DEVELOPMENT OF A NATIVE PRAIRIE AND IMPLEMENTATION OF CURRICULUM RESOURCES TO ENHANCE ENVIRONMENTAL EDUCATION AT MARSHALL MIDDLE SCHOOL

By

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ABSTRACT

This project sought to encourage environmental education at Marshall Middle School in Janesville, WI through the development of native grassland on the school site and curriculum resources for staff and students to use. Creation of the site not only established a small piece of habitat, it also provided an outdoor classroom for MMS to utilize and impact student achievement. Research has proven that development of these types of projects make learning concrete and valuable for students involved.

Staff and students began the project during the 2002-2003 school year. The researcher provided direction for the project through staff development and creation of an interdisciplinary unit for his students that led to the planting of the ¾ acre site. A curriculum guide, which was tied to state standards in all core areas and environmental education, was created by the researcher to provide staff with opportunities to utilize the site with their students.
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Chapter One

Introduction

Project Problem Statement

The purpose of this project is to encourage environmental education at Marshall Middle School in Janesville, WI through the restoration of a native prairie and the development of curriculum resources, tied to state standards, which will support utilization of the site as an intricate part of the curriculum.

Subproblems

- Address the Marshall community, to include administration and site council, seeking support, approval, and funding for the prairie restoration and present the project to the Superintendent’s Advisory Committee.
- Given professional development time, provide the staff at Marshall Middle school with information on the Wisconsin mandate on environmental education, environmental education academic standards, infusion of EE into their curriculum, and the benefits of a prairie restoration.
- Establish a prairie restoration committee consisting of school staff, members of the PTA, and other resource professionals that will oversee implementation of the restoration project. Implementation
would include research, design, financing, planting and installation, and development of a maintenance plan.

• Create the Marshall Middle School Prairie Site through the efforts of students, staff, and community members.

• Follow up the preliminary planting with an in-service for staff members identifying specific curricular activities that would be appropriate for each grade level to use on the prairie site.

Significance of the Problem

As environmental issues and concerns continue to mount, so does the need to establish an educated, informed citizenry. The most likely avenue to meet this need is through the education of tomorrow’s citizens in our schools. Currently, environmental education instruction is mandated in the State of Wisconsin. This, however, does not guarantee that environmental education is reaching students in the classroom. The integration of environmental education in the classroom curriculum has become a difficult hurdle to clear. This holds true for the staff at Marshall Middle School.

Today, many schools, Marshall included, are addressing the need for environmental education through isolated field trips to a variety of outdoor sites. While these schools are to be commended for their efforts, the effects of a brief encounter in the wild have not been shown to produce significant effects. In a study administered to 71 third and fourth grade students,
Sibthorp and Knapp (1998) found that memories of an outdoor field trip were nonspecific and disassociated for specific information given by the interpreter. One solution to this problem and the problem that exists with integration of environmental education into school curriculums is restoration of native natural areas on school grounds and educational resources that would encourage teachers to utilize such sites.

Development and use of outdoor sites makes learning concrete and valuable for students. Recent studies have shown the important roles that outdoor sites play in students’ environmental development. Harvey (1989-90) found that the impact of landscape on children made significant contributions to the children’s development of botanical knowledge and environmental dispositions.

Teacher’s attitudes toward teaching and learning are also affected by the significance of natural areas. Simmons (1993) has shown that teachers perceive distinct differences in natural settings and that these settings communicate clear educational opportunities and resource needs. However, many teachers still feel uncomfortable teaching unfamiliar material in an unfamiliar setting. This problem can be addressed by providing teachers with a variety of resources and training to create a familiarity with the topic of environmental education, thus promoting its infusion into the curriculum.

Through the establishment of a native prairie site, the development of curriculum resources, and teacher training, it is the hope of the researcher
that the utilization of said resources would occur; thus, influencing environmental education within Marshall Middle School.

Limitations

- The development of a native prairie may not replace the need to travel off of school grounds for environmental educational instruction or activities.
- Curriculum resources will not replace any curriculum utilized by grades six, seven, and eight at Marshall Middle School.
- The associated resources and training cannot include all possible activities that could be used on the site.
- All Wisconsin State Academic Standards for Environmental Education cannot be met through this project.
- This project will not evaluate the effectiveness of teacher instruction for those who choose to implement environmental education activities.

Definitions

**Environmental Education (EE)** – Environmental education is that component of education whose goal is to help students develop environmental awareness, knowledge, ethic, actions skills, and action experience.

**Curriculum Resources** – Curriculum resources include material available that could be use to enhance and supplement existing curriculum.
Infusion – Infusion is the process of including teaching of environmental education in all subject areas.

Multidisciplinary – Multidisciplinary deals with the involvement of numerous curricular areas.

Native Prairie – Prairies are complex ecosystems that are open and usually dominated by grasses with less than one tree per acre. Native prairies include the grasses and forbs that existed prior to the region being settled.

Restoration – The act of returning the landscape as close to an original state as possible.

Site Utilization – Site utilization is the use of the school site (prairie) for educational purposes.

Assumptions

It will be assumed that:

- This project will be well received and supported by administration, staff, and community of Marshall Middle School.
- Implementation of the school site can be completed in a manner that adheres to a schedule.
- Teacher in-services will be productive time spent addressing environmental educational needs and goals.
- Development of the site will include opportunities for student learning to take place.
• Funding for the prairie restoration will be sought and provided for by numerous sources.

• Once established, the staff at Marshall Middle School will utilize the prairie site and resource guide to integrate EE into the curriculum.
Chapter Two
Review of Related Literature

Introduction

The area of Janesville, Wisconsin was settled in the early 1800s. The Rock River and surrounding fertile soils of the prairie and oak savannas drew people to the region. Agriculture and industry soon developed. In doing so, much of the native prairie was destroyed to accommodate crop fields and building sites.

The people who chose to live in the region saw nothing but promise and opportunity from the natural environment. Children of the early settlers were influenced greatly by the land. The prairie created their life and education. Somewhere in time, though, society has lost sight of the value of the natural world and the positive experiences that it can produce. "In the space of a century, the American experience of nature has gone from direct utilitarianism to romantic attachment to electronic detachment." (Louv, 2005).

Prairie Restoration

"Prairie" is the French word for meadow. This is as close as early Europeans could come to describing the vast openness of Middle America dominated by grasses and forbs (wildflowers). Extending from the Eastern forests of the Ohio Valley to the shadow of the Rocky Mountains in the west,
Texas to the south and Canada to the North prairie once spread some 400 million acres. Beneath it lay rich and fertile soil. This soil would become the undoing of one of the world's most diverse ecosystems. Western civilization took control of the prairie and turned it to the most productive cropland in the world. What remains of this once vast landscape is less than one-percent of the original, existing only in fragmented pockets.

Fortunately, interest in preservation and restoration of prairies is growing. The reasons for this are as diverse as the life found within it. Prairies may harbor species whose benefits are unknown, provide habitat for various species, or reduce erosion; they can serve as active area of scientific study or ecological teaching tools, link the present to the past, can store twice as much carbon per acre as forests (Chadwick, 1995), and can be aesthetically pleasing. Whatever is the reason, prairie reconstruction and restoration is a process that includes many steps.

The first step in prairie restoration involves selecting a site and analyzing it. During this step the plant community that currently exists and whether or not the site will support a prairie is determined. Of most important consideration is the availability of sunlight. Prairies require at least 12 hours of sunlight, although some species can tolerate partial shade. Other considerations include: site access, past and current land use, and soil type.

Once the site has been determined, appropriate species can be selected. Prairies are rich in biodiversity, often containing 40 to 50 species in
one acre (Mirk, 1997). While most species will tolerate various habitat types it is important to make sure that those selected are not restricted by the ecology of the site. Another important consideration in species selection is making sure to choose plants native to the area, thus improving biotic diversity. Prairie plants can be acquired from a variety of sources as seed or seedlings; native plant nurseries and conservation agencies are the most common sources.

Site preparation involves the removal of existing vegetation and preparation of the soil. This is a critical step in the restoration process as slow growing prairie plants are susceptible to over-competition by non-native weedy species. Removal can be accomplished in a variety of ways. Cultivation involves tilling of the land to expose root structure. Herbicides will kill existing vegetation by chemical means and smothering deprives the plants of light essential to the food making process (photosynthesis).

Upon completion of the site preparation planting may take place. In the upper Midwest planting is best in the spring. This has several advantages over fall planting including: improved germination, less seedling loss, and less exposure of seed to wildlife. Planting can be accomplished by using seed or transplants. When using seed it can be distributed by hand broadcasting or mechanically by using a no-till seed drill. Hand broadcasting is more labor intensive but often produces a more natural distribution of the plants, while the use of planters requires less time and labor.
Prairie plants will spend most of their energy in the first year establishing an extensive root system. This means that existing weed species have the potential to out-compete native species in the first year. To control this mowing the site will be necessary. Weeds can be mowed a number of times in the first growing season usually when they reach a height of about one foot. They should be mowed no lower than six inches and any thick mulch remaining should be removed. Slowly the need to mow will decrease and by the third season all that should be needed to maintain the site is burning.

**Benefits of School Sites**

Unlike the children who settled on the prairie, today's schoolchildren are often deprived of experiences in nature. It is not uncommon for students to be shuttled from the four-walls of home to the four-walls of the classroom and back. Today's children have fallen victim to the forces of a fast-paced, technological society. They spend a considerable amount of time tied to the advances that technology has given them. Television, computers, and video games have taken away a child's connection to the natural world. As author, Richard Louv states in his book *Last Child in the Woods*, "Today, kids are aware of the global threats to the environment – but their physical contact, their intimacy with nature is fading." He continues, "For a new generation, nature is more abstraction than reality." (Louv, 2005)
Slowly a movement to change this has taken place. Many schools around the world are looking at what they can do to reconnect children to nature and develop within them a sense of responsibility for the environment. The school grounds are logically an ideal place to accomplish this, as they are most likely the first environment which a child spend a significant amount of time (Stine, 1997). In fact, in *How Schoolyards Influence Behavior* (1996), Edward Chesky asserts that by the end of sixth grade, students have spent 1,800 hours, or 257 days, just in the schoolyard (not including time spent in structured activity). With this amount of time being spent on school ground they should offer students more than a vast expanse of mowed grass and concrete.

Establishment of outdoor study sites provides learners and opportunity to interact in a non-traditional environment through direct experiences and concrete activities. When using the environment as an integrating context for learning it has been shown that time on task and problem-solving skills improve. Grade point averages and standardized test scores increase. This approach has also been shown to adapt, more readily, to a variety of learning styles (Lieberman and Hoody, 1998). Based on the level of a student’s involvement, benefits will vary with age. As stated by Anne Bell (2001), “For children in middle school, educational benefits are linked to establishing ethical principles, getting along with others, understanding delayed
gratification, and building the language and social skills to negotiate a place in the world."

Learning outside of the classroom not only benefits a student’s academic development it has also shown to have an effect on other aspects of child development. Increasing vegetation on school grounds promotes a sense of community and ownership. Students feel empowered when they know that their actions are having an effect on the community. This promotes positive emotional health. Natural features also alleviate stress, reduce aggression, and promote health, which is beneficial to student’s physical development (Cheskey, 1996).

