, through our teacher education approach, we see to improve and increase the environmental literacy of Wisconsin citizens. The Wisconsin program is considered to be one of the more advanced statewide environmental education programs in the U.S.A.

## I. History or Rationale for Establishing Environmental Education

The history or evolution of environmental education in Wisconsin is similar to other states and the U.S.A. as a nation. In the 1600-1900s, most education or activity related to the environment was directed at developing, harvesting, or extracting natural resources from the environment for human use. Natural resources were viewed as abundant and even endless in supply. Our agriculture practices did not consider how soil fertility could be depleted. We harvested wildlife and fish with no concern for the ability of these species to reproduce. We dumped waste into the air, on to the lands, and into our lakes rivers, and streams

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without knowing these wastes would degrade the environment, kill other species, and ultimately, have a negative impact on human health and the quality of life.

In the late 1800's and on to today, we began to see the impact of past approaches to resource use. Species of wildlife and fish were disappearing. Air and water resources were identified as polluted or unfit for humans or other species. One major crisis, which swept across the U.S. in the 1930s, was the massive erosion of our fertile soils by wind and water as a result of poor agricultural practices. Farmers were losing soil - the natural resources that provided them with the basic needs to sustain their lives. This period of massive erosion is now identified in our history books as the Dust Bowl Era. In addition to depleting our soils, we had over harvested many of our forests. People were depleting the wealth of the land.

The general public was less aware of the large picture related to our declining natural resource base, but there were scientists, politicians, and business people who had the foresight to understand that this abuse of our natural environment could not continue because it would lead to a decline or even collapse of our economic system. They understood that natural resources or the environment is the basis of any country's economic prosperity and it contributes directly to the physical and spiritual health of a nation.

A noted early U.S. philosopher was John Muir (late 1800s), who taught that the environment was part of our spiritual well being. He ultimately founded the Sierra Club, which is very influential citizen environmental organization in the U.S. Theodore Roosevelt, one of our early presidents (1901-1909) is credited with establishing a national policy of "Environmental Conservation" meaning we must use our resources "wisely" or conserve them so that present and future generations will have them to support their quality of life.

Another influential scientist/philosopher/teacher in the mid 1900s was Aldo Leopold, a former professor at the University of Wisconsin, Madison. He proposed and taught a concept called the "Land Ethic," which stressed the fact that people are part of the environment and not separate from it. The following is a famous quote from Leopold.

The question is, does the educated citizen know he is only a cog in an ecological mechanism? That if he will work with that mechanism his mental wealth and his material wealth can expand indefinitely? But that if he refuses to work with it, it will ultimately grind him to dust? If education does not teach us these things, then what is education for? (p. 210)

The teachings and policy positions of these historical leaders and others like them ultimately led to the acceptance by the public of the environment as an important part of public policy. In the 1970s, the U.S. experienced the passage, by our government, of many environmental laws and educational programs aimed at protecting the environment. The passage of this environmental legislation is now recognized in our history books as a major social movement. Today the debate does not question the need for protecting the environment, but rather to what degree do we protect it. Sustainability has become the goal of environmental

protection today in the U.S.A. That is, developing social systems that function while minimizing negative impact on the environment and protecting it for the long term. By sustaining quality of the natural environment, we will contribute to the long-term sustainability of our economy.

## **II. Development of EE in Wisconsin**

Environmental education (EE) in Wisconsin's schools clearly was established as a response to the growing awareness of environmental problems. It grew out of and ultimately includes three earlier education efforts or movements. The first approach in the schools to EE was nature study (1500-present). This focused on studying the natural history of plants and animals out of interest appreciation and to determine utility for human use. The next contributor to EE is "Conservation Education" which developed in the early 1900s. Classes in Wisconsin schools were developed to educate students about wise natural resource management practices; for example, agriculture practices that minimize erosion of soil by wind and water. Conservation was taught mostly in specific courses for students that might be interested in fields like agriculture or forestry. In the 1950s to present, ecology became an important area of study within our science classrooms. Ecology is the study of how energy flows through and matter cycles within natural systems or ecosystems. In other words, how ecosystems work.

