

EIGHTEEN ACRES OF EDUCATIONAL OPPORTUNITY

A permaculture plan developed for the Midwest Renewable Energy Association

2008



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PREFACE

Permaculture is about whole system design. It is about relationships, building connections between all elements in the landscape in a balanced way. We are attempting to design systems that are ecologically sound and economically viable. But, most of all, we are building community: of minerals, plants, animals and people.

In our work for the MREA it is this process of community that stands out like a shining beacon. We have worked tirelessly together with the same goals in mind: observe, collect, synthesize, design.

In spite of ourselves, we have become over a short period of time, like-minded Permaculturalists sharing our observations and setting up a dynamic dialogue with the landscape that is so much bigger than each of us as an individual.

We would like to thank our students, MREA board members and staff for participating so openly in making this a powerful and transformative experience that will echo down through the years and hold out hope for all. Care of earth, care of people, benevolent distribution of goods and resources. We have come closer to these ideals in our work together. May this design for the MREA be the inspirational banner that moves people from all walks to take the next step and move us closer to these ideals. Thanks.

Wayne Weiseman and Mark Shepard

INTRODUCTION

Friends,

It is my pleasure, and honor, to provide this introduction to the Midwest Renewable Energy Association's (MREA) permaculture plan. This plan is the combined effort of wonderful teachers, students, volunteers, donors, staff members, and the MREA Board of Directors. In the true spirit of permaculture these people brought their unique gifts to the table, shared their experiences, learned from one another, and came up with a "whole that is greater than the parts."

The initial seed for this project was planted two years ago when a MREA donor made a financial gift to start a permaculture demonstration at our site. Thanks to the folks at Midwest Permaculture that seed set roots. With their help, our hope for a small demonstration project quickly turned into an opportunity to develop a complete site design for our 25 acres, and to teach others along the way. Through workshops, lectures, webinars, site tours, readings, and hands-on design more than 40 students learned the skills of permaculture design. This, to me, is the most inspirational part of this project – we didn't just contract for a permaculture design, we trained a workforce.

The design contained in these pages is built on, and enhances, the MREA's mission to promote renewable energy and sustainable living through education and demonstration. It sets out to create a welcoming atmosphere, where people can learn from each other and share their ideas. In this design the site becomes a partner in the educational process, teaching people the tenants of sustainability through its various components and their relationships to each other. I imagine visitors to this site learning through osmosis, as well as through planned educational programs.

Now, I invite you to join us as we take this design and turn it into a reality. Over the next few years the MREA will be hosting workshops to implement various parts of the plan. We will also be fundraising for building projects and other large capital expenditures. As you read through this plan I encourage you to think about where you fit in. Are you a worker bee? We need you. Are you an organizer? You're needed too. Do you have skills, materials, or money to donate? All are welcome. Together we can create a place that teaches, inspires, and renews our spirits.

Tehri Parker
MREA Executive Director
August 8, 2008

OVERVIEW

EIGHTEEN ACRES OF EDUCATIONAL OPPORTUNITY

By the Midwest Permaculture Basic and Advanced Classes, 2008

The schematic design described in this report is based on a whole systems design methodology known as Permaculture. Permaculture design utilizes a set of guiding principles that stem from the philosophical position that, "The only ethical decision is to take responsibility for our own existence and that of our children" (Mollison, 1990) Permaculture is about relationships, building connections between all elements in the landscape in a balanced way. Taking inspiration from natural systems, Permaculture design seeks to create spaces for human use that are both ecologically sound and economically viable. The success of a Permaculture design is measured on how well it builds communities: of minerals, plants, animals and people.

Goal: To provide a visionary design concept for a site plan that allows for the ethical human use and permanent sustainability of the Midwest Renewable Energy Association (MREA) property.

Design Objective: To assess the resources available to the MREA (including, but not limited to, the land, soil, wildlife, plants, sun, rain, wind, water, topography, buildings, people, financial resources, governmental programs, etc.) and create a permaculture design that will:

- Harvest the available and abundant resources in a sustainable manner, to
- Improve the quality of the soil and the natural environment, while
- Producing a myriad of products and services, that
- Require a minimum amount of work and effort, that will
- Support the MREA's vision, to
- Drive the transition of renewables to mainstream use, acceptance, and understanding in the Midwest, while
- Demonstrating how we can all live honorably and sustainably, while
- Creating an authentic-living environment for students, visitors and members of the MREA to work within, for generations to come.

This plan is based on information collected from the MREA's board of directors, executive director and staff—their input provided direction and insights into the practical challenges and visionary opportunities that the organization and the site offer.

PROJECT MISSION

With the needs and the dreams of the MREA in mind, the design team crafted a guiding mission statement for this project:

The MREA promotes renewable energy, energy efficiency, and sustainable living through education and demonstration. (MREA mission statement)

This Permaculture design continues the transformation of the site into a living demonstration of the MREA mission by creating an oasis; a model of sustainability that awakens the senses, educates, and invites participation by the whole community.

Every interaction with the site should result in a mutually transformative experience for both the visitor and the MREA - financially, socially & ecologically.

As humans living in the physical world, we have the ability with our thinking and actions (our personal energy) to create sustainable systems that care for the earth and all people.