Benefits of school grounds development are not limited only to the students. By establishing a natural area ecosystems can be affected and restored. Entire communities can also benefit when they view the school property as part of a larger picture. Business and schools can foster partnerships while creating the site. In most cases, the school grounds will be more aesthetically pleasing, adding to the value of the community. Economic benefits can also be found; often the development of natural areas means less lawn maintenance, which saves fuel, man-hours, and reduces pollution.

Clearly the benefits of outdoor classrooms and school natural areas are great. Creation of the site and the ability to reap such benefits will take a dedicated effort from many.
Developing an Outdoor Site

When undertaking a task such as creating an outdoor site “establishing a team is essential: having a core group of committed leaders will ensure the long-term sustainability and growth of the project” (National Wildlife Federation, 2001). The members assembled for this team must be leaders committed to the many tasks that are associated with developing and implementing an outdoor site. Students should be the driving force behind the project and they should be involved in all aspects of it from its inception to the completion. Other members on the committee should be administrators, teachers, maintenance staff, parents, businesses or community organizations, and resource professionals. “The diverse skills and support brought by each member of the project team are invaluable in the overall conception, construction, and maintenance of the project” (Stowell, 2001).

Once a committee of team has been established they should be able to outline their goals and vision. This will assist them in creating objectives that are attainable, thus keeping the project on task and motivation high. Other key tasks that a steering committee should address are: the site selection and inventory, acquisition of funds, how they will reach the community, and how the development and use of the site will be integrated into the curriculum. These tasks will best be addressed through the establishment of sub-committees. It is most likely that the sub-committees will have to meet more
frequently than the steering committee. This will ensure the project is kept manageable and can proceed in a timely manner.

**Creating Curriculum Resources**

Many resources, that are applicable for prairie restoration, are available for teachers to use. Most will incorporate activities across all curricular areas and grade levels. Of those available two of the most significant are the University of Wisconsin – Arboretum *Earth Partnership Program* and *Project Bluestem* from the Neal Smith National Wildlife Refuge in Prairie City, Iowa. Both programs were designed specifically with prairie ecosystems in mind. Activities from *Project Bluestem* are geared toward established prairies while the *Earth Partnership* curriculum guides teachers and students through the ecological restoration process and beyond. Other well-known and readily available sources of curriculum material, which can be used or adapted for use, include *Project WILD, Project WET, Project Learning Tree*, and *National Wildlife Federation’s Schoolyard Habitats Site Planning Guide*.

Although many sources of educational materials exist, it is of utmost importance to ensure that those resources used correlate to district and state curriculums and standards. Not only will this allow educators to save time planning, it will also validate those activities used in today’s world of high stakes testing and the No Child Left Behind Act. Many of the resources
available today understand this and have already accomplished this task with relationship to national standards. It may be necessary, however, to correlate activities to standards specific programs.

By integrating environmental education into the curriculum with specific materials that address concepts and standards, being taught it is presented in a way that makes sense pedagogically (Samuel, 1993). In order to accomplish this task teacher training (i.e. staff development, in-service) must occur.

**Staff Development**

Lane and Wilke (1994) surveyed teachers in Wisconsin concerning the infusion of environmental education. What they found was that the most common reason environmental education is not infused is the teacher perception that EE is unrelated to their subject area. When asked what would influence them, in-service training and access to resources were common responses. Further studies show that another shortcoming of EE staff development is that teachers are given pre-packaged activities and asked to implement them rather than be treated as professionals and reflect critically on their own performance (Wade, 1996).

Successful staff development motivates teachers. Ham and Sewing (1987) identified characteristics necessary to EE workshops to eliminate barriers, among them were: program design for all content areas,
instructional materials appropriate for all, and instruction on using the
classroom and schoolyard as sites for environmental education. When these
characteristics are part of the staff development program the likelihood of
successful implementation increases.
Chapter Three
Methodology and Treatment of the Subproblems

The principal of Marshall Middle School, Dr. Michael Kuehne, and the researcher discussed the initial concept of developing a prairie during the spring 2001-2002 school year. Dr. Kuehne was very supportive of the idea and agreed that the initial steps should be taken toward its development. These initial steps involved gathering information regarding the development of school sites and a very basic site analysis.

Specific Treatment of Each Subproblem

Address the Marshall community, to include administration and site council, seeking support, approval, and funding for the prairie restoration and present the project to the Superintendent's Advisory Committee.

The researcher will develop a presentation that outlines the project and its goals. It should include definitions, a timeline, funding possibilities, development, benefits, possible costs, and examples of other school sites. The presentation will be given to Marshall Middle School Site Council (a decision making committee that represents all areas of the school) and Marshall Middle School Parent Teacher Association. After the presentation to the two groups, it will be necessary to inform the Superintendent's Advisory Committee of the project by completing a three-page form that outlines the
project and gives details as to how it will affect the school district. It should be established that a continual, open line of communication, with all three groups would remain through the duration of the project.

Given professional development time, provide the staff at Marshall Middle School with information on the Wisconsin mandate of environmental education, environmental education academic standards, infusion of EE into the curriculum, and the benefits of a prairie restoration.

After seeking administrative approval a staff development program will be developed and presented to the staff of Marshall Middle School in the fall of the 2002-2003 school year. This training will set the tone for the project goals and vision. It will include, but not be limited to, the definition of environmental education (EE) and outdoor school sites, the benefits of developing and using an outdoor school site, and the possibilities that would exist for teachers to infuse EE into their classrooms. The presentation will include a power point of different prairie sites and the biodiversity that can be found within a prairie. This presentation will take place on an afternoon of a Monday early release and should last no longer than 45 minutes.
Establish a prairie restoration committee consisting of school staff, members of the PTA, and other resource professionals that will oversee implementation of the restoration project. Implementation would include research, design, financing, planting, and installation, and development of a maintenance plan.

Establish the Marshall Prairie Restoration Committee, MPRC. Staff that the researcher feel would be very interested in serving will be approached first and asked to serve on the committee. Ideally, it should include:

- The principal and/or the assistant principal
- Interested staff – at least one from each grade level, two encore teachers, and the learning support teacher
- Students
- Maintenance and/or custodial staff
- Parents
- Business, civic organizations, or environmental organizations – Lab Safety (Ben Meadows), Rotary Club, Rock County Conservationists, Prairie Enthusiasts, etc.
- Resource Professionals – landscape architect, Wisconsin Department of Natural Resources, Applied Ecological Associates

Once the committee is formed it will need to define and allocate roles that each person will play within the committee. Examples of potential roles could include: team leader, budget, curriculum coordinator, maintenance, communication and publicity, volunteer coordinator, etc. This committee will then, create a vision statement for the prairie site, and develop both long-term and short-term goals. It may be necessary to establish sub-committees
that will meet more frequently to accomplish the goals set by the restoration committee.

Create the Marshall Middle School Prairie Site through the efforts of students staff, and community members.

Actual development of the site would take place by the students. They would complete a site analysis and inventory. It would include, but not be limited to: water flow, soil types, permanent structures, existing vegetation, traffic patterns, land use, wildlife and sunlight. Students would also create a design which may be used by the restoration committee. A native plant list would be developed under the guidance of the project advisor and prairie seed will be purchased. The entire parent population will be informed of the project at fall conferences through a display designed by students. The restoration committee will secure funding for the site and installation would begin in the spring of 2003.

Site installation will include the removal of existing vegetation, either by tilling and leveling or by sod removal. These methods make securing the proper equipment necessary. Once existing vegetation has been removed and soil prepared, all members of the student and staff population will have an opportunity to disperse seed at a spring planting celebration. Watering should not be necessary, but would be preformed by the staff if deemed appropriate.
During the first year of growth it may be beneficial to monitor weed growth and mow off weeds just as they are flowering. Students will be responsible for monitoring for the remainder of the school year and the researcher will be responsible for monitoring during the summer months. Maintenance staff will be responsible for mowing if necessary.

**Follow up the preliminary planting with professional development for staff members identifying specific curricular activities that would be appropriate for each grade level to use on the prairie site.**

Following the preliminary planting the researcher will prepare a professional development presentation and seek administration approval for the presentation. Upon approval, it will be necessary to determine if the presentation should occur in the spring of 2003 or the fall of 2004. This date is dependent on the timing of planting. The ideal date for the presentation would be on another Monday early-release (as it was for the first) and last no longer than one hour. At this time it would be appropriate to inform staff of the specific curriculum connections and activities that the curriculum committee developed. Another main focus of this staff development will be the explanation of the EE goals that were set for the school and the possibilities for the future (wetland restoration site).
Chapter Four
Results for Subproblems

Once the project problem statement and methodology was developed, the researcher and principal met again, in July of 2002, to discuss implementation of the project during the upcoming school year. It was agreed upon that the project provided Marshall Middle School with a wonderful learning opportunity, a means to develop a sense of community within the large school, and that upon the beginning of the school year the project should begin.

Specific Results of Each Subproblem

Address the Marshall community, to include administration and site council, seeking support, approval, and funding for the prairie restoration and present the project to the Superintendent’s Advisory Committee.

During the July 2002 meeting, it was decided that the researcher would make an initial presentation during an all-staff meeting on the first day of the 2002 school year. This presentation was brief and outlined the project and its potential. Initial interest in the project dictated that a formal presentation be made to the Marshall Middle School site council seeking school-wide support. This presentation was made by the researcher in early October of 2002. It included specific information on the restoration process.
and the benefits of outdoor school sites. Site council approved of the project and encouraged development of a proposal for the Superintendent’s Advisory Committee (SAC).

A SAC Proposal (appendix A) was completed by the principal, Dr. Michael Kuehn, and the researcher. It included rationale for the project, resources needed, district goals met, impact on student achievement, and research supporting the project. The proposal was presented and approved on November 27, 2002. At the presentation of the proposal, the researcher highlighted the success of the UW-Arboretum Earth Partnership Program and many restoration projects. It was agreed upon at the meeting, that due to the cost savings the restoration would provide the school district, any initial costs of developing the site would be covered by the district and the school.

Upon approval of the project Dr. Kuehne attended the next PTA meeting to inform them of the project and seek support of members. A list of interested members was created and forwarded to the researcher as well as an application for a Marshall PTA grant.

Given professional development time, provide the staff at Marshall Middle School with information on the Wisconsin mandate of on environmental education, environmental education academic standards, infusion of EE into the curriculum, and the benefits of a prairie restoration.
Professional development time was provided by the school administration in early 2003 for the researcher and other teachers to provide staff with the information mentioned in the subproblem. The presentation was given three times to small groups of approximately 30 teachers. The manner in which the information was presented included participation in a group activity (*Habitat Lap Sit from Project WILD*), a Power Point of the material, and a guest speaker. Mr. Brian Buenzow, wildlife technician from the Wisconsin Department of Natural Resources was on hand to speak specifically about prairie ecology.

Reaction of the staff varied. Most core area teachers (math, science, language arts, and social studies) were interested and supportive, specifically science teachers and sixth-grade teachers. Exploratory areas from the music and physical education department were less interested. The art department was the exploratory area most interested in the infusion of EE into their curriculum. In following years many of the products that students were completing became evidence of each individual teacher’s commitment.

