

3.2 Wetlands and Environmental Education

The restoration of the Hennepin floodplain will allow area residents to be involved in the observation of the changes and growth that occurs as the wetland restoration proceeds. Extended focus on a single, tangible floodplain ecosystem would likely inspire a sense of environmental stewardship and allow the children of Hennepin to learn science and social studies in an experiential context. This, in turn, is likely to have the desirable effect of developing a positive sense of place and pride in the hometown.

3.2.1 Defining Environmental Education

“Environmental Education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution.”¹ There are several well agreed upon components of environmental education. These common goals include:

- awareness and sensitivity to the environment and environmental challenges;
- knowledge and understanding of ecology and environmental issues;
- an attitude of concern for the environment and motivation to work toward improving environmental quality;
- skills in environmental problem solving, including specific subject areas; and
- participation and behavior that is consistent with environmentally friendly attitudes.²

These five components or goals of environmental education can serve as a basis for theoretical developments and practice within the field.

Importance of Environmental Education

Although knowledge is an important part of learning, it takes more than the impartment of knowledge about the natural world for environmental education to be effective. Other issues must also be addressed since the ultimate goal of the discipline is behavioral change.

Hungerford and Volk articulated additional aspects that environmental education must encompass to be successful:

- *Environmental Sensitivity* is the development of empathy toward and a feeling of deep care and respect for the environment, including all the living and non-living things that make up a given ecosystem.
- *Locus of Control/ Self-efficacy* is the feeling that one can make an actual positive difference in the state of the environment. This is the opposite of environmental hopelessness or feelings of helplessness.
- *Personal Investment and Sense of Responsibility* comes from feeling and understanding that each individual is related to, both physically and psychologically, the natural world. A sense of place and belonging in an environmental community and positive role modeling can lead to the development of such feelings.
- *Knowledge* may develop based on individual exploration and discovery and traditional teaching. Knowledge about the environment must be in depth and include aspects of the biophysical, social, and interrelational aspects of the natural and human realms.
- *Skills in Action Strategies* develop when individuals are allowed to practice the behaviors, including scientific skills, needed to take action for the environment. Such skill may include political strategy, scientific knowledge, and tangible experience.
- *Intention to Act* is the culmination of all these factors. It is what makes an individual finally decide to take positive action. While all the above mentioned factors are likely to be required for one to act, a person much all feel motivated by peers, role models, or other influences to do something with their skills and desires.³

In addition to these important variables, most adults who care about, work for, and enjoy the environment cite the same two influences as most important in the development of their personal environmental ethic: positive outdoor experience and positive role models encountered while they where growing up. Environmental education based in the Hennepin floodplain, can provide these two factors and, ideally, make a significant impact on the future of this region's natural environment.

Focusing on the positive, rather than dwelling on devastating environmental problems, is especially important for children below the fourth grade level. By focusing on the positive in the natural world, children develop environmental sensitivity, an essential building block on which their future attitude about the environment rests. Children learn to care about the world around them if they are allowed close and positive contact with the natural world. “If we want children to flourish, to become truly empowered, let us allow them to love the earth before we ask them to save it.”⁴

Ethnobiology: a Tool for Education

Ethnobiology is a field of study, relevant to environmental education, focused on the direct interrelationships between human populations and the plants and animals in their environment including their use and cultural beliefs about them.⁵ The study of indigenous, ethnobiological ways of thinking about the environment can open new and valuable perspectives. Because of the rich cultural history of the Illinois River Basin, ethnobiology based on Native American and Euroamerican patterns of natural resource use can serve as a vehicle for understanding both the history and the ecosystems of the HLD. It is a bridge that links biology and culture as well as past and present.