In this design energy is defined as: “Any life force expended to create, sustain and/or enhance other life.” Sustainable technologies take into account their rate of replenishment by nature.

The mission, the plan, and the site will evolve together over time and each will fuel the innovation of the other.

PERMACULTURE METHODOLOGIES

The following describes the Permaculture methodologies used to create the MREA plan.

Relative Location --- components placed in a system are viewed relatively, not in isolation.

Everything is connected to everything else --- recognize functional relationships between elements

Every function supported by many elements(redundancy) --- good design ensures that all important functions can withstand the failure of one or more elements

Every element is supported by many functions --- each element we include in the system is chosen and placed so that it performs as many functions as possible

Local focus --- “think globally- act locally”; grow you own food, cooperate with neighbors. Community efficiency, not self-sufficiency

Diversity --- as a general rule, as sustainable systems mature, they become increasingly diverse in both space and time. What is important is the complexity of the functional relationships that exist between elements, not the number of elements

Biological resources --- we know that living things reproduce and build up their availability over time assisted by their interaction with other compatible elements. Use and reserve biological intelligence.

One calorie in / one calorie out --- do not consume more biomass than carbon fixed by the solar budget.

Stocking --- finding the balance of various elements to keep one from overpowering another over time. How much of an element needs to be produced in order to fulfill the need of the whole system.

Stacking --- multi-level functions for single elements (stacking functions). Multi-level garden design, i.e. trellising, forest garden, vines, groundcovers, etc.

Succession --- recognize that certain elements prepare the way for the system to support other elements in the future, i.e. succession planting

Using onsite resources --- determine what resources are available and entering the system on their own. Maximize their use.

Edge effect --- ecotones are the most diverse and fertile area in the system. Two ecosystems come together to form a third which has more diversity than either of the other two, i.e. edges of ponds, forests, meadows, currents, etc.

Energy recycling --- yields from system designed to supply onsite needs and/or needs of local region.

Small scale --- intensive systems start small and create a system that is manageable and produced a high yield.

Make the least change for the greatest effect --- the less change that is generated, the less embedded energy is used to endow the system.

Planting strategy --- natives first, proven exotics second, unproven exotics third; careful on small scale with lots of observation.

Work within nature --- aiding the natural cycles results in a higher yield and less work. A little support goes a long way.

Appropriate technology --- the same principles apply to cooking, lighting, transportation, heating, sewage treatment and other utilities.

Law of return --- whatever we take, we must return. Every object must responsibly provide for its replacement.

Stress and harmony --- stress here may be defined as either prevention of natural functions, or of forced function. Harmony may be defined as the integration of chosen and natural functions, and the easy supply of essential needs.

The problem is the solution --- We are the problem, we are the solution. Turn constraints into resources.

Mistakes are tools for learning

The yield of a system is theoretically unlimited --- the only limit on the number of uses of a resource is the limit of information and imagination of the designer.

Dispersal of yield over time --- principle of seven generations. We can use energy to construct these systems providing that in their lifetime they store or conserve more energy than we use to construct or maintain them.

Policy of responsibility (to relinquish power) --- the role of successful design is to create a self-managed system.

Principle of disorder --- order and harmony produce energy for other uses. Disorder consumes energy to no useful end. Tidiness is maintained disorder.

Observation --- protracted and thoughtful observation rather than protracted and thoughtless labor.

OUR APPROACH

Most of the people who visit the MREA campus in Custer, Wisconsin come for the big party they hold every year. Like most families who throw a big party, the house doesn't look the same as it does the rest of the year. A place takes on a very different character when it's set up to host 25,000 people over a three day weekend for the nation's largest outdoor alternative and sustainable living fair. Visiting the MREA on a typical day is a very different experience. One is struck not only by the wind turbines and solar panels but also by the vast open spaces surrounding a rather modest office building.

Addressing the daily needs and anticipated growth of the organization while preserving the site's ability to host a major event each year was a difficult challenge. We divided the site into seven functional areas based on their current and potential uses and their ecological properties. Each area is labeled by its practical function and by its primary human use.

- A. REI building-*Work*
- B. Commons-*Host*
- C. Forest Campground-*Rest*
- D. Interpretive Center-*Gather*
- E. Fair Parking-*Attract*
- F. Innovation Incubator-*Create*
- G. Homestead-*Live*
- H. A Mazing Park-*Play*

Throughout all areas of the site, we recommend that interpretive signage is created and placed so that visitors can explore, play and understand what they are interacting with.

THE REI BUILDING - WORK

Area A

This building is the control center of the MREA. All business is conducted from this area. The staff is seeking a space that encourages focus and concentration. This will allow the MREA to run more efficiently and better serve the public.

This building was originally built as a wildlife center. At this time the MREA uses it as office space and dorm area. In this design the building is taking on a revised personality by becoming office space exclusively.

The Flow

There are three daily flows of people and one yearly influx. The daily flows are the employees, visitors, students of workshops and their attendant instructors. The annual influx consists of vendors, members and visitors for the MREA's Renewable Energy and Sustainable Living Fair. All these streams are growing, straining the ability of the current facilities to properly service each of these groups. Throughout the building design our goal has been to aid the flow of people around and throughout the main building so that all the demonstrations are more visible and visited.