Establish a prairie restoration committee consisting of school staff, members of the PTA, and other resource professionals that will oversee implementation of the restoration project. Implementation would include research, design, financing, planting, and installation, and development of a maintenance plan.
Establishment of a restoration committee was initiated by the researcher soon after approval of the project by Marshall staff and administration. Those colleagues who had shown the most interest during informal conversations with the researcher were approached first and asked if they would consider serving on the restoration steering committee. There was a positive response from the staff and the committee soon grew large.

Membership on the committee included:

- The assistant principal
- Two - sixth grade teachers
- Six - seventh grade teachers
- One - eighth grade teacher
- One - art teacher
- The Learning Support teacher
- The Technology Integrator
- DNR Wildlife Technician
- One - PTA Member (parent)

Once the committee was formed, it met in September of 2002 to define and allocate roles that each person would play within it. Few specific roles were taken by members of the group. Those that were, however, included a budget chairperson, curriculum chairperson (the researcher), and a communication chairperson. During a second meeting in October 2002 the committee then began to sculpt a vision for the project. It was decided that the main short-term goals of the project would be acquisition of funds and development of curriculum resources.
The researcher and other members began looking at the middle school curriculum, state standards, and activities they felt would be appropriate to incorporate into a prairie resource guide. Appropriate activities were compiled from a variety of EE resource materials and sorted to best meet the curricular needs of each grade level. The researcher then correlated those activities with the Wisconsin Model Academic Standards for environmental education and each core subject area.

The budget chairperson acquired information on grants that would be easy to apply for. It was decided to write two grants, one to Marshall PTA for the amount of $2000.00 and one to Wal-Mart for $500.00 (see appendix B). Both would eventually be received, as well as an additional grant from the PTA for the amount of $1200.00 during the 2003-2004 school year.

In early December 2002, the restoration committee held a meeting that would be the last one for many members of the group. The daily demands of education and additional responsibilities whittled away at participation; by second semester in January there remained six active members. With the addition of a student teacher in the researcher's classroom, seven committee members undertook the task of developing the prairie site with the help of some very dedicated students.
Create the Marshall Middle School Prairie Site through the efforts of students, staff, and community members.

Creation of the school site began with the researcher developing an interdisciplinary unit on prairies for his seventh grade students (approximately 100) to participate in. It was decided that these students would take the lead in the project and through the completion of their studies they would be able to instruct the rest of the student population on the species of plants chosen and the planting of those species, as well as, other aspects of the restoration process. Students began the unit early in the 2002 school year with a school site analysis, soil investigations, and research on native species and ecosystems. Their findings and access to a no-till planter (or seed drill) led the restoration committee to decide that the best course of action would be to herbicide the area and then plant both seed and seedlings (plugs).

While students worked to develop a list of appropriate species and calculate the number of plant plugs needed for the entire student body to plant, Brian Buenzow and the researcher made contact with plant and seed sources. It was decided that native plant plugs would be purchased through Midwest Prairies in Fort Atkinson, WI and seed would come from Osenbaugh Grass Seeds through Pheasants Forever. Mr. Buenzow’s participation in this aspect of the project was critical as it provided the school with a contact to Pheasnts Forever and substantial discounts on both plugs and seed (see appendix C for a complete list of native plants and purchases).
In late April of 2003 a seeding date of May 15th and planting date of May 19th was set. The researcher’s class measured and marked the site which would eventually become the prairie. District administration was contacted and herbicide was applied to kill the grass on the site. Students then created simple signs in their technology education class to inform the public that a prairie restoration was in progress.

On May 2, 2003 members of the restoration committee created a survey distributed to the staff in order to get an accurate count of the number of students that would be involved in planting, during what time of the day they would be participating, and if they were interested in observing the seed planting process (see appendix D). The results of the survey were very encouraging with approximately 900 students participating and 7 teachers interested in observing the seed drilling process.

On May 15, 2003 prairie seed was planted on the site with the use of a seed drill. This allowed seed to be placed directly into the soil with minimal disturbance. It is also the reason that the existing sod did not have to be removed. A letter was sent to the staff reminding them of the seeding and explaining how plug planting would take place on the following Monday.

Throughout the course of the school day on May 19th the planting of approximately 2,000 native plants took place. The researcher’s students were available every hour of the day to facilitate planting with other classes. As teachers brought students out to the site they were met by the researcher,
his student teacher, and students. A brief introduction was given and then students paired off. The researcher’s students provided others with plants, explained what they were, described the plant at maturity, and gave instruction on the planting process. All students involved were able to plant at least one plant. An unexpected planting of a bur oak tree took place later that month on the site. This tree was a gift in honor of the current principal who would be moving at the end of the year. It should be noted that this species of tree was selected because of its dominance on the savanna and its ability to withstand fire. It would also grow to provide shade for classes that utilized the site.

For the rest of the 2002-2003 school year and summer 2003 the only maintenance required of the site was an occasional mowing down to a height of six inches. This mowing kept weed species at bay and allowed much needed sunlight to reach the developing prairie plants. Work continued throughout the summer with the removal of particularly invasive species, by the researcher, and occasional watering of the oak tree.

Follow up the preliminary planting with professional development for staff members identifying specific curricular activities that would be appropriate for each grade level to use on the prairie site.

Change in administration at Marshall Middle School for the school 2003-2004 school year hindered the staff development process with regard to
the prairie. The only time allowed for professional development on this project was during science department meetings, of which the researcher was the chair of. These departmental meetings consisted of the nine science teachers in the building and continued once a month throughout the school year. The prairie and associated activities were addressed at every meeting.

The researcher had continued to gather resources and materials over the course of the summer of 2003. These resources were then divided by grade level (sixth, seventh, and eighth) during the following school year (2003 – 2004) and correlated fit into the middle school curriculum of the School District of Janesville. Great care was given to make sure that every activity chosen would build upon at least one other and include all curricular areas. These activities were then correlated to the Wisconsin Model Academic Standards in Environmental Education, Science, Math, Social Studies, and Language Arts. A resource guide was then created to encourage and assist teachers in utilization of the prairie site. The guide include special sections on taking students outdoors, prairie ecology, EE resources and state standards addressed, as well as, 25 activities and one literature guide for each grade level (see appendix E for a complete list of activities and resources).
Chapter Five

Conclusions and Recommendations

Address the Marshall community, to include administration and site council, seeking support, approval, and funding for the prairie restoration and present the project to the Superintendent’s Advisory Committee.

Gathering verbal support for a project such as this came quite easily for the researcher. A close, professional relationship between the school administration and the researcher was essential in the establishment of the project. This allowed the initial process to move much quicker than expected and garnered support from the rest of the school staff. Informal conversation with many staff members prior to formal presentation allowed them to consider the educational value and importance of the project without the stress and distractions of the first days of a school year.

Staff interest and support was evident after the initial presentation during the first days of the 2002-2003 school year. This allowed the researcher to move quickly through the approval process from the site council. The school principal’s commitment to the project was clear when he offered to assist in the writing and presentation of the proposal to the Superintendent’s Advisory Committee and the gathering of funding for the project. This type of administrative support is a critical factor that needs to be maintained throughout the project development.
After the first year of this project the administration changed and support for the project was not as evident as it had been in the past. The project had to adapt to the vision of the new administration.

Given professional development time, provide the staff at Marshall Middle School with information on the Wisconsin mandate of environmental education, environmental education academic standards, infusion of EE into the curriculum, and the benefits of a prairie restoration.

Prior to formal staff development the researcher made contact with Mr. Brian Buenzow, wildlife technician from the Wisconsin Department of Natural Resources. The professional and personal commitment given by Brian to the project was beyond that of any resource professional that the researcher would contact. Mr. Buenzow's dedication allowed the researcher to develop a quality staff development presentation that addressed environmental education and the prairie project.

Engaging and energizing the staff during this presentation was critical. It was necessary for the researcher to ensure that the presentation stayed positive and included many examples in all curriculum areas to engage the staff present. School administration assisted in a successful presentation by allowing the researcher to address small groups rather than one large group where attention and engagement is more likely to wander.
Assistance from other teachers in the creation and presentation of this staff development would have been beneficial. Including other staff members in the initial presentation would have lightened the workload for the researcher and created a team atmosphere. By allowing committed members to take a leadership role earlier in the development of the project, interest in the project may have been sustained for a longer period of time.

Establish a prairie restoration committee consisting of school staff members of the PTA, and other resource professionals that will oversee implementation of the restoration project. Implementation would include research, design, financing, planting, and installation, and development of a maintenance plan.

According to most sources, establishment of a committed team is essential in developing a sense of collective ownership which will allow the project to be successful. Initial interest in the project committee was high with 15 individuals agreeing to serve. Within months, however, membership began to dwindle. This led the researcher to conclude that, early in the committee formation process it is essential to determine which members are interested in and which are committed to the project. Clear expectations for each member must be provided in order to ensure that members are not misled in what they will be undertaking; when developing expectations, it is imperative that the group consider other responsibilities of its members outside of the project.
Leadership within such a committee can not rest solely on one person, as it did for much of this project. A core group of individuals providing direction is essential in maintaining the long-term commitment that a prairie restoration requires. By allowing leadership to be shared, the project can be preserved through administration and staff changes.

Three years into the project the researcher transferred to a different school within the district. While contact with staff was maintained and assistance maintaining the prairie was provided, the long-term commitment to the project dissolved when he left. The utilization of the prairie would decline to the point where only one teacher was including it in her instruction just three years later.

Administration engagement also decreased. In the spring of 2007 the school's current administration allowed the prairie site to be tilled under and re-seeded as a service project for one student. This not only removed a valuable teaching tool, but destroyed the efforts of many people to establish a diverse, native ecosystem. It is the conclusion and recommendation of the researcher that decisions affecting the outcome of such projects are left to the devices of school administrators unless committed members (willing to provide guidance) remain and school administrators and district officials should examine closely the outcome and impact that those decisions will have on future, present, and past students.
Create the Marshall Middle School Prairie Site through the efforts of students staff, and community members.

Actual establishment of the prairie was easier than expected. Much of this was due to the knowledge and dedication of Mr. Buenzow as mentioned earlier. His involvement and technical assistance allowed the researcher to focus on the educational component of the project.

The development of an interdisciplinary unit by the researcher allowed his students to participate in the creation of the prairie and become leaders for the rest of the student population. When students were engaged in the activities the researcher noticed a considerable positive influence on student achievement and learning behavior. Students were engaged and focused on achieving their learning goals, including those who may have been considered at-risk or exhibited disciplinary problems. Each day the prairie was the topic students were eager to go outside and get to work.

Challenging students to take the lead and become teachers in an environmental project also provided some unexpected results that influenced environmental education at Marshall Middle School. At the end of the 2002-2003 school year, students of the researcher approached him and inquired about the formation of an environmental club for the following year. At the beginning of the 2003-2004 school year the Tree-huggers of Marshall was formed. The club focused its efforts on the continued development of the prairie site and education about native ecosystems. Highlights of their
activities included: seed collection and dispersal (from native plants that had been removed from the site prior to school construction in 1996), involvement in an Earth Day fair developed by the University of Wisconsin – Rock County, and fund raising for a sign that would identify the restoration site.