Humans evolved, both physically and cognitively, in conjunction with the world around them.⁶ Only since the advent of agriculturally based civilization 10,000 years ago did humans become increasingly influenced by culture and decreasingly influenced by their affinity with the natural world. According to Medina and Atran, “Much of human history has been spent (and is being spent) in intimate contact with plants and animals, and it is difficult to imagine that human cognition would not be molded by that fact”.⁷ Even as nature shapes human life and culture, people shape the natural world.

For an area such as the HLD floodplain, ethnobiological information can be obtained from a combination of sources. Archaeology, comparison with similar places and case studies, and history (including ethnohistory) can all help us to understand the uses, interactions, and sentiments toward plants, animals and other organisms of the area. The information uncovered can best be interpreted when the cultural context (including folklore, religion, and philosophy), as well as the physical and ecological one, is considered.

Scattered data on the utilization of plants and animals by native peoples in the Americas has certainly been accumulating since the earliest voyages of Columbus, if for practical rather than scientific purposes. In fact, Ford believes that “the traditional uses of plants and animals by American Indians are better documented than for the original peoples of any other continental area of the world.”⁸ Although much of this information has been recorded in an informal, rather than a scientific manner, it is still valuable to modern scholars. The major focus of early explorations of ethnobiology was economic or use oriented. Ethnobotany (the study of uses and beliefs about plants) has been given more attention in publication and academia because of research by popular scholars. Ethnozoology (study regarding uses and beliefs about animals) is no less important in a holistic understanding of humanity’s relationship to the environment. Linguistic and ecological approaches now dominate the field of ethnobiology.

3.2.2 Building a Successful Curriculum

Existing Curriculum Guides

Several existing and relevant curricula were reviewed based on the guidelines set forth by the North America Association for Environmental Education. The North American Association for Environmental Education cites the following guidelines for choosing materials:

- *Fairness and Accuracy* in the information chosen and its manner of presentation; sources should be documented and facts should be credible. Environmental education materials should not present an obvious bias.
- *Depth of Coverage* of issues, including multiple facets and layers involved in a single concept or issue. Students should be left with a real understanding of the environmental issue covered.
- *Emphasis on Skill Building* is important in ensuring that learners are able to actually do something with the knowledge they gain, rather than hearing of problems and feeling powerless to do anything to help. Materials should demonstrate and allow for the practice of real world skills, including critical thinking skills.

- *Action Orientation* means that at least some portion of the learning that occurs is hands-on. Learners may use their senses and their own skills in uncovering environmental knowledge.
- *Instructional Soundness* is necessary to make sure the developmental needs of learners are being met in an age-appropriate way and that a variety of learning styles are addressed. Learners vary greatly; so should environmental education activities and programs.
- *Usability* means that the instructors are able to find (through good indexing) and make use of the materials in a given curriculum. Activities should not be intimidating, hard to present, or require unattainable supplies.⁹

In addition to the NAAEE criteria, content and locally specific needs should be considered when reviewing materials for potential use. What follows are observations from well-known and accessible environmental education curriculum guides that proved highly relevant to floodplain and wetland education.

WOW: Wonders of Wetlands and Aquatic Project WILD

The Wonders of Wetlands curriculum guide is well indexed and contains a comprehensive and usable background information section for teachers. Because of the ease of finding information and planning for lessons, this material is likely to be very usable for classroom educators. All activities identify very clearly what age levels a certain activity is intended for and the learning objective that it aims to cover.

WOW also puts forth a strong message. “Wetlands are powerful places in which to learn. They are environments of intense, dynamic activity, humming with life.” This educational material recognizes that wetlands are a crucial part of any and all watersheds and is dedicated to ensuring that young people are allowed to realize this fact. Wetlands have many socioeconomic functions and benefits, both direct and indirect. This includes the potential for a unique learning atmosphere.

The human relationship with wetlands is addressed in several activities, as are suggestions for ways to get involved locally. Information for teachers planning a field trip to a wetland is quite useful and could be adapted for use in the HLD.