The process of environmental education evolved to include the concepts of nature study, conservation education, and ecology. However, it places an additional emphasis on involvement of each citizen in preventing and solving environmental issues. Wisconsin's definition of environmental education is as follows:

"A lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, ethical awareness and sensitivity for the relationship between humans and the environment, and commitment to engage in responsible individual and cooperative actions. By these actions, environmentally literate citizens will help ensure an ecologically and economically sustainable environment."

## **III. The Implementation of Environmental Education in Wisconsin Schools**

Environmental education was formally established in Wisconsin through two pieces of legislation passed by the state government in 1985.

One piece of legislation or law requires that students studying to be teachers must receive formal university course work in environmental education. The other piece of legislation requires that all 400 school districts in Wisconsin develop curriculum for students that addresses environmental education. Each of these laws is more fully explained below.

### **Teacher Training Requirement**

To become a teacher in Wisconsin, a person must attend and graduate from a four-year university teacher education program. After successful completion of the university program, they are then certified to teach

in Wisconsin's schools. Certification may involve teaching one or two age groups. A teacher can be certified to teach 5-year old-13 year old students. This is called "elementary school certification." These elementary teachers teach multiple subjects such as reading, math, English, and social studies. The second area of certification is for teachers teaching 13-year-old students to 18-year-old students. This is called "secondary certification." Secondary certification involves teaching in specialty areas. At the secondary level, teachers become specialists in teaching only math or only science and usually do not teach in multiple areas as the elementary teachers do.

The 1985 law required that all elementary teachers and secondary teachers in the areas of agriculture, science, economics, civics/government, and social studies receive university course work in the following environmental areas.

- a. Natural resources and their conservation;
- b. Ecological principles;
- c. Energy in both biological and physical systems;
- d. People-environment interactions, including;
  - a historical/philosophical review of such interactions,
  - implications of human population growth,
  - natural resource management,
  - the impact of technology on the environment,
  - the impact of the environment on physical and mental health;
- e. The use of affective education methods to teach about the environment; and
- f. The use of cognitive education methods to teach about the environment; and
- g. Methods of teaching citizen participation skills.

The above areas were collectively called environmental education training.

Wisconsin has thirty-one university and college teacher certification programs. All of these programs are reviewed on a five-year cycle to confirm that these environmental education concepts are being covered in their teacher certification programs. If they are not covered, the particular college or university in violation could lose its clearance to have a teacher certification program.

### **School District Curriculum Requirement**

The second piece of legislation or law that established environmental education in Wisconsin schools required school districts to develop curriculum or educational plans for implementing environmental education in the classrooms. The requirement reads as follows:

- Every school district must develop and implement a written, sequential curriculum plan incorporating instruction in environmental education into all subject area curriculum plans, with

the greatest emphasis in plans for art, health, science, and social studies education.

There are 2,000 schools making up 400 school districts in Wisconsin. These districts are associated with particular urban or rural communities. There may be a few too many elementary and secondary school buildings within a district. All of the school buildings within a district follow the district's classroom education or curriculum plan. The Wisconsin State Department of Education provides guidelines, which strongly suggest what should be included in the more detailed district educational plans. These state guidelines are called "Standards." For example, there are standards for mathematics, reading, science, and all the other subject areas taught in schools. Environmental education also has a set of standards (Wisconsin's Model Academic Standards for Environmental Education, 1998). If a school district does not follow the suggested standards, they could potentially lose their state funding, which supports about 60 % of their operation. The other 40% comes from local/community taxes.

There are too many standards to list here and I refer you to Wisconsin Model Academic Standards for Environmental Education, 1998 listed in the reference section of this paper. In general, the standards call for environmental education to be integrated into the elementary and secondary level within the areas of science, agriculture, economics, civics, language arts, and social studies. All the standards can be summarized into the following categories.

- A. Awareness & Investigation of Environmental Issues
- B. Ecological Knowledge and Knowledge of Resource Management Practices Leading to a Sustainable Society
- C. Knowledge of how citizens can participate in the prevention and resolution of environmental issues.