Much of the success of this project rests in the ability of those involved to maintain certain flexibility and embrace the unexpected. When engaging students to become stake-holders in their own educational experiences teachers must accept those experiences for what they are and create learning opportunities from them that will last beyond the direct involvement in the project.

Follow up the preliminary planting with professional development for staff members identifying specific curricular activities that would be appropriate for each grade level to use on the prairie site.

Creation of a resource guide is a labor intensive process. The amount of material that needs to be reviewed, considered, and included can be overwhelming to the most dedicated professionals. In the case of EE activities, value must be seen by all teachers in their specific subject areas. This can be accomplished by connecting the activities to state standards. This connection also provides credibility for those who cannot see the educational value in environmental education. The resource guide that was
created for this project is comprehensive in that respect. It would have, however, better served the population if it had been created prior to the establishment of the prairie site. This would have given more teachers the opportunity to utilize the restoration process as a teaching tool.

Placing a curriculum guide or activity book into the hands of unprepared teachers is ineffective. Without proper training with those materials, the implementation of them will be hindered. Most decisions regarding professional development rest with school administrators. Unless administrators see educational value in topics that are proposed it is difficult to get those topics included in staff development time. This was the case at Marshall Middle School. One factor, that may have influenced the amount of time allowed for environmental education professional development has been already mentioned, staff involvement.

When many educators see value and seek training on a subject, that topic has a better chance of being included on the professional development agenda. Thus, involvement of more staff may have influenced decisions made regarding staff development and eased the formation and implementation of curriculum resources. This may have also demonstrated the importance of environmental education to district administration and the school board.
References


Appendix A
PROPOSAL

Person Submitting: __________Mike Kuehne/Craig Fischer__________________________

Date Submitted: __________November 27, 2002_____________________

Representing: __________Marshall Middle School__________________________

Topic: __________Proposed Natural Prairie/Wetlands on Marshall Site with the addition of curriculum and curriculum resources being developed.__________________________

Principal Review: __________Part of Proposal__________________________

Implementation can begin only after SAC minutes of approval have been published.

1. Rationale: (Summary of proposal: Who impacted, timeline, evaluation component)

   The study of our ecology in Wisconsin involves the understanding of natural eco-systems and how they evolve. Wisconsin’s natural habitat was once native prairies and in places, natural wetlands. We would like to develop a natural prairie and possible wetlands in an unused area of our present campus site.

2. How will student achievement be impacted?

   Mapping, math, science, social studies, communication arts and student service are all integrated to the study and development of a natural prairie site on our present campus.

3. How does the request support district goals, mission, and purpose?

   This goal will support parent involvement in the school, along with integrating concepts from math, science, and socials studies and students examine the site, lay out a plan to plant natural prairie, and participate in the actual planting of natural prairie grass.

4. Resource impact – does this decision maintain fiscal neutrality? How?

   This project will be completed with donations, grants and student/adult volunteer time.
<table>
<thead>
<tr>
<th>Resources</th>
<th>Cost</th>
<th>Where Are These Resources Covered?</th>
</tr>
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<tbody>
<tr>
<td>Time/Materials</td>
<td>??</td>
<td>These costs will be covered through a grant proposal to the PTA, and/or through school funds from school magazine sales. Other grant sources include: Wisconsin Environment Education Board, Rock County Conservationists, Wisconsin Association for Middle Level Education.</td>
</tr>
</tbody>
</table>

5. Is there research evidence that supports this proposal? Please attach a copy of any research you have that supports or would oppose this proposal.

* Attached articles

Project Wild is a state program that promotes the study of eco-systems and the natural resources in the state of Wisconsin. This project, and others like it, have their support.

6. Does this proposal impact sending and receiving schools? How will students be impacted at another school in the district or at the next level due to the implementation of this proposal?

The only school that in someway might be impacted would be Monroe Elementary School. The only impact would be an additional resource for their students to study the natural environment of Wisconsin as they study local history in primary grades, and Wisconsin’s history in 4th grade.

7. What resources are necessary to support the continuation of this initiative beyond its initial year of implementation?

The only resources that will be of an "on-going" nature would be maintenance costs associated with maintaining a prairie on the school site. It may reduce some costs because the area proposed is presently mowed and maintained by the school custodial staff, and we wouldn’t be proposing to cut the prairie grasses. It may require some time and effort from the classroom teacher responsible for this project, and if the project doesn’t accomplish its intended purpose, it will take some time and effort to revert it back to grass.

There is a possible "prairie burn" that takes place the second or third year into the prairie restoration, but this has been done without incident at other schools close to a highway, i.e., Oregon, WI. This would be done under direction of the Janesville Fire Department, and Wisconsin Department of Transportation.
8. Is this proposal legally, morally, and ethically correct? Yes _X_  No ___  
(If no do not submit this proposal)

9. Which stakeholders have been made aware of this proposal and how have you sought their support?  
   The staff at Marshall Middle School have been made aware of this proposal at a site-counsel meeting.

10. Does this proposal support school board policies? Yes _X_  No ___

11. Does this proposal impact other schools or departments in the District.  
    Yes ___  No _X_  
    If yes, please describe in detail how this proposal would impact another school or department.

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**STATUS:** Approved by director(s)

Signature: ___________________________  Date: __________

Signature: ___________________________  Date: __________

Signature: ___________________________  Date: __________

___  Information Sharing Only - For Superintendent’s Advisory Council (SAC)

**STATUS:** Assigned by SAC: Superintendent’s Advisory Committee for approval/disapproval.
Refer to CC
Refer to Ad Hoc Committee
Refer to Curriculum Comm.
Refer to Principals
__ Elementary
__ Middle
__ High
__ Approved

Refer to Board of Education or Committee of Board of Education
__ Building, Grounds & Finance
__ Personnel
__ Legislative

__ Put on HOLD
__ STOP action
__ Other:

Comments:

SAC Date: ____________

proposa
Prairie Restoration for Wisconsin Schools

A Guide to Restoration from Site Analysis to Management

by Molly Fifield Murray

From the Earth Partnership Program at the University of Wisconsin–Madison Arboretum

1993; revised 2000
Introduction

The Importance of Cultivating a Sense of Place

Children today are being deprived of experiences that many adults take for granted. Studies have shown that the reliance on the automobile and a change in the design of public spaces prevents children from serendipitous experiences with nature. This keeps children from knowing the natural world in an intimate way. For example, in 1971, 80 percent of 7- and 8-year-olds were allowed to go to school on their own. By 1990 this figure dropped to 9 percent (Hillman et.al, 1990). Today, children are more likely to be involved in scheduled, organized activities under the supervision of adults, rather than playing with peers, or being allowed to explore freely a bit of nature within safe boundaries.

Without these experiences with nature, children do not have the opportunity to learn what they might become. For instance, my neighbor, who 30 years ago could dabble in a small pool by a culvert and develop an interest the creatures living there, learned that he wanted to become a freshwater biologist. Today, that culvert and pool is underground. Children who are transported everywhere do not have the same opportunity to learn about themselves, let alone develop spatial knowledge and cognitive mapping skills.

The transformation of awareness into a critical, probing, problem-seeking attitude towards one’s surrounding’s is essential to the healthy development of an autonomous, effective adult. Wendy Titman, author of Special Places, Special People (1994, p. 68), writes, “Freedom of access to the environment, the ability to find one’s way around, and to feel confident in doing so, is clearly an important human need with far reaching consequences, and one which must be learned essentially through experiences.”

The extinction of these experiences for children today is clearly summarized in the book Geography of Childhood (1994) by Gary Paul Nabhan and Stephen Trimble. While it is up to parents to provide the opportunities for many of the experiences with nature that children need, school grounds are an important factor in a child’s life and in a child’s view of what important adults in a child’s life think about children and the environment.

What is Ecosystem Restoration and Why Should We Do It?

Ecosystem restoration has been attempted at various scales and for different purposes. In some cases, restorationists work at the scale of landscapes or watersheds. For example, The Nature Conservancy has made great efforts to set aside and restore large areas of forest in the Baraboo Hills in Wisconsin, and similar efforts on thousands of acres of grasslands in the Great Plains. In these cases, restorationists are trying to restore all the functions, components, and structures of the ecosystem—components such as bison on the grasslands, or structure such as a large, unfragmented areas in the woodlands.

Some restorations may be smaller, but serve a similar purpose, in that they cover all of an area that functions in the same way, such as a bog and its watershed. Still others, including the prairies at the University of Wisconsin-Madison Arboretum, function without key components such as elk or bison.

Scientists have found that it is not easy to restore ecosystems because the natural world is quite complex. This complexity has been revealed in restoration projects that have resulted in poor facsimiles of the real thing. Nonetheless, restoring an ecosystem provides a powerful tool for better understanding the complexity of nature.

For instance, after the first attempts to restore prairie at the University of Wisconsin-Madison Arboretum were not very successful, ecologists
John Curtis and Max Partch conducted experiments to see if fire served an important function in the health of the prairie ecosystem. Thanks to them and other researchers, we now know that it does, although the role of fire is still being studied to determine how the timing and frequency of fire affects different parts of the ecosystem.

It is important to recognize that this ability to learn about nature through the restoration of ecosystems is not limited to professional scientists or restorationists. Students working in their schoolyard prairies and gardens also have the ability to contribute to the knowledge base of restoration ecology. There is still much to learn about germinating native species, how species act in young plantings, and which species perform best in certain soils. So much of the natural ecosystems that we want to restore was destroyed before it was studied that the only way to learn the answers to many questions about species and ecosystems is to experiment.

This does not mean that we plant species randomly and just see what happens. It does mean that at times we are taking educated guesses as to what species might grow in a certain type of savanna, or what the soil restrictions are for various species. For instance, most people think of wild lupine as a species that grows only on sand. However, some 19th-century texts on vegetation give the impression that lupine may have grown in many types of soil. With some advice and support, a young student could set about to answer this question.

Planting and maintaining a small prairie or butterfly garden at a school can serve the valuable purpose of teaching students to have positive interactions with the environment. At the same time, these small areas, being rich in native plant species, provide nectar and food sources for insects and birds and contribute to the environmental health of the larger system.

Finally, as Aldo Leopold pointed out in *A Sand County Almanac*, we must always remember that the first rule of intelligent tinkering is to save all the parts. The preservation of species and of existing ecosystems is of paramount importance. Restoration has a key role in preservation by helping us understand how ecosystems work, by providing refuges for genetic material, by making study sites available to students of all ages, and by providing buffers around existing preserves.

In the case of restoration, the rule is: Just do it! Do it in a thoughtful way, but any scale restoration will be valuable to the environment and to the people participating in it.

**Prairie Restoration**

Across the Midwest, people are trying to restore small areas of prairie on land that hasn't supported a prairie ecosystem for 50-150 years. We can probably never fully replicate a true prairie ecosystem; they are far more complex than we can comprehend. In addition, the natural creation of prairies took millennia and many of the organisms that once called the prairie their home are now rare or endangered.