The curriculum guide suggests that, when possible, “plan several wetland visits. The first will provide an introductory experience, while subsequent trips will expand and reinforce concepts.”¹⁰ Trips may be interspersed with classroom activities throughout the learning cycle. The use of an extended case study model is also possible, using activities drawn from various sources combined with fairly long term local involvement. Both these opportunities would be made possible for the children of Putnam County by the restoration of the Hennepin Floodplain.

Developed in 1992 as a supplement to *Project WILD*, *Aquatic Project WILD* follows a similar well-indexed and usable format to the original. Some of the activities in this material focus on fine arts, a subject not often touched on in environmental education curricula. The materials aim to develop environmental awareness and sensitivity in young children through direct and positive exposure.

3.2.3 Creating *Learning in Wetlands*

An educational program designed in conjunction with this project should be specific to the wetlands and floodplain situation of the HLD. However, teachers must be free to use educational materials in their own way. A curriculum guide, for the purposes described above, should emphasize the importance of spending time in the field, provide ways in which to prepare students for a wetland visit, and reinforce what they have learned in the field upon returning to the classroom. *Learning in Wetlands* is a curriculum guide that had been developed to fill this existing gap. A copy of the guide can be found in Appendix 5.

Methods and Process of Development

In developing a curricular unit for the Hennepin Floodplain, the learning cycle was drawn upon both within a particular activity and as a method for educators to tie together the many activities that comprise a learning unit. The first step in any type of learning is to *engage* learners, that is, to get the students interested in learning about the given topic. Learning does not occur without some degree of interest. This can be done through a game or other

activity that students naturally find stimulating, or by drawing on something relevant to the learners' lives, and thus, likely to get their attention.

Once learners are interested in learning about the floodplain and human interactions with it, the process of *exploration* may begin. Students should be allowed to discover on their own, through experimentation and hands-on experience. A site visit, in itself, would most likely fall into this stage of the learning cycle. Learners may also relate what they are learning to their own personal experiences.

After time has been allowed for exploration, the phase of *explanation* may begin. In this stage, student may read about the issue they are studying, attend to audiovisual aids, or discuss the subject with the teacher and amongst themselves. *Extension* normally occurs at the end of an educational unit. Students should be given ways that they can keep on learning about a set of concepts or ideas after the formal period of learning is over. At all phases of the learning cycle, feedback or *evaluation* is important in gauging how students are learning and attending to their educational needs.

Even if classroom activities are well designed and implemented, contact with an actual natural area remains more important than any classroom learning. Through hands-on, personal experience, children (and adults) learn to empathize with and care deeply about the natural world. This reality was taken into account in the development of *Learning in Wetlands*, and has led to an emphasis on time spent in the field.

Another important factor taken into account in developing this curriculum guide is the need for age appropriate materials and instruction. For the youngest children, educational experiences should focus on the concrete and allow for much sensory stimulation. For age levels under grade 3, field trips and hands-on experiences are likely to have the most positive impact.¹¹ As children progress developmentally, less use of sensory materials and more abstract types of learning can take place. Models, audio-visual learning and continued direct experience are appropriate for the upper elementary grades. As children develop into young adults, information can be presented in an even more abstract manner, for example, in the lecture format so common in today's high schools and universities. It is important to be aware that concrete, tangible, and hands-on experiences are often the most successful for any age group. This is what people tend to remember when they think back on their own education.

According to Sobel, environmental learning takes place in three sometimes overlapping stages.¹² From ages three to seven children are developing *empathy* for the world around them and the creatures and plants that share it. The phase of environmental *exploration* occurs from ages seven to eleven. In this stage, children should be allowed to discover the wonders of nature in both guided and individual manners. In this phase, a child can be said to develop an environmental ethic, or an attitude about the treatment and interaction with nature that will accompany them throughout their lives. After age eleven, children enter the stage of *Social Action*. They are now ready to discuss environmental problem and how to solve them, starting with the local and small and progressing to the larger picture as the child matures. The skills developed in the Empathy and Discovery stages are vital in acting on environmental concern.