The Inside

The interior will be reconfigured according to the needs of the office staff. In addition to the development of the interior of this building, other office spaces have been created in other areas of the property.

Atrium

The building entrance airlock doors currently have a large transition, making wheel chair access difficult. A miniature ramp or reconfiguration of this area will alleviate this.

North Office

This office will continue to be used by two staff.

Copy Room

The current copy room will be cleared to allow for use as office space allowing for two desks.

Upstairs West End

There is currently a lack of light in the offices at the west end of the transom. Either a solar tube or windows matching the current set on the south face of the roofline should be used to add light to the transom office space. The further west of south roof line the windows are placed, the more concern for placement will be needed because of current plumbing in that wall utilized by the solar water heating on the west end of the south facing roof.

Library

The library will continue to be used as it is currently configured.

Kitchen

The current kitchen will continue to be used as a kitchen for preparing food for classes and courses.

Old Library

The MREA server is currently in this area. We propose locating the copy machine and related storage here.

Basement

The NW area of the basement is currently used to house a cleanup kitchen, which is primarily accessed once a year for the Energy Fair. A commercial kitchen will be added to the basement. The new kitchen installation would be used as a potential teaching kitchen to demonstrate food prep and storage and to prepare food service for the Energy Fair and events hosted onsite. The northeast area is currently used as workshop space with storage around the east and south walls. A long-term plan includes removing storage from the basement into storage space built into the cooler shed.

Dorm rooms

The current dorm rooms will be converted to office space.

Dorm Bathroom

Another wall should divide the sink/shower and toilet into two separate spaces, each with its own entrance to maximize utility and availability, given potential heavy traffic. This may be done with the current plumbing configuration or the shower and sink may be swapped, while an 'L' shaped wall divides the shower from rest of the bathroom. The current composting toilet will also help with this load.

Apartment Porch

Cold frames can be built and used by staff as hobby spaces. These may also be utilized by the MREA as demonstration units.

Outside

Outside the building we see cold frame gardens along the foundation. Filled with colorful flowers and vegetables, the frames will be interspersed with seating, as a respite for staff during the workday.

South Side

The south side of the MREA building is the main entrance and contains several PV panels. It is sunny, windy and dry. Special care with tree placement using the solar pathfinder is part of this plan. This area is a beautiful location for a small-scale Permaculture demonstration garden. The garden will be planted as an "edible forest garden" which focuses around edible perennial plants.

Plants will include dwarf fruit trees, shrubs, herbs, and vines that can grow over arching trellises above the path. Art and places to sit should also be incorporated - a sundial and wind turbine sculpture are already established. Prairie grass will be planted with the existing blue indigo along the building. In front of the trees banana yucca will line the front of a swale. In front of that will be strawberries and plantings of various native species already found in the garden. Heading further to the south, beyond the path, little bluestem will be planted with the already existing prairie smoke.

A small pond currently exists with a solar powered pump. We recommend expanding the pond for increased water storage as well as habitat for aquatic plants and wildlife. Taking advantage of the natural slopes and water running off the roof will allow for a sustained water level. A swale may be used to collect water from the front of the building and channel it into the pond. Down slope from the swale will be planted with banana yucca, as this specific species expels a chemical from its roots, which can increase water absorption ability in other plants.

In front of the current dorm area we recommend building two small cold frames for demonstration purposes and kitchen use. Cold frames are mini green houses, nothing more than a raised bed with sloped glass that allows for plants such as spinach to be harvested throughout the year. The maintenance and harvesting of these edible crops will be minimal once established and may be done by both staff and visitors. This will illustrate Permaculture principles by establishing a beautiful, productive, low maintenance landscape that feeds the soul, the people and the wildlife.

East Side

This shaded area can be used to grow more shade tolerant plants that fit into the “edible forest garden” plan. This cool area of the building would be good to house Shitake mushroom logs. This creates a demonstration site for mushroom growing on timber harvested from the local forest. By installing a siphon rain barrel on this side we may ensure easy access to water to keep the mushrooms moist.

North Side

The north side is shady and cool. This would be a perfect location for an earthen oven that may be built as a workshop and then used to cook pizzas for the energy fair. The walk-in cooler will be enclosed by a new shed. The existing plantings along with rock retaining walls along the North Side will be enhanced with kitchen herbs, easily accessible from the transitional basement kitchen. A hops vine will climb the retaining wall going towards the West.

West Side

One of the wishes from the MREA members was to have an outdoor workspace big enough for a class of twenty. Constructing a deck over the back “driveway” from the currently existing cement patio to the NW corner of the current kitchen will serve this function as well as being a shaded comfortable atmosphere for those viewing the permanent stage. A pergola could be built above the deck to provide more shade and serve as a trellis for grapes, hops, or other edible climbers. The deck will provide a cover for the basement door entrance, will have storage and workshop space below and act as a bridge around the building to increase flow and take advantage of otherwise lost space. During the fair, the deck will function as VIP seating for the

corporate sponsors of the MREA.

On the direct west side of the building (classroom) we propose a natural log pergola (using onsite cut timber) with grapevines to provide shaded outdoor class space. This adds shading for the building, beauty and added seating space facing the stage. Plantings of aromatic herbs will surround the grape arbor to ward off insects. The area beneath the pergola may be left grassy or a recycled/scrap flagstone patio may be installed. A small retaining wall down slope will make a large level area beneath. The retaining wall will be planted with edible lawn plants like dandelion, plantain, violets, clover, chicory, daisy, etc.