However, in restoring a small plot of land, we begin a healing process for the prairie land. We learn about the prairie community and the natural processes that rule it. We provide a safe haven for rare species, we create an enjoyable natural space and we help to restore a healing and natural balance to our earth. Restoring a prairie is also tremendously valuable in demonstrating a model for humans to interact with nature in a positive way.

Each step involved in restoring a prairie provides excellent opportunities for learning. As the ultimate goal is student learning, we urge you not to rush through the educationally rich planning stage. We want to savor and learn from the process rather than rush towards the product. An established prairie is attractive, however, a rich and robust educational program must be the educator's primary goal.
Native Biotic Communities
The Basis for Beginning

Introduction
Native biological communities include a variety of plant and animal species that have evolved together, each adapted to its regional and local environments. "Each species has individual environmental limits" (Curtis, p. 3). Those species that have similar limits tend to grow together. No two species have exactly the same limits, so the communities in which they grow lack precise boundaries and occur along a continuum of natural parameters, including moisture and soil-type gradations.

Prairies, savannas, and eastern deciduous forests are among many of the native biological communities that exist on the North American continent. Wisconsin is on the edge of the prairie region, where prairie and forest biomes meet and struggle against each other for existence.

This guide focuses on the Prairie/Oak Savanna communities that dominated Wisconsin south of the "tension zone" as recently as 160 years ago. Shaped by eons of geologic and cyclic change, and sited on the soils they helped create, these communities were home to native plants, animals, and people. Prairies covered 2.1 million acres in Wisconsin; two types of savanna—oak openings and oak barrens—covered almost 7.3 million acres.

Prairie: A Special Place
When French explorers and missionaries tried to describe the vast grasslands they encountered near and beyond the Mississippi river, they used the word "prairie" or meadow." The early travelers were awed by the beauty and abundance found in these open lands.

JOHN CURTIS, a botany professor at the University of Wisconsin-Madison, studied and analyzed vegetation with his students in over 1400 examples of prairie, forest, and wetland communities throughout Wisconsin. In 1959, Curtis' The Vegetation of Wisconsin was published, the first complete documentation of the vegetation of an entire state. Using data collected in the field by his students, he summarized the species combination, geographical limits, and environmental relations of the natural communities of the state. With this information as a starting point, land managers and scholars have been able to study the vegetation of the area within a framework. It enables those who are interested in preserving and restoring the native vegetation of the state to gain an understanding of what that vegetation is and what environmental forces affect it.
...in every direction, prairies only, as far as the eye can reach... All this prairie affords ample subsistence to the elk not infrequently encountered in herds of four or five hundred each. These by their abundance, furnish adequate provision for whole villages, which therefore are not obliged to scatter by families during the hunting season. (Father Dablon, 1670, quoted in Curtis, p. 263)

By reading surveyors' records and pioneer journals, we gaze through their eyes on sights unseen in the East or in Europe, which was dominated by vast forests, meadows of short grasses, and small farms. Many pioneers likened the prairie to the ocean when the wind blew waves across the grasses. They even had to navigate as if on the ocean, for the prairie often lacked landmarks.

On the summit levels spreads the wide prairie, decked with flowers of the gayest hue; its long and undulating waves stretching away till sky and meadow mingle in the distant horizon. (Owen, 1848, quoted in Curtis, p. 264)

Laura Ingalls Wilder describes the prairie and many of the mixed emotions that pioneers felt about it in her books about pioneer life. In By the Shores of Silver Lake, she writes of a time when the Ingalls family was building a shanty on their homestead claim in South Dakota.

Ma said, “I would like to see some trees again myself. They would rest my eyes from all this prairie with not a tree. Not even a bush to be seen in any direction.”

Pa reminds her that every homesteader must plant ten acres of trees, and he isn’t sure it’s a good idea. “Trees spread, and you know what it was like back in the Big Woods of Wisconsin, grubbing out stumps and breaking our backs on the sprouting hoe to keep a little land clear for crops. It’s restful to have clear prairie land like this, if you’re going to farm.”

But the next day Pa brings some cottonwood trees from a grove to plant around the shanty anyway. While they are planting, baby Grace toddles away and is lost. Everyone is frantic that she has wandered into the tall grasses of the slough and will never be found.

Laura was running straight toward the south. Grass whipped soft against her bare feet. Butterflies fluttered over the flowers. There wasn’t a bush nor a weed that Grace could be hidden behind. There was nothing, nothing but grass and flowers swaying in the sunshine.
Native Biotic Communities

... She ran on and on. Grace must have gone this way. Maybe she chased a butterfly. She didn't go into Big Slough! She didn't climb the hill, she wasn't there.

Oh, baby sister, I couldn't see you anywhere east or south on this hateful prairie.

"Grace!"

This horrible, sunny prairie was so large. No lost baby could ever be found on it. Ma's calling and Pa's shouts came from Big Slough. They were thin cries, lost in wind, lost on the enormous bigness of the prairie.

... [Laura] ran up a low slope. Nothing, nothing, not a spot of shadow was anywhere on the level prairie all around her. She ran on, and suddenly the ground dropped before her. She almost fell down a steep bank. There was Grace. There in a great pool of blue, sat Grace. The sun shone on her golden hair blowing in the wind. She looked up at Laura with big eyes as blue as violets. Her hands were full of violets. She held them up to Laura and said, "Sweet! Sweet!"

... They were surrounded by masses of violets blossoming above low-spreading leaves. Violets covered the flat bottom of a large, round hollow. All around this lake of violets, grassy banks rose almost straight up to the prairie-level. There in the round, low place the wind hardly disturbed the fragrance of the violets. The sun was warm there, the sky was overhead, the green walls of grass curved all around, and butterflies fluttered over the crowding violet faces.

Thanks to restoration, this author has known such a magical place. It was experienced on May 18, 1986, on a walk with other naturalists to a 40-acre prairie restoration at the Arboretum. The prairie had been burned that spring, and as we emerged from a trail that descended from the woods, Greene Prairie looked like just another green, grassy area to me—until one of the naturalists cried out with joy. Masses of blue lupine covering over six acres of the hill in the distance greeted us. As we went out onto the trail, stars of blue-eyed grass and yellow star grass twinkled up from among the knee-high greenery. Deep pink patches of downy phlox, wood betony, toadflax. In all, more than twenty species were blooming that day.

The hope of restoration is to bring us all face to face with the wonder of the world that sustains us by getting to know a natural place intimately. To grow in awareness. To learn. And to make and share a commitment to far-sighted actions and lifestyles. In this way, we work together to preserve, recreate, and sustain native ecological communities and the quality of life on this planet.

Descriptions of Prairie and Savanna

John Curtis described many grassland communities. In reality, these occur along a continuum of moisture and soil types that blend into one another gradually, but are here presented separately for discussion purposes.

Prairies

Prairies are dominated by grasses and sedges (grass-like plants) in association with species of other flowering plants called forbs. Shrubs and an occasional tree also occur. According to Curtis, prairies have less than one tree per acre, and at least 50 percent of the cover of grass-like plants are grass species.

Prairies occur in full sun and require at least 12 hours of daylight per day during the growing season. As mentioned, grasses form 50 to 90 percent of the cover, but only a few species of grasses form this matrix. However, a large variety of forb species, each present in small numbers, can account for up to 80 percent of the total number of species on
a site. On the Arboretum’s Greene Prairie, for example, there are almost 300 species of plants. Even though less than 10 percent of the species are grasses, grass stems and leaves cover a large proportion of the prairie. This structure is important to remember when you are trying to plant a prairie.

Among the prairie forbs, some families are better represented than others. Plants from the daisy, legume, rose, milkweed, and mint families are very important to the structure, visual impact, and function of the prairie community.

**Dry (xeric) prairies occur on rocky, shallow soils or on sand and are dominated by short grasses such as little bluestem and side oats grama. In general, the stature of all plants on dry prairies is short.**

Mesic prairies are found on rich soils with moderate moisture available—now good corn land. Mesic prairies are dominated by tall grasses such as big bluestem and Indian grass. In the spring, the plants are short, and flowers bloom close to the ground. The height of bloom of later species increases as the prairie stretches higher throughout the summer. By late summer, flowers may reach 4 to 6 feet high, and the grasses often reach even greater heights.

Wet prairies have moisture near the surface but do not have standing water for long periods of time. They have a variety of tall grasses and sedges, as well as forbs. Wet prairies have fewer early spring flowers because of cold air drainage.

**Savannas**

Savannas can be defined as having one tree or more per acre, but with less than 50 percent of the area covered by trees (Curtis 1959: p. 330). Among the trees were herbaceous woodland plants often grading into mostly prairie species in sunny openings. Some believe that savannas were communities with a distinct group of plants, not just some plants from woods and some plants from prairies (Packard, 1988). Some species grew best in sunny openings, some in partial shade, and some in denser shade under the trees.

**Changes Since Settlement**

Together, prairie and oak savanna once covered 9.4 million acres in Wisconsin. Today, those acres comprise some of the richest agricultural soils in our state. That natural process of soil building took many hundreds of years—roots recycling, dying and growing to depths of 6 to 12 feet; animals, such as prairie ants, mixing this organic material with minerals and byproducts from all the biota; legumes and their associated nitrogen fixers, special bacteria, incorporating nitrogen from the air into the soil; fires, consuming the fuel of dried vegetation and stimulating new growth.

The productivity of these soils attracted immigrant farmers. To the newcomers, however, the native plants had no apparent economic value. In order to succeed, they imposed plants and animals on the land that could be sold to markets created by the industrial East.

The savannas were prime homestead sites. Park-like in appearance, they offered beauty and space for home and pasture. The oak trees provided wood for cabins, barns, fences, furnishings, and fuel. They also offered relief from the intense sun of the open prairie.

The burr oak openings are among the most productive portions of the State being especially adapted to the continued production of wheat. They are, moreover, the most beautiful portions of the varied and picturesque surface of the country. Grouped here and there, like so many old orchards, on the summit of a gentle swell of land or on the border of a marsh, prairie or lake, there is nothing in the whole catalogue of American sylva that equals these burr oaks for the charming, homestead-like expressions they give to the landscape. (Hoyt, 1860, quoted in Curtis 1959: 329)

This native landscape of lush, expansive grasslands interspersed with groves of oaks not
Native Biotic Communities

Prairie plants survive drought, harsh winters and fire through adaptations. Most prairie plants have about two-thirds of their mass below ground.

only defined the visual character of the Midwest but also influenced the way the land was settled. Settlement occurred first around water and groves, where small farms were able to sustain a family. The diverse prairie grassland has now been replaced mainly by a monoculture grassland of corn.

Wildfires and those set by native people had burned over the land for thousands of years. Those fires were an essential part of the prairie/savanna ecosystem. They maintained the openness of the communities by setting back young trees and shrubs. Many of the oak woods communities of today are the result of the cessation of fire at European settlement time.

Prairie grasses and forbs survive fires because they have buds at or below the soil surface and a lot of root mass below ground compared to the biomass of the plant above ground. Remarkable root systems of many prairie species reach depths of over 6 feet. Some even extend as deep as 20 feet.