Much of *Learning in Wetlands* was adapted from existing materials. This process involves the careful review of materials according to NAAEE criteria and then ensuring the applicability to the specific floodplain case in question.

The interdisciplinary nature of Environmental Education was also considered in the development of *Learning in Wetlands*. Within environmental education, many subjects (outdoor education, ecology, and social studies) come together in a fairly explicit manner. In fact, environmental education is, at its very core, interdisciplinary and focused on education at the level of the individual learner.¹³ Many, ideally all, subjects are able to work together in environmental education. For example, music and the arts can often be enhanced by a relationship to the natural world. Students may learn drawing skills, and at the same time, learn about plant identification from a field-based drawing session. While each individual subject area may be enhanced by environmental education, all the subjects can work together to support and enhance environmental education. All subjects should be involved in environmental education, not just science. Practicing this type of education can serve as an integrating theme in an educational setting.

The need to meet academic standards and to perform well on standardized tests is a reality in most school districts today. Environmental education can be used as a tool to meet these standards now so important to general education.¹⁴ In fact, in today's educational climate, it is unlikely that environmental education would be widely adopted if it did not do just that.

Education in the HLD

Through *Learning in Wetlands*, a series of activities and concepts has been provided to teachers and other educators interested in teaching children about floodplain and wetland ecosystems and human relationships to them. These materials will be most successfully used as a supplement to a field trip or trips to the project area. Ideally, several activities would take place before a site visit and several would be used after. Each individual educator will have the ability to determine how best to use the wetland as an educational resource for his or her classes. Copies of the curriculum guide have been distributed to educators at all grade levels in the Hennepin area Public Schools. Contact information has also been provided to ensure that teachers can ask for help in implementing the lessons. Questions remain, however, as to whether the wetland will actually be used by area educators.

To ensure that the floodplain's educational potential is not wasted, time and personnel must be invested to encourage Hennepin teachers to use the restoration area for education. An informal survey conducted of elementary school teachers in the Hennepin Public School system in the spring of 2000 illustrated this need. While several teachers were quite enthusiastic about the site, the majority was uninformed of the potential for using the site for educational purposes. Teachers must be informed of the benefits of education in the floodplain if they are to use the site on a regular basis.

One way to encourage educational use of the site is to hold in-service training for teachers in Putnam County. A one-day training course could include presentation of several activities that may be used in the classroom or on a field trip, a visit to the site, and a basic overview of the principles and importance of environmental education. Community enthusiasm based on informational meetings and public activities (such as a "River Day" celebration) could also encourage teachers to plan lessons revolving around the local wetland. If students and parents are interested in the site, teachers will likely be interested as well.

Promotion of Environmental Education in the HLD is recommended once the restoration process has begun, most likely in the fall of 2001. Once the restoration plans have been implemented, Hennepin residents will have an accessible passive recreation area to enjoy and to learn in. Environmental education, including environmental education based in the Hennepin floodplain, can provide positive outdoor experiences and, ideally, make a

significant impact on the future of Illinois's natural environment. For the people of Hennepin and Putnam County and others who may visit the site, the accessible nature of the Hennepin floodplain makes the restoration area ideal for learning about the natural world.

¹ Stapp, W. B. 1969.

² UNESCO. 1979.

³ Hungerford, H. R. and T. L. Volk. 1990.

⁴ Sobel, D. 1995.

⁵ Ford, R. I. 1985.

⁶ Kaplan, S. and R. Kaplan. 1982.

⁷ Medin, D. L. and S. Atran. 1999, p1.

⁸ Ford, R. I. 1985.

⁹ NAAEE, 1996.

¹⁰ Wonders of Wetlands. 1995.

¹¹ Sobel, D. 1995.

¹² Ibid.

¹³ Hungerford, H. R. and T. L. Volk. 1990.

¹⁴ Simmons, B. 1999.