The existing pond will be enlarged to an approximate size of 35' x 20' and planted with cattails and marsh marigolds. Directly below the pergola area, a swale will be installed to consolidate water and move it down slope towards the lower pond area. On the west side duck potato will be planted. Leeks, spring beauties, trout lily and bracken ferns will be planted throughout. Looking northeast, there will be a pruned Korean Pine Nut hedge acting as a windbreak for drifting snow.

Water Retention

On the south side of the building a rain chain will be installed at the lowest intersecting corner of the two eaves. This will direct water runoff and dispel any harmful velocity. The initial rainfall will drop into the swale and drain slowly down slope to the plantings. The excess water will drain into the swale and be directed into the pond.

On the north side, we have placed a large water retention unit to collect rain water for watering the cold-frames and/or plantings in the area.

Outdoor Cooler

The need to cover the outdoor cooler in order to increase its efficiency and extend its useful life provides an opportunity to provide additional cold storage and a place to demonstrate new solar hot water technologies. While this may not be an ideal location for a *solar collector*, it's not unlike the less-than-ideal conditions many people face when choosing a system for their installations. This panel could be used to test the efficacy of current technologies in marginal locations and provide valuable data for manufacturers and installers.

Compost Area

A compost area is just beyond the building. The compost created here will be utilized as fertilizer for various planting areas and the area will serve as a demonstration area for composting classes.

The Rain Garden

This is the first view the visitor obtains as he nears the REI building. It comprises the steep drop off ridge area you step through between the upper road and the immediate lower parking lot. The intent is to present a colorful, unified composition of plants, as well as a functional use of space. Here the visitor will walk through the collection of edible, medicinal, insect-repelling plantings which double as a snow fence and water retention area. The grade and steps are steep and difficult to climb. To assist the traveler, we will re-grade the slope to a gentler angle, while retaining a swale effect. In place of the steps, the gentler grade and swale allows the opportunity

to demonstrate another method of creating a path. Flat stepping stones will hold the traveler above any moist, loose terrain. These stones could be created by a children's workshop or by artists employed by the Incubator. A wheel chair access will be added to the east of the stone path, uphill from the water flow.

Since the area is difficult to mow and is mostly grass it creates an opportunity to diversify the plantings. A living fence will be installed consisting of: apple and plum trees; hazelnuts (*corylus*), winterberry holly (*ilex verticillata*), shrubby, flowering cinquefoil (*potentilla fruticosa*), serviceberry (*amelanchier*), dogwoods (*cornus*), viburnum species, chokeberries (*aronia*), and currants *ribes* species; tick and insect-repelling plants like pennyroyal, garlic chives, wild geranium and mountain mint (*pycnanthimum*); bulb plants for dried and cut flowers; and nitrogen fixing plants like field peas and fava beans. This group of plants will have visual interest throughout the year, while providing food and fuel resources for humans and wildlife.

THE COMMONS --- HOST

Area B

This area is the exterior expression of the heart of the REI Building. The colorful borders welcome the visitor with beautiful flowers and plants, while the central meadow area offers a calm space to relax.

Designed into the Commons area are multiple uses. These uses include a relaxation area; a band shell; an audience area; prairie meadow with gardens; and an Oak Barren incorporating an orchard. The REI building's backyard is a place to invite friends and community for those special occasions.

Stage/reception area

During the fair, this is the central gathering place for people from all walks of life. The visitors may enjoy shows, special speakers and music which will be presented from the band shell, a 25'x40' ft stage. The meadow area is left open to allow for free flow of traffic and seating during the Energy Fair and other large events. Surrounded by prairie flowers and a berry garden, the nearest area to the north of the stage allows for an additional 40'x80' tent.

During other times throughout the year, people from the community may enjoy anything from concerts, dramas and the arts, to renting the area for weddings and other special events. The band shell itself offers plenty of storage space beneath the stage, as well as a built in artisan 20" x 30" bread oven. Here is a place to showcase a hand-built cordwood structure that utilizes local materials. The proposed band shell design is based on a design from a Permaculture course in Ireland taught by Rob Hopkins. In replicating this design, the MREA can create a connection to this other project, allowing visitors to experience it without making an energy intensive overseas trip.

Prairie meadow

Specifically, the septic meadow is a space that spans an eastern portion of our site. This 'meadow' is marked by a triangular assortment of septic well/drainage caps. As opposed to

letting the septic drainage field take up space and render it unused, unadorned, and a dropping point for spotted knapweed seeds, this as an opportunity to introduce an assortment of shallowrooting groundcover species. This may provide several functions: comfort for feet (these species can be walked upon and should feel pleasant to the soles of feet), multilayered beauty for the ground layer, insectaries, pleasant odors, edible and medicinal functions and biodiversity. The plants, if not eaten, can flower, provide beauty, attract human and insect attention, and add to the overall aesthetic component of our design. We promote self-seeding of this area. We value these groundcovers as dynamic accumulators and soil builders. The west side of the forest will need a gradual soil revitalization since we plan to slowly thin out the outer rows and re-introduce secondary hardwood species.