Those roots presented problems to the prairie pioneer. Iron and wooden plows couldn’t break the prairie. But once the steel mold-board plow was invented by John Deere, the farmer had a tool that was able to cut the deep prairie roots, turn the soil, and plant crops. People say it sounded like fiddle strings snapping as the steel plow sliced through the roots.

Unfortunately, stripped of prairie vegetation and sometimes subjected to unsound agricultural practices, tons of soil per acre have been lost to erosion. In recent years, conservation efforts have aimed to prevent further loss of soil and fertility through enlightened farming practices. Some of these efforts include planting native prairie species on set-aside land in the Midwest and rangeland in the West, in order to rebuild the soil.

The prairies disappeared one field, one house at a time until less than one-tenth of 1 percent remains. Remnants occur along old railroads, in pioneer cemeteries, or on sites too rocky or steep for agriculture. Others can be found where farmers or landowners saved a few rare acres of natural prairie for their own precious value and beauty.

Even greater destruction of savannas occurred. They became either homesites, pastures, or towns. In many cases, the cessation of fires allowed savanna areas to grow up into woods. They are so rare today that it is difficult to find in Wisconsin a savanna with an intact ground layer to study as a model for restoration.

This near extinction of entire ecosystems in southern Wisconsin makes preservation and restoration of prairies and savannas urgent. The loss of native plant communities often means the loss of plant and animal species due to an impoverished or diminished environment. The surest way to save threatened and endangered species is to save the entire biotic community in which they live.

In less than 200 years, most native Midwestern landscapes have been eliminated or drastically changed by modern society. By eliminating these plant communities, part of the character of
the Midwest has been lost. Pioneers like Laura Ingalls Wilder would no longer recognize it.

When Laura found her baby sister, Grace, sitting in a large, round, flat-bottomed depression covered with violets, she wondered if the place was a fairy ring. "A place like that couldn't just happen, Pa. Something made it," she said.

Pa replied, "You are right, Laura; human hands didn't make that place, ... but your fairies were big ugly brutes, with horns on their heads and humps on their backs."

Laura found Grace in a buffalo wallow.

No remnant Wisconsin prairie is large enough today to support a herd of bison (buffalo) or elk, or a pack of wolves. Even smaller animals, such as prairie chickens, need thousands of acres of habitat to sustain their populations. We are just beginning to ask questions like "What are the requirements for certain species of rare butterflies? and "Can frogs be restored to a prairie pond?"

Restorationists are now realizing that without all members of the community, some links and processes of a "natural prairie" will be missing, putting the whole system at risk. Lessons such as this have been part of restoration since the first prairie ever planted was started at the Arboretum by Ted Sperry and crew members from the Civilian Conservation Corps in 1935. They planted prairie plants and seeds into a degraded pasture until the war came.

The restoration process is a powerful tool for learning about native plant communities and the natural processes that rule them. As we test and investigate restoration processes, we will be better able to recreate functioning biotic communities. The exciting thing about involving students in this process is that they will be posing questions for which there are yet no answers. They will explore the scientific process as part of a real investigation.

In spite of all that we are learning about prairie restoration, we must remember that the preservation and proper management of existing native remnants is of utmost importance. While serving as reservoirs of biological diversity, they are the real prairie textbooks. We look to them as our models for prairie restoration.

Fire was a natural part of a functioning prairie/savanna ecosystem. Set by lightning or Native Americans, fires burned frequently over the prairie until stopped by a river or other natural barrier. These fires inspired both awe and fear in early settlers.
Creating an outdoor classroom is not simply another "add on," but a means to enhance the curriculum with outdoor, hands-on learning.

Outdoor Classrooms: the learning links

by Jeff Reading and George Taven

In 1991, Olympic Heights Elementary School opened in Calgary with the typical school landscape. In a word, grass. One year later it could be summarized in two words: dead grass — at least from September through to June. An open area between two wings of the school had become a horrendous eyesore and mud bowl during the spring and fall. Rather than get it cemented or gravelled over, several staff obtained a grant to turn the area into a native plant park and natural amphitheatre. In addition to the aesthetic need, we needed a little bit of "wilderness" nestled into this urban landscape for our environmental and outdoor education programs. We also wanted to try to reclaim some wilderness from the ever-expanding city. What resulted was more than we ever expected. The native plant park and natural amphitheatre were the synergistic result of hard work by students, staff, community, and local horticulturalists, and of many donations of materials, expertise and time, along with lots of creative dreaming.

The links between the curriculum and the learning associated with an outdoor area became apparent even at the planning stage. Students were involved in all aspects of organizing the project, and this included calculating the quantities of soil, rock, compost, etc. needed for the area (math); diagramming what the area would look like over time (art); writing grant requests and thank you letters (language arts); discussing how the area might improve the quality or "wellness" of our lives (health), and researching information about plants and the elements necessary to create a successful ecosystem (science). While the park was being created we also had many people come into the classroom to discuss career options associated with park development, municipal planning, horticulture, technology and community relations.

Since completing our native park and amphitheatre, we have found that, with a little creativity, there are literally hundreds of ways to integrate a naturalized area into the curriculum. When we say integrate, we do not mean "add on." Instead, we are talking about doing what we already do but doing it differently, using the outdoor classroom as a vehicle for hands-on learning. Our use of the outdoor classroom with our grade five and six students has been quite extensive and continues to expand. To facilitate an integrated curriculum that fosters environmental literacy, we use a chart to plan our activities in the park month by month. The intent not to fill the chart completely, but to ensure that the park is used across the curriculum and through...
Outdoor composting or indoor vermiculture are possible spinoffs of establishing a natural area in the schoolyard. Students can chart the weight of organic material that goes into the composter and compare it to the weight of what is produced.

Science
Our plant park is divided into grasslands, boreal forest and alpine ecosystems that represent those found in Alberta. Having a natural environment so close at hand enhances discussions and provides for hands-on learning about many aspects of the natural world: balanced ecosystems, food chains, communities, diversity, change, interrelationships and so on.

- Students can explore the populations, balance within, role of and locations of living and non-living components of an ecosystem. Much of this life can be seen with the naked eye. Using a hand lens, bug box or microscope opens another whole new world to explore.
- Host a community competition to design and build a bird feeder or nesting box.
- Have students adopt a plant or tree, study its needs and care for it over time.
- Conduct environmental assessments that test soil, air, pollution levels, soil compacting, etc. These studies can then be extended to different environments around the community. Students may investigate questions like how do soil conditions, the pH of soil or the availability of water and sunlight affect plant growth and the presence of animals?
- “Lasso the Earth” by tossing a one-metre length string tied into a loop. In small groups, and using a kitchen knife, fork and spoon, have students explore the populations and diversities of plants, animals, insects, non-living items, etc. The contents of various “lassos” can be compared in different areas.
- Explore basic scientific concepts such as: erosion patterns; soil percolation and compacting; plant transpiration; the water cycle; classification of organisms and the use of identification keys; the physical make of soil and the impact of composting.
- The Institute for Earth Education has an excellent collection of activities called Earthwalks. An Earthwalk is a series of connected activities that invite a multi-sensory exploration of a natural area. Natural areas in schoolyards are great places to use these activities as they don’t require a huge space to complete. Project Wild activities, if organized within an infrastructure that provides direction and curriculum connections, are also excellent for use in a schoolyard.

Social Studies
- Explore the role of plants in pioneer life by planting native species that were used extensively by settlers.
- Learn the significance of plants and animals to Native people. Better still, try to involve members of local Native communities in these programs.

Health
- Explore the medicinal value of plants.
- Invite parents or local restauranteurs to lead cooking classes using plants or herbs grown at the school.

Our plant park has galvanized many people to get outside much more than before; consequently, we spend much more time simply “being” in the plant park. As one staff member put it “Teachers need fresh air too!”

Physical Education
- A naturalized area presents opportunities for many physical education activities such as creative dance, gymastics, obstacle courses, camouflage games, tai chi and creative but passive games such as frisbee golf.

Art
- A naturalized area on the schoolgrounds provides a place for sketching, painting, rubbing, and for considering the aesthetics of colour schemes and patterns.
- Invite a local artist to conduct a sketching or watercolour painting workshop in the outdoor classroom. Mount and display the “products” in the school.
- Use waste paper from the school together with plant material to make writing paper and creative posters.
- Create plaques and interpretive signs that describe the plants, their needs, their role in the ecosystem, etc. This can be a long term project as there will be a need to update the signs as the natural area grows up and fills in.

Music
- Write songs about the development of the nature area, or use the area and environmental themes as inspiration for song lyrics. These songs and accompanying dance steps may be videotaped.
- Make “orchestra cards” that use pictures to describe natural sounds that students hear in the schoolyard.

As our native plant park and amphitheatre grew, they were embraced by the entire school as well as many community members. One evening a local astronomy group held an outdoor meeting there while viewing the night sky. After school one day, six high school students were found holding a group study meeting in the amphitheatre.

Now we sit back and watch it grow and develop. Creating a natural learning area on school grounds has had nothing but a positive impact on Olympic Heights students, staff and community. Not only have our curriculum and learning opportunities increased, but our living and working environment has been greatly enhanced. The official opening of our native plant park and amphitheatre culminated in a countdown that triggered a water sprinkler in the centre of the park. As water cascaded onto the park that sunny Alberta morning, I overheard one parent say to another, “Man, we never did stuff like this when I went to school.”

Jeff Reading and George Taven teach at Olympic Heights Elementary School in Calgary, Alberta.
Appendix B
February 4, 2003

Dear Mr. Fischer,

Thank you for using the Marshall PTA grant process. The PTA Finance Committee and the membership are pleased to grant the request for Outdoor Lab Environmental study area in the amount of $1,200.00.

Please spend your grant money as soon as possible. If you find that you are not going to use your grant please let us know as soon as possible.

We would like to know how this benefits the students.

The materials that you are receiving do become the property of Marshall Middle School.

You may receive the money for your grant in several ways.

1. a. Write out an order form (include a postage paid envelope).
   b. Fill out a request for funds (Found in the red folder in the PTA Mailbox).
   c. Put your order and the form in the PTA mailbox and Nancy Sonntag, the PTA treasurer will mail a check to the business being used.

2. Buy the materials yourself and hand in the receipt by doing b (above) and put your receipt and form in the PTA mailbox

3. If your grant is a school related function and needs to be deposited in your account, please see Jeanne Lee to set it up and the funds can be transferred.

Thank you,

The PTA Finance Committee
Marshall PTA
Grant Application
2004-2005

PROJECT DESCRIPTION: The purpose of this project is to encourage environmental education at Marshall through the restoration of a native prairie, possible wetland, and the development of curriculum resources, tied to state standards, which will support the utilization of the site as an intricate part of the curriculum.

RATIONALE: Establishment of outdoor study sites provides learners an opportunity to interact in a non-traditional environment through direct experiences and concrete activities. When using the environment as an integrating context for learning it has been shown that time on task and problem solving skills improve. Grade point averages and standardized test scores increase. This approach has also been shown to adapt, more readily, to a variety of learning styles. Author Anne Bell states, “For children in middle school, educational benefits are linked to establishing ethical principles, getting along with others, understanding delayed gratification, and building the language and social skills to negotiate a place in the world.”