#### **IV. Support for Building Environmental Education in the Schools**

Legislators/politicians did not feel that requiring environmental education in teacher certification programs and in district curriculum planning was enough to establish or nurture the long-term development of environmental education in Wisconsin. In 1990, the state government passed what might be called the Environmental Education Support Act. With this law, two statewide resources were established to help build environmental education programs in the schools. A Wisconsin Center for Environmental Education was established along with a statewide coordinating body called the Wisconsin Environmental Education Board. The structure and functions of each of these institutions is explained below.

##### **Wisconsin Center for Environmental Education**

The Wisconsin Center for Environmental Education ([www.uwsp.edu/keep](http://www.uwsp.edu/keep)) was established to directly assist teachers in the development of environmental education, and it was placed within the state University System.

The goals of the Wisconsin Center for Environmental Education are as follows:

- To develop, offer and evaluate graduate and undergraduate credit courses in environmental education.
- To collaborate and develop partnerships with agencies, organizations and institutions on the development, implementation, evaluation and recognition of environmental education programs to benefit the state of Wisconsin.
- To develop and conduct environmental education needs assessments and program evaluations.
- To develop and conduct environmental literacy assessments of Wisconsin's students and teachers.
- To maintain an environmental education resources center or library for use by educators.

To meet these goals, the WCEE has a staff of eleven full-time faculty/staff and 15 part-time faculty/staff. A brief overview of programs that help meet the goals of the WCEE is provided below.

- An EE Masters Degree in Environmental Education Leadership for Teachers. This involves two years of advanced study beyond the four years required for teacher certification.
- An EE Resources Library was established for teachers. It contains hundreds of EE curriculum and activity guides, children's books, reference books, videos and other information that assist teachers in developing their classroom activities. It is one of the largest EE curriculum collections in the nation.
- Enrichment EE courses are offered around the state for certified teachers. Over 80 courses are offered and about 1,200 teachers participate each year. Teachers in Wisconsin are particularly interested in taking university courses because they must have an additional 125 hours of university instruction every five years to maintain their certification.
- On an annual basis, the WCEE facilitates a high school conference on the environment. Up to 300 high school students (16-18 year olds) meet at a central location to discuss and present papers on environmental topics.
- Special Topic Programs are another area addressed by the WCEE. Programs in energy, wildlife, waters resources, and forestry are available or are being developed. Generally, these curricula follow a similar structure. They contain activities that can be taught by elementary and secondary teachers. Activities relate to four areas: human need for the natural resource, developing the resource, effects of developing the resource, and managing the development of the natural resource in a sustainable way. The energy program, the Wisconsin K-12 Energy Education Program (KEEP) started in 1995 and is described further below. A K-12 forestry education program (LEAF - Learning Experiences and Activities in Forestry) started in 2001 and is modeled after KEEP.

#### Wisconsin K-12 Energy Education Program

The Wisconsin K-12 Energy Education Program (KEEP) is a comprehensive teacher education program that aims to increase and improve energy literacy in Wisconsin. It accomplishes these objectives by helping teachers integrate hands-on, standards-based, energy education into classrooms. The cohesive KEEP package-Conceptual Guide, Activity Guide, and inservice course-takes teachers from "What is energy?" to "How can we manage today's energy use for tomorrow?" Nearly 1,800 K-12 teachers have participated in the KEEP inservice. In addition, KEEP provides networking, student involvement, and funding opportunities.

KEEP is funded through Focus on Energy and administered through the Wisconsin Center for Environmental Education.

KEEP offers professional development opportunities, such as our introductory energy education course and an online course that covers fundamental energy concepts. KEEP is developing follow up courses that focus on specific topics such as renewable energy and school energy efficiency. KEEP provides teachers with resources, including the KEEP Activity Guide and energy education trunks will be available to teachers soon. Through the website ([www.uwsp.edu/keep](http://www.uwsp.edu/keep)) and newsletter, teachers receive updates on energy happenings and events. KEEP is partnering with the Wisconsin Environmental Education Board to offer nearly \$200,000 in energy education grants. Finally, KEEP involves students in energy education through a CFL fundraiser and works with the Midwest Renewable Energy Association ([www.the-mrea.org](http://www.the-mrea.org)) to coordinate statewide events for students.