Prairie Meadow Species:

Ground layer: New Jersey Tea (Ceanothus americanus), hog peanut (Amphicarpaea bracteata), buckwheat (Fagopyrum esculentum), northern bedstraw (Galium boreale), ramps (Allium tricoccum), wild garlic (Allium vineale), clover (Trifolium spp.), yarrow (Achillea millefolium), dill (Anethum graveolens), chives (Allium schoenoprasum)

The West Edge

The West Edge is an area hugging the length of the far west fence line. The primary human function abutting this area divides the west edge from the butterfly garden—a driveway used by the neighbor to the west several times each week, perhaps daily. Though this driveway is functional and used often, we look beyond its borders to the windbreak hedge we have designed amid pre-existing vegetation. This hedge will serve as the west border of our primary windbreak. By strengthening the plant community already in this area, we feel we will create several interdependent functions. We offer an improved aesthetic area containing an abundance of native plants, diverse habitat and windbreak elements. The aesthetic and functional qualities of this area are an extremely important component of a visitor's experience at the MREA. From the southeast gazing westward, one can view a sunset above a beautiful frame of diverse and colorful groundcover, swaying cherry branches and communities of berry shrubs.

We also suggest two potential future amendments to the West Edge area. A gradual amendment added to the driveway beginning approximately 50 feet from our area's southwest beginning. In visual terms this spot is marked by the first balsam fir seen to the west at knee level. (At this point we suggest a leveling of the grade so that the depression that occurs in the driveway contours. This depression collects abundant water and softens the driveway surface. By leveling the grade, it becomes level on an incline toward the apex of the driveway.) Somewhere along this leveling we would suggest a potential grading of the driveway toward the east so that rainwater may flow on an even slope toward the butterfly garden. This grade and a possible shallow swale/root-pruned ditch to the east of the driveway (abutting the butterfly garden), would improve any potential erosion problems on the driveway while duly supplying additional water to the butterfly garden. This would promote the health and vigorous growth of our primary windbreak trees as well as other plant species in the butterfly garden.

West Edge Species:

(Notice the lack of canopy trees—we urge the monitoring of tree height in this area. Alterations should be performed as wind patterns are observed)

Sub-canopy: *Wild cherry (Prunus spp.), balsam fir (Abies balsamea), white spruce (Picea glauca)*

Shrub layer: *Serviceberry (Amelanchier spp.), Dogwood spp. (Cornus spp.), hazelnut (Corylus spp.)*

Groundcover: *Phlox (phlox pilosa), common milkweed (Asclepias syriaca), round-headed bush clover (Lespedeza capitata), field goldenrod (Solidago nemoralis), stiff-leaf aster (Aster linarifolius), smooth aster (Aster laevis), lead plant (Amorpha canescens), prairie coreopsis (Coreopsis palmata)*

Butterfly garden

This area occupies the northwestern edge of the meadow. This space may serve many functions—windbreak, habitats for birds, collection point for water runoff, colorful array of plants, and textural variation of resources.

It will be the primary layer (the highest layer) of our windbreak. This windbreak will alter the prevailing northwest winds, providing a yearlong habitat for birds, and a natural collection point for rainwater and snow. Several larger trees exist in the butterfly garden area. We suggest using these trees (white pine, Siberian elm, and pin oak) for a multi-species windbreak. Further plant introduction could include a predominance of Korean pines. These will serve as a source of edible pine nuts, animal shelter, and windbreak-strengthening trees.

In the Butterfly Garden area there are stones of varying sizes. These stones, including an extensive border of stone around the entire butterfly garden, offer an opportunity for microclimate creation and aesthetic appeal. We suggest moving the small edge stones in an artful fashion to mimic a rocky outcrop appearance in the area.

We also suggest revitalizing the year-round beauty of this site. Diversifying the ground layer of this area will improve the biodiversity of all animal and plant life in this area, while controlling the rampant overabundance of a single species of flora (daylilies). Incorporated keyhole beds in this garden will add more growing edges to the space while giving the viewer a greater opportunity to walk in and through the area while harvesting food and flowers or simply enjoying the ambience.

To the rear of the butterfly garden windbreak, a swale would be dug. This swale would slow the flow of water across the property and be utilized by the plants in the vicinity. The slope of the northern portion of this area converges into a bottomland basin adjacent the birch trees in the north/northwest corner. The contour of the landscape deposits rainwater in this area. We see a moist soil area as a natural fit for this area. With this in mind we suggest a list of species that serve many functions within a moist soil environment.

Butterfly Garden Birch Guild Species:

Canopy: *Butterfly garden and windbreak pin oak, American elm. Moist area river birch (Betula nigra), paper birch (Betula papyrifera), black locust (Robinia pseudoacacia),*

Sub-canopy: *prairie willow (Salix humilis), apple (Malus spp.), pear (Pyrus spp.)*

Shrub layer: *Siberian pea shrub (Caragana arborescens), hazelnut (Corylus spp.), elderberry (Sambucus canadensis)*

Ground layer: *red columbine (Aquilegia canadensis), ferns (Pteridium spp.), pointed leaf tick-trefoil (Desmodium glutinosum), wild strawberry (Fragaria virginiana), chamomile (Matricaria chamomilla), comfrey (Symphytum officinale), rough blazing star (Liatris aspera), prairie blazing star (L. pycnostachya), fewleaf sunflower (Helianthus occidentalis), Bee Balm (Monarda fistulosa), Ohio spiderwort (Tradescantia ohiensis), Coneflower spp. (Echinacea spp., Ratibida spp.)*

Butterfly Garden Oak Guild Species:

(An oak guild to complement the trees on the north edge may be included).