Learning outside of the classroom not only benefits a student’s academic development it has also shown to have an effect on the other aspects of child development. Increasing vegetation on school grounds promotes a sense of community and ownership. Students feel empowered when they know that their actions are having an effect on the community. This promotes positive emotional health. Natural features also alleviate stress, reduce aggression, and promote health, which is beneficial to students’ physical development.

Benefits of school grounds development are not limited only to the students. By establishing a natural area ecosystems can be effected and restored. Entire communities can also benefit when they view the school grounds as part of the larger picture. Business and students can foster partnerships while creating the site. In most cases, the school grounds will be more aesthetically pleasing adding to the value of the community. Economic benefits can also be found. For example, often the development of a natural area means less lawn maintenance, which saves fuel, man-hours, and reduces pollution.

GRADE LEVEL/NUMBER OF STUDENTS BENEFITTING: All grade levels will benefit from this project. Depending on the enthusiasm and actions of particular teachers, this restoration has the potential to benefit the entire student population.

AMOUNT OF MONEY: $2000.00 will allow for the purchase of plants (for students that did not plant last year) and a second sign to identify the prairie and the date it was established, e.g. Marshall Middle School Prairie Restoration, established 2003. We could also begin construction on an area for instruction to take place and a small sign dedicating the bur oak tree that was planted to Dr. Michael Kuehne. Any additional funds could be put toward the beginning of a wetland restoration or expansion of the prairie.

TIMELINE: Planting, for current 6th grade students, should occur in May of this year. Sign design and construction can begin as soon as funding is approved. Use and maintenance of the site will be ongoing.

SUBMITTED BY: Craig Fischer – Science Department Chairperson
FACSIMILE TRANSMITTAL SHEET

TO:  Stacy Brunsell
FROM:  Craig Fischer
FAX NUMBER:  758-8669
DATE:  3/11/03
PAGES:  3
(RE:
ED GRANT

□ URGENT □ FOR REVIEW □ PLEASE COMMENT □ PLEASE REPLY □ PLEASE RECYCLE

THANK YOU!
Marshall Middle School is in the beginning stages of establishing a native prairie on our school site. This project is going to be used to encourage environmental education within our school and community. It is our hope that through the restoration of a native prairie and the development of curriculum resources, tied to state standards, the site will be utilized as an intricate part of the curriculum. The site will also provide the community with the ecological, economic, and aesthetic benefits of the restoration of native habitat. The funds provided by this grant would be used to purchase materials that are needed for the restoration process and curriculum development.
Application for Grant Funding

Please Select Grant Program:
- Matching Grt
- Bonus Grt
- Literacy Grt
- Safe Neigh. Heroes
- Environ. Grt
- Grandparents Day Grt (i.e. only)
- Civic and Veterans Grt

Location: 1305
City: Gainesville
ST: FL
Type: (AM) SAM'S / DC / TO / Other

Today's Date: 1/1/____
Date of Event: 1/1/____
Fundraiser Location: __ On Site __ Off Site
Amount Requested: $5000

How many associates will / did participate in the event? _____
(Not required if held on site)
Specifically, what is the fundraiser? (Matching grants only)

Managers Name (signed and printed):

Community Involvement Associate:

This application and a receipt letter (Matching grants only) must be completed and ON FILE at your location for ALL grants.

Select one: IRS designated □ 501c3 organization * OR: □ 501c4 □ 501c19 organization* (eligible for Civic and Veterans Grant ONLY)

*Must provide a valid Federal Tax ID / EIN #: Number will be validated using the IRS publicly available database.

Select one: □ Faith Based Organization ** □ Public School □ Federal, State or Local Government Agency

**Faith Based Organizations must be conducting projects that benefit the community as a whole. Grants cannot directly or indirectly benefit, directly or indirectly, their adherents or members

Organization Name: MARSHALL MIDDLE SCHOOL
Federal 501c3, 501c4 or 501c19 Tax ID (EIN) #: (9 digits):
Address: 35 SOUTH POINTE DRIVE
City: Gainesville
ST: FL
Zip: 32605
Contact Name: CRAIG ASCHER
Contact Phone: 608-743-6034

What service does your organization provide to the community? MIDDLE SCHOOL LEVEL EDUCATION

Specifically, how will funds from this grant be utilized in your local community? 

Which of the following groups will this funding primarily benefit? This information is used solely to track our funding to specific diverse community groups and is NOT considered during the grant review or approval process. Please select only the most appropriate:

□ Hispanic □ African American □ Asian American □ Native American □ General Population (benefits the entire community)

Will these grant funds directly benefit your LOCAL community? □ Yes □ No

Complete for Grandparents Day ONLY:
Number of youth involved: ______
Number of senior citizens involved: ______

Organization Representative: By signing below I acknowledge that this form represents a request for funding, and is not a guarantee of funding. Final approval is subject to the guidelines of the Wal-Mart Foundation. All organizations holding fundraisers at any Wal-Mart Stores, Inc. location, or requesting grant funding, must abide by the rules and guidelines set forth by the location, Wal-Mart Stores, Inc., and the Wal-Mart Foundation. This request will not be processed unless signed by all parties.

Signed: ____________________________ Printed: ____________________________ Date: ___________
Appendix C
# Prairie Plants 2003

<table>
<thead>
<tr>
<th>Grasses, Sedges</th>
<th>Grasses, Sedges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Indian grass</td>
<td>29. Porcupine Grass</td>
</tr>
<tr>
<td>2. Big Bluestem</td>
<td>30. Prairie Sedge</td>
</tr>
<tr>
<td>3. Little Bluestem</td>
<td>31. Gama Grass</td>
</tr>
<tr>
<td>4. Switchgrass</td>
<td>32. Prairie Cord Grass</td>
</tr>
<tr>
<td>5. Canada Wild Rye</td>
<td>33. Prairie Dropseed</td>
</tr>
<tr>
<td>6. Side Oats Grama</td>
<td>34. Broom Sedge</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forbs</th>
<th>Forbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Black-eyed Susan</td>
<td>35. Culvers Root</td>
</tr>
<tr>
<td>8. Yellow Coneflower</td>
<td>36. Common Boneset</td>
</tr>
<tr>
<td>10. Wild Bergamot</td>
<td>38. Tall Coreopsis</td>
</tr>
<tr>
<td>11. Cup Plant</td>
<td>39. Showy Tick Trefoil</td>
</tr>
<tr>
<td>13. Sky Blue Aster</td>
<td>41. Prairie Cinquefoil</td>
</tr>
<tr>
<td>14. Foxglove Beard Tongue</td>
<td>42. Wild Quinine</td>
</tr>
<tr>
<td>15. Prairie Blazing Star</td>
<td>43. Spotted Bee Balm</td>
</tr>
<tr>
<td>16. Marsh Blazing Star</td>
<td>44. Great St. John’s Wort</td>
</tr>
<tr>
<td>17. Canada Milk Vetch</td>
<td>18. Evening Primrose</td>
</tr>
<tr>
<td>21. Stiff Goldenrod</td>
<td>22. Lead Plant</td>
</tr>
<tr>
<td>23. Purple Prairie Clover</td>
<td>24. False Sunflower</td>
</tr>
<tr>
<td>27. Blue Vervain</td>
<td></td>
</tr>
</tbody>
</table>
March 6, 2003

Brian Buenzow
1071 Laramie Lane
Janesville WI  53546

Dear Brian:

RE: Prairie Plugs

Following is a list of suggested native plant plugs for the Wet Mesic site of approximately 2,000 sq. ft. There is a three-month lead time required for plugs. Plugs have a root ball about the size of your thumb and can easily be pushed into a pocket formed by pushing a stick into the ground.

Please contact us as soon as possible if this is acceptable so the greenhouse can begin growing them to be ready in time for planting.

I also listed 50 of each of the Compass Plant and Prairie Dock for the mesic site.

The cost of the plugs are .40 each and can be picked up from our house. (By the way, this is a special price for the Brian Buenzow project) Once the plugs arrive, they need to be planted right away.

If this is for a tax exempt project, please forward a copy of the exemption certificate for our records and who gets the bill.

Give me a call if you have any questions.

Sincerely,

MIDWEST PRAIRIES LLC

Ronald L. Martin

Enclosure

Proposals for seeds or other work is good for 30 days from date of letter or while quantities last.

Licensed by the WI Department of Agriculture & Consumer Protection and Insured
Species Selected
Brian Buenzow Project
3/6/03

Wet Mesic Site — 100 Each @ .40 Each
Blue-Joint Grass
Cord-Grass
Fox Sedge
Rattlesnake Grass
Purple Coneflower
Blue Flag Iris
Marsh Blazing Star
Great Blue Lobelia
Blue Vervain
Cardinal Flower
Sneezeweed
Wild Bergamot
Yellow Coneflower
Cupplant
Marsh Milkweed
New England Aster

Mesic Site — 50 Each @ .40 Each
Compass Plant
Prairie Dock

Proposals for seeds or other work is good for 30 days from date of letter or while quantities last.

Licensed by the WI Department of Agriculture & Consumer Protection and Insured
Marshall Middle School Prairie Restoration
Janesville, WI

Craig Fischer and Brian Buenzow

Grasses and Sedges - 8 oz of each
- Porcupine Grass  $1.25/#
- Prairie Sedge  
- Gama Grass  $3.33/#
- Prairie Dropseed  $1.50/#
- Broom Sedge
- Prairie Cord Grass

Forbs - 1 oz of each
- Culvers Root  $2.66/#
- Common Boneset  $1.03/#
- Golden Alexander  $3.33/#
- Tall Coreopsis  $3.00/#
- Showy Tick Trefoil  $1.30/#
- Spotted Joe-Pye Weed
- Prairie Cinquefoil  $1.43/#
- Wild Quinine  $1.40/#
- Spotted Bee Balm
- Great St. John's Wort  $3.12/#

I have listed list prices.
I'll give you 50% discount.