#### **V. Other Environmental Education Efforts in Wisconsin**

Several Organizations have contributed to the development of environmental education in Wisconsin. These are the Wisconsin Association for Environmental Education and the Wisconsin Department of Natural Resources.

The Wisconsin Environmental Education Board was established in the 1990 legislation as the second major support mechanism for coordinating the development of EE in Wisconsin. Members of the Board represent various sectors of Wisconsin's society. The Board has two primary activities it pursues to address its goals. It facilitates a \$450,000 annual grants program, and it has developed a statewide strategic plan for advancing environmental education in all community sectors across the state. The second major pursuit of the WEEB is the development of a Statewide Strategic EE Plan. This strategic plan consists of a series of recommendations for improving EE in all sectors of Wisconsin's society. The WEEB disseminates these recommendations and then uses its grant program as an incentive to encourage pursuit of the recommendations by various education programs in the state.

The Wisconsin Association for Environmental Education (WAEE) is described as a nonprofit professional organization set up and run by the volunteer efforts of its membership. Membership dues or payments serve as the primary funding base. The organization develops its own board of directors from its membership. Members include professional environmental educators, agency personnel, schoolteachers and nature center educators. The goal of the Wisconsin Association for Environmental Education is to provide networking/sharing opportunities for environmental education professionals. The WCEE sponsors annual statewide conferences for environmental educators where papers are presented on ways to develop and improve EE in the state. Often WAEE leaders sit on other influential boards such as the Wisconsin Environmental Education Board. Also, members of this organization are sometimes effective at influencing government and public policy. This organization was, in large part, responsible for promoting the legislation that created the Wisconsin Environmental Education Board and the Wisconsin Center for Environmental Education.

The Wisconsin Department of Natural Resources is the state governmental organization responsible for managing natural resources and enforcing environmental laws in Wisconsin. They have a Division of Information and Education, which places educators at natural areas and parks around the state. They are a primary source for information or publications about the status or quality of Wisconsin's natural environment. The Wisconsin Department of Natural Resources often cooperates on various EE efforts with the Wisconsin Center for Environmental Education, Wisconsin Environmental Education Board, and the Wisconsin Association for Environmental Education.

The Global Environmental Management (GEM) Education Center at UW - Stevens Point is a unifying concept, program, and facility at the College of Natural Resources (CNR). GEM provides intercontinental learning bridges to build a sustainable future. It will serve as an international model for training leaders who think globally and act locally to make a world of difference in communities in America and abroad in the 21st century. The Education Center intersects CNR's teaching, outreach, and research components. GEM programs focus on many critical environmental issues including watershed management, smart growth land use planning, sustainable forestry, and sustainable energy systems. For more information visit the GEM website at <http://gem.uwsp.edu>.

## **VI. Evaluation of Environmental Education and Summary**

The Wisconsin Department of Education cooperates with the Wisconsin Environmental Education Board to periodically evaluate the level of environmental literacy of the state's students. This is done by testing student's knowledge about the environment and their attitude towards it. The Environmental Education Academic Standards are used as a guide for the development of test questions. In general, student environmental test scores have improved and the feeling across the state is that all the efforts to improve EE are resulting in a more environmentally concerned public. The hope is that the public will continue to build this concern for the environment into their day-to-day lifestyles.

### **Summary**

Environmental education in Wisconsin has developed in response to the awareness that the natural environment was and is being degraded and polluted by human activities. Yet, humans are dependent upon the natural environment for a strong economy and for their quality of life. Wisconsin requires environmental education in teacher training programs and in school curriculum or educational plans. These requirements have been in place for close to fifteen years in Wisconsin. To support the required EE in the schools, the state has provided resources in the form of a Wisconsin Center for Environmental Education, a Wisconsin Environmental Education Board, and its environmental grants program.

As a result of these laws and resources, environmental education is becoming a basic part of Wisconsin's educational system. The students' environmental literacy is increasing and we hope this will result in improved environmental conditions for the short and long term. The goal of a sustainable society is becoming more and more a part of public policy.



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