Canopy: *white oak (Q. alba), burr oak (Q. macrocarpa), and shagbark hickory (Carya ovata)*

Shrub layer: *hazel (Corylus spp.), elderberry (Sambucus canadensis), siberian pea shrub (Caragana arborescens), serviceberry (Amelanchier spp.), currant (Ribes spp.), gooseberry (Ribes spp.)*

Groundlayer: *Little bluestem (Andropogon scoparius), big bluestem (A. gerardi), Pennsylvania sedge (Carex pensylvanica), field goldenrod (S. nemoralis), stinging nettle (Urtica dioica)*

The Oak Barren and Orchard

This biotic community is an integral component serving many functions. It is a link in the wildlife corridor, an educational tool, a potential home for human-made sculpture, a restorative community, an aesthetically pleasing location and a key component in the rejuvenation of the forest community to the east of our site.

We have entitled this section ‘The Oak Barren’ in homage to the previously abundant Wisconsin ecological community of Oak Barren. We suggest a plant community consisting of species that are known to thrive in this native biome. These species are all indicator species of the scrub barren/oak barren biome. For further guild assemblages we offer the following list of potential species. The west end would concentrate on woody shrubs, added to the present tree edge with prairie flowers. A center bed would consist of prairie grasses, flowers and a companion planting of vegetables. This area would provide a sheltered area for butterflies.

Oak Barren Guild Species:

Canopy: white oak (*Q. alba*),

Shrub layer: hazel (*Corylus spp.*)

Ground layer: Little bluestem (*Andropogon scoparius*), big bluestem (*A. gerardi*), field goldenrod (*S. nemoralis*)

Orchard Guild Species:

(An orchard-based Permaculture garden would be located in the east and north of the commons. An herb garden comprising culinary and medicinal herbs is located within the orchard, beneath the trees where the plants may assist each other in their growth.)

Apple orchard guild: Plum (*Prunus domnestica*), pear (*Pyrus communis sativa*), cherry (*Prunus cerasus*), apricot (*Prunus armeniaca*) mulberry (*Morus species*), daffodil (*Narcissus pseudonarcissus*), allium (*Allium*), mint (*Mentha*), comfrey (*Symphytum officinale*), rhubarb (*Rheum*), clover (*Trifolium*), Russian sage (*Perovskia*), snakeroot, purple cone flower (*Echinacea*), butterfly plant (*Asclepias*), silky aster (*Aster*).

Changes

The current water heating panels in the Commons have an embodied history that should be honored. Having originally come from a Milwaukee site, the panels have been positioned on the MREA site for a time and now they may travel to their next destination. Here are a few venues that have been discussed: They may be auctioned off to raise funding for a new water heating system that could be used on the roof of the new shed for the cooler. Another possibility might be to donate or sell the water heating panels. A third possibility could be to use the current panels in another sector of the MREA to demonstrate technology of the past. Any of these scenarios allows open space for the new stage.

The P-Volt, situated in the central area of the Commons, has been repurposed as an entry area for the Campground.

The training turbines have been placed near the Homestead area, in close proximity to the Pole Barn where they are demonstrated and serviced. The Tilt Up turbine has been placed in the Innovation Incubator area.

The remaining tracker PV panel will remain within the butterfly garden area - a human-made energy system that will exist in unison with an aesthetically pleasing and restorative ecosystem. This area can then serve as an integral area within the greater MREA site – one that showcases animal habitat, aesthetic beauty, human domain, forest corridor and forest rehabilitation.

FOREST CAMPGROUND - REST**Area C**

This area includes the campground area and the edge of the forest to the east. The visitor will come to camp, enjoying the sounds of the wind through the trees, cool air during a hot summer day and many opportunities to learn about the forest and edge as he/she strolls through the area.

The MREA forest offers an opportunity to create a microcosm of the historic native mixed pine hardwood forest of central Wisconsin. Restoration of this forest ecosystem will offer the MREA a limitless suite of opportunities for training courses, outreach and education programs focused on forestry management skills, vegetation succession, and forest product utilization. The following proposed steps may be carried out as resources and staff interest present themselves, but care should be taken to carefully plan the timing of activities to build the appropriate forest infrastructure and functional relationships.

GOAL OF FOREST DEVELOPMENT PLAN: to establish biodiversity on the western and eastern edges of the forest, gradually transitioning from prairie grassland to mature pine and hardwood over-story. The vegetation should develop in stages of elevation from grasses through herbs, shrubs, medium sized trees, pines, and finally to mature northern hardwoods. Although the forest may appear uniform, varying conditions will require a mix of strategies segregated into the following zones.

NW Section

The prevailing winds approach the property from either the northwest or southwest depending on the season. This requires the western edge of the forest to remain intact to function as a windbreak for the southeastern section of the property. As the transitional zones are developed west of the forest, gradual thinning can take place and will accelerate the development of hardwoods in the interior. Initial intervention is recommended for the northwest corner by removing a small grove of trees to begin the increase of sunlight into the interior.