John W. Osenbaugh
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<th>Common Name</th>
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<th>extension</th>
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<td>Small yellow fox sedge</td>
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<td>$12.00</td>
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<td>$4.50</td>
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<td>0.05</td>
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**Depressional Wetland Plants**

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<td>Prairie cord grass</td>
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<td>$1.25</td>
<td>$20.00</td>
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<tr>
<td>Mud/Water plantain</td>
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<td>$1.50</td>
<td>$24.00</td>
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<tr>
<td>Wild blue iris</td>
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<td>$1.50</td>
<td>$24.00</td>
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<tr>
<td>Water horsehound/bugle weed</td>
<td>16.00</td>
<td>$1.25</td>
<td>$20.00</td>
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<tr>
<td>Blue vervain</td>
<td>16.00</td>
<td>$1.50</td>
<td>$24.00</td>
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<tr>
<td>Common mountain mint</td>
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**Upland Prairie Grasses, sedges, etc.**

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<th>Common Name</th>
<th>lb/ac</th>
<th>$/lb</th>
<th>extension</th>
<th>lbs/zone</th>
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<th>2.70 acres</th>
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<td>$0.90</td>
<td>0.09</td>
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<td>0.30</td>
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<tr>
<td>Big bluestem grass</td>
<td>1.00</td>
<td>$12.00</td>
<td>$12.00</td>
<td>0.90</td>
<td>1.00</td>
<td>3.00</td>
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<td>Little bluestem grass</td>
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<td>$ / lb</td>
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<td>Common milkweed</td>
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<td>ASTNOV-S+</td>
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<td>$250.00</td>
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<td>ASTPUN-S+</td>
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<td>DALPUR-S+</td>
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<tr>
<td>ERYYUC-S+</td>
<td>Rattlesnake master</td>
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<td>45.00</td>
<td>0.18</td>
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<td>PENDEG-S+</td>
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<td>$90.00</td>
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<td>0.18</td>
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<td>RATPIN-S+</td>
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<td>SOLSPE-S+</td>
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<td>VERHAS-S+</td>
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Seed Total $ / ac $793.45
Seed Total $ / zone $714.11
HABITAT SPECIALIST: JACOB FRIES
TELEPHONE #: (608) 663-9613

MARSHALL MIDDLE SCHOOL
25 S PONTIAC
JANESVILLE, WI 53545

PHEASANTS FOREVER, INC.
1783 BUERKLE CIRCLE
ST. PAUL, MN 55110
(651) 773-2000
WWW.PHEASANTSFOREVER.ORG

INVOICE NUMBER: 0031459-IN
INVOICE DATE: 09/24/03

SALES CODE DESCRIPTION UNITS QTY PRICE AMOUNT
SEED02 SEED MIX-MESIC ACRE 1.00 $135.19 $135.19
SEED02 SEED MIX-DRY ACRE 1.00 $133.77 $133.77

*ALL WEIGHTS ARE GIVEN IN PURE LIVE SEED

MISSION: Pheasants Forever, Inc. is dedicated to the protection and enhancement of pheasant and other wildlife populations throughout North America through public awareness and education, habitat restoration, development and maintenance, and improvements in land and water management policies.

PLEASE REMIT PAYMENT TO:

PHEASANTS FOREVER, INC.
1783 BUERKLE CIRCLE
ST. PAUL, MN 55110

NET INVOICE: $268.96
SALES TAX: $13.45
INVOICE TOTAL: $282.41
DEPOSIT: $0.00
AMOUNT DUE: $282.41

☐ TO BECOME A MEMBER, CHECK BOX AND PAY $307.41

See Reverse Side
Spring 2003 Individual Species Seed Bill

<table>
<thead>
<tr>
<th>Grass Species</th>
<th>Rate/Acre</th>
<th>Total Lbs</th>
<th>Price/Lb.</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiangrass</td>
<td>$12.50</td>
<td>$0.00</td>
<td>$12.50</td>
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<tr>
<td>Big Bluestem</td>
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<tr>
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<tr>
<td>Canada Wild Rye</td>
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<td>$0.00</td>
<td>$9.36</td>
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<tr>
<td>Little Bluestem</td>
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<tr>
<td>Side Oats Grama</td>
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**TOTAL GRASSES** (all weights are given in pure live seed) $61.64

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<th>Rate/Acre</th>
<th>Total Ozs</th>
<th>Price/Oz.</th>
<th>Total Cost</th>
</tr>
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<tr>
<td>Bergamot</td>
<td>$14.50</td>
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<td>$14.50</td>
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<td>Black-eyed Susan</td>
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<td>$0.00</td>
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<tr>
<td>Canada Milkvetch</td>
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<td>Cupplant</td>
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<td>Evening Primrose</td>
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<td>$0.00</td>
<td>$6.10</td>
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<tr>
<td>Penstemon</td>
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<td>Pale Purple Coneflower</td>
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<td>$3.75</td>
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<td>Purple Prairie Clover</td>
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<td>$4.00</td>
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<tr>
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<tr>
<td>Stiff Goldenrod</td>
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**TOTAL FORBS** (all weights are given in pure live seed) $72.13

**SUBTOTAL (grasses and forbs)** $133.77

**SALES TAX (if not exempt)**

**TOTAL**

*If you are actively farming, please sign form S-211 indicating you are tax exempt.*
# Pheasants Forever

## "The Habitat Organization"

### Spring 2003 Individual Species Seed Bill

**Landowner:** Marshall Middle School  
**Date:** 8/31/2003

**Address:** c/o Craig Fischer  
25 S. Pontiac  
Janesville, WI 53545

**Acres:** 1.0 Mesic

**Prices as of 03/02/03. Subject to Change**

<table>
<thead>
<tr>
<th>Grass Species</th>
<th>Rate/Acre</th>
<th>Total Lbs.</th>
<th>Price/Lb.</th>
<th>Total Cost</th>
</tr>
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<tbody>
<tr>
<td>Indiangrass</td>
<td>2</td>
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<td>$6.24</td>
<td>$6.24</td>
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<tr>
<td>Canada Wild Rye</td>
<td>1</td>
<td>$9.36</td>
<td>$9.36</td>
<td></td>
</tr>
<tr>
<td>Little Bluestem</td>
<td></td>
<td>$16.00</td>
<td>$0.00</td>
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</tr>
<tr>
<td>Side Oats Grama</td>
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<td>$14.82</td>
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</table>

**TOTAL GRASSES**  
(all weights are given in pure live seed)  
$48.40

<table>
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<td>Canada Milkvetch</td>
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<td>$8.85</td>
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<tr>
<td>Cupplant</td>
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<td>Pale Purple Coneflower</td>
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<tr>
<td>Purple Prairie Clover</td>
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<tr>
<td>Rattlesnake Master</td>
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<td>$7.88</td>
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<tr>
<td>Blue Vervain</td>
<td>1</td>
<td>$6.00</td>
<td>$6.00</td>
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<td>White Wild Indigo</td>
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<td>Rosinweed</td>
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<td>$7.50</td>
<td>$1.88</td>
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</table>

**TOTAL FORBS**  
(all weights are given in pure live seed)  
$86.79

**SUBTOTAL (grasses and forbs)**  
$135.19

**SALES TAX (if not exempt)**

**TOTAL**

*If you are actively farming, please sign form S-211 indicating you are tax exempt.*

Rep: Brian Buenzow  
Picked up from Newville on 05/05/03
Appendix D
To: All Science Teachers

From: Prairie Restoration Steering Committee

Re: Student Participation in Plug Planting

Date: Friday, May 02, 2003

Plans for creating a prairie on the southeast corner of Marshall’s property are progressing. To date, the area has been marked with flags and sprayed with Round-Up.

Very soon, some seeds will be planted with a seed drill—perhaps the week of May 5 or 12. When this occurs, classes are welcome to observe. The seed planting will not take an entire day and, therefore, may not be an opportunity for all your classes.

The next step will be the planting of 2000+ plugs. The plugs are scheduled to arrive on Monday, May 19. We are hoping for a lot of student participation that day (you do the math!)

Please consider this an invitation to participate in this project. So, check your curriculum schedule, fill in the appropriate boxes below, and return to Sandy Armstrong’s mailbox by Wednesday, May 7, 2003.

☐ No, my classes will not be able to plant Marshall’s prairie on May 19th.

☐ Yes, my classes will be able to plant Marshall’s prairie on May 19th.

<table>
<thead>
<tr>
<th>Class Period</th>
<th>Number of Students Per Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2</td>
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<td>5</td>
<td></td>
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<tr>
<td>6</td>
<td></td>
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<tr>
<td>7</td>
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</table>

☐ Yes, I would like to be notified when seeds are drilled.

(this will be an observation day for students)
<table>
<thead>
<tr>
<th>Name</th>
<th>1st Hour</th>
<th>2nd Hour</th>
<th>3rd Hour</th>
<th>4th Hour</th>
<th>5th Hour</th>
<th>6th Hour</th>
<th>7th Hour</th>
<th>Seed/Drilling</th>
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<tr>
<td>Meyer-6</td>
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<td>Golz-6</td>
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<td>Tollefrud-6 (No-PLD)</td>
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<td>Morgan-6</td>
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<td>Johnson-Frees-7</td>
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<td>Fox-7</td>
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<td>Helmers-7</td>
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<td>Pann-8</td>
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<td>111</td>
<td>93</td>
<td>238</td>
<td>233</td>
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</table>
Staff,

Thank you for taking some time to allow our students to plant. Hopefully, this will be the first of many opportunities for us to expose the kids to our native ecosystems.

Today we will seed and Monday we will plant the plugs that have arrived. If you still intend on bringing your class out to plant please come during the times that you signed up for. We would appreciate it if you could come out 10 to 15 minutes after the bell. This will allow Pete and me time to prep our class and give them instruction.

Planting should not take long at all. Once you come out we will give a short introduction and some instructions. We do not foresee planting taking more than 15 minutes. Sixth and Seventh period will be especially crowded so it may take a little longer.

I am taking my personal day today, but if you have any questions Pete should be able to answer them. If you would like to talk to me, my home number is 743-0602.

Thanks, see you on the prairie!

Craig and Pete
Appendix E
Resource Guide Table of Contents with Activity Source Numbered
(See bibliography for corresponding resource number)

**Getting Started Outside**
- The Pedagogical Potential of School Grounds
- Tips and Tricks for Taking Kids Outside
- Take My Kids Outside? You’ve GOT to Be Kidding!

**Prairie Basics**
- Native Biotic Communities – The Basis for Beginning
- K-12 Learning in a Schoolyard Prairie

**6th Grade Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Resource #</th>
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<tbody>
<tr>
<td>Preparing for Field Work</td>
<td>2</td>
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<tr>
<td>Urban Nature Search</td>
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<tr>
<td>Bulking Up</td>
<td>8</td>
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<tr>
<td>Experimenting With Carrying Capacity and Overpopulation</td>
<td>13</td>
</tr>
<tr>
<td>What is a Prairie Climate?</td>
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<tr>
<td>Prairie Weather</td>
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<tr>
<td>Soil Stories</td>
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<td>Temperature Influences on a Community</td>
<td>10</td>
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<tr>
<td>Drawing on Nature</td>
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<tr>
<td>Please Help!</td>
<td>11</td>
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<tr>
<td>Spider Web Geometry</td>
<td>11</td>
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<tr>
<td>Interview a Spider</td>
<td>11</td>
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<tr>
<td>Ants on a Twig</td>
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<tr>
<td>Poet – Tree Forms</td>
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<td>Natural Dyes</td>
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<tr>
<td>Deadly Links</td>
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<tr>
<td>Grasshopper Gravity</td>
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<td>Shrinking Habitat</td>
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<td>Habitrails</td>
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<td>Environmental Barometer</td>
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<td>Improving Wildlife Habitat in the Community</td>
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<td>Did You Notice?</td>
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<td>Build a Bison</td>
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<td>Prairie Biome Mobiles</td>
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<td>Seed Collection Company</td>
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<td>Literature Connection – <em>The Great North American Prairie</em></td>
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<td>Wisconsin Academic Standards</td>
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</tbody>
</table>
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• Outdoor Study Stations ................................................................. 2
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Wisconsin Academic Standards

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• Line Transect: A Classroom Demonstration of the Method for Surveying a Small Community .................................................. 13
• Line Transect: Using the Line Transect Method in the Field ......... 13
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