SW Section

The southwest section is bordered by the septic system and drain field to the west. This will restrict the development of the transition zone to relatively short species with shallow root systems. The pines on the border will therefore have to withstand a greater portion of force exerted by prevailing winds. These pines should be retained for their windbreak function, but there is an opportunity to fill in the southern border of this section with oak hardwoods.

West Nursery Section

Species should be removed and healthy specimens should be utilized to improve transition zones on other areas of the property. Shade tolerant hardwoods like maple, yellow birch, and beech should be planted in randomly to begin the hardwood succession zone.

SE Section

Substantial thinning has resulted in establishment of an elderberry-dominated understory with raspberry, gooseberry, poison ivy, and box elder also present. The thinning has resulted in an abrupt increase in wind stress on the remaining pines, and intervention efforts should focus on reducing this stress before removing any additional pines. By removing several pockets of elderberry and planting groups of oak saplings, a spatial transition zone can be created. Once established, oak succession can be expected to move north and west, abutting the thicker stands of pine by the eastern section of the wood chip path. As the transitional section grows and wind stress is reduced in the forest core, pines on the eastern edge can be removed to connect to the spruce and orchard section east of the forest.

Central Section

Saplings of silver maple have been identified just north of the straw bale outhouse and just south of the northern path within the central corridor. This offers an opportunity to plant clusters of silver and sugar maple, allowing them to spread into the interior core of the forest. Eventually, a core of maples and hemlocks will represent the mature northern hardwood ecosystem historic to this region of Wisconsin.

In the middle of the forest, a sheltered meeting circle is the ideal gathering space for hot days. As outlined on the map, a semicircle of stones adjacent to the picnic area takes advantage of this underutilized section of the forest property.

Sauna

The sauna has been moved to a clearing near the composting toilet on the path coming from the REI building. An added natural, low maintenance water collection pond may be utilized as a plunge tub for the sauna. It also creates more diversity in plants, animal\insect inhabitants and birds, which help maintain the pond. The sound of gently falling water will create the calming, restful atmosphere many people desire after a long day at work or on the trail. The sauna should be lit with bio-fuel lanterns and or solar-charged battery operated lights to eliminate the need for electric power and to showcase these alternative lighting technologies.

Straw Bale Outhouse

There is a section of bare dirt encircling the north edge of the outhouse structure. This represents a potential erosion source within the forest. If rocks secured the steep exposed area, blueberries may be planted along the edge of the structure, establishing an additional edible native understory plant.

Pods

On the west edge of the forest area, abutting the Commons, we have located some off-grid office pods amongst the orchard trees. These are permanent, low impact structures. These may be demonstrations of a backyard home office/studio that offer quiet working space for staff, office space during the Fair and demonstrations of off-grid office solutions. Demonstrations may include small-scale solar heated buildings, varied building systems, and office-related alternative technologies such as laptop and cell phone chargers.

Access and Path Modifications

Once the sauna is moved away from the campground entry, the existing slab can be used to construct a gazebo type structure that not only serves as a welcoming entrance into the forest but also becomes a sheltered meeting area and staging area for dropping off and picking up gear. This can be constructed using onsite materials recovered from the P-Volt and adorned with creepers and productive vines.

Recent improvements to the existing path allow for improved flow of visitors into the forest and a connection to neighboring areas. A short link to the Commons area allows for tour opportunities that can explore the transitional succession from grassland to mature pine and

hardwood forest. Additionally, the northeast corner benefits from a small extension, which connects with the proposed council circle in the eastern strip of property. The final path network will allow multiple flow patterns for self guided or guided tours. Through recorded messages or written literature, guests to the MREA property can compare and contrast the restored forest ecosystem with the neighboring pine plantation to the North.

The Edge

This part of the design was developed in response to the MREA's wish for a Permaculture design. This list includes a spiritual area, forage area, outdoor teaching spaces, and an outdoor workshop space (i.e. pruning or bee keeping). The development is planned to require a limited investment, minimal fiscal input, relatively low maintenance, and be a boon to existing fair/festival activities. The design will also focus on demonstrations, facilitating a learning environment for visitors. The intent is to create a bio-diverse forage area that includes human gathering spaces, workshop possibilities for the MREA, and a passive improvement of habitat for flora and fauna.

The Council Ring

We placed a council ring on the north end of the site, located on the highest point in the area and composed of existing boulders from the forest edge. Council rings are usually constructed at a woodland edge with a view to a meadow or lake. Drawing from both Nordic and Native American traditions, council rings serve as a meeting place for conversation, song, dance, storytelling, poetry, campfires and the linking humanity with nature.

The council ring design was originated by landscape architect Jens Jensen, a designer/conservationist who worked with Frank Lloyd Wright. Working in harmony with nature and the site, Jensen's designs feature local resources and native plants. Collaboration may be possible with a University such as Minnesota School of Architecture or UW Madison, or the project may be turned into a workshop opportunity or a design competition.

Labyrinth

The labyrinth is often confused with the maze, in which one may become lost. Here is an opportunity for the visitor or staff member to slow down in quiet contemplation. A labyrinth has a continuous route to the center and back. It is simple to navigate. This gives the person time to reflect on his challenges or his dreams. One may lose track of direction and the outside world, resulting in a relaxed mental attitude, free of internal dialog. Many people believe this meditation has health as well as spiritual benefits.

Guilds

A guild is an assembly of plants and/or animals of different and cooperating species that by their convivial nature provide benefit to each other and their environment. Guilds are usually clustered around a central element and the assembly of plants assists in the health of all the parts of the whole. We have designed the forest edge to be used to demonstrate the benefit and features of guild systems. The guilds will be established in cooperation with the emerging edge and will complement the existing flora while providing opportunities for demonstration, education and workshops.

These guilds will be placed in a formation that will encourage microclimate, increase edge surface area, and draw plant and animal diversity, while providing areas of interest to visitors. The guilds used in this area are complimentary to the current pine overstory and to the planned succession species of red maple and red oak. Many of the suggested plants are currently found in the existing pine forest. Examples of the plants that may be a part of these guilds are listed below.

The Edge Guild Species:

Overstory: Red Maple, Red Oak Secondary Tree Layer: Cherry, Apple, Plum Understory Tree Layer: Service Berry, Choke Cherry, Elderberry Shrub Layer: Raspberry, Blackberry, Gooseberry, Blueberry, Rose

Herbaceous Layer: perennial vegetables, Alpine Strawberry, Comfrey, Tansy, Horseradish, Leadplant, Asparagus, and Rhubarb

Prairie Layer: Echinacea, Bee Balm, Few Leaf Sunflower, Black eyed Susan, Spiderwort, Goldenrod Bulbs, Roots, and Fungus: Daffodil, Daylilies, etc.

Vines: Grapes, Hops

Fruit Progression for Understory Tree Layer:

1st: Service Berry – early summer

2nd: Choke Cherry – summer

3rd: Elderberry – late summer

4th: Nanny Berry – late autumn

The guild located immediately north of the council ring consists of a central dwarf fruit tree such as an apple, plum or cherry surrounded by a low shrub layer such as rose, gooseberry and currant. This guild will be kept intentionally low to preserve the wide view of the meadow and beyond. The herbaceous layer of the guild will interconnect with the herbaceous plantings around the council ring and incorporate a wide variety of perennial vegetables, fruits, and herbs such as asparagus, rhubarb, strawberries, sage and mint. A random assembly of small fruiting shrubs and perennials are planned on the north slope to provide forage for birds, bees and other pollinators. This north fence line is also a good location for bee hives as it offers good seclusion for a bee colony.

At the entrance path to the pine forest campground is a grouping of three existing apple trees. This guild includes gooseberries, low bush blueberries, or currants with an herbaceous planting of tansy or comfrey.

To the south of the apple tree guild is a guild focused around an existing grouping of balsam fir trees. Other planned members of this guild include serviceberry, hawthorn or black cherry, a shrub layer of nanny berry, chokecherry or elderberry and an herbaceous layer of comfrey, lupine, and ferns.

South of the first balsam guild is a second balsam guild. This guild incorporates a nut tree such as oak or hickory and a cluster of fruit trees such as apple, pear, plum or cherry. Other berries such as gooseberry, raspberry and blackberry are complimented by an herb layer of daylilies, asparagus and comfrey. In both balsam guilds, rocks from the existing rock edge can be incorporated to create a microclimate of increased heat and moisture.

At the southwest end of the area is an existing large box elder tree, which can be used as shade for a student gathering space. In the southeast corner a guild dominated by a large fruit tree such as a serviceberry, plum or cherry will serve to enclose this space. Other members of this guild include shrubs such as gooseberry, current, and raspberry or blackberry and an herb layer comprised of asparagus and lilies.

A prairie restoration area is located along the eastern fence near the council ring, creating a focal point for those entering the space from the campground path. The planting includes Echinacea, Bee Balm, Few Leaf Sunflower, Black-eyed Susan, Spiderwort, Goldenrod and prairie grasses. This planting provides additional forage for wild birds.

Bees

The northeast corner of the “Edge” provides an excellent environment for bee keeping. Bees have many advantages including pollination for the fruits trees and other plantings on the MREA site. The northeast area is secluded and low in visitor traffic, which makes it the best location on the property for keeping bees. A bee hive can face southeast offering early morning warm sun for optimal hive conditions and a flight pattern that is least intrusive to human activity. The MREA could consider partnering with a local beekeeper who would be willing to offer workshops in beekeeping. Bees may also offer a contribution to the harvest fair in Fall, in the form of saleable honey.

Circulation and Education

The campground path that leads to the site could be extended to draw people toward the council ring; however, site circulation is otherwise informal and may be guided by a pamphlet. Educational materials may be in the form of signage, self-guided tour tri-fold, staff interpreter, or through a water-tight box that will hold a variety of pocket identification books or other materials supplied to the visitor who can return them to the box. This area should be tied into a larger Permaculture MREA site tour.

INTERPRETIVE CENTER --- GATHER

Area D

As the MREA grows and the number of workshops and drop-in visitors increase, the need for a dedicated visitor center is more apparent. The new Interpretive Center will provide a flexible space for year-round class use, as well as a welcoming and interactive space for visitors to learn what the MREA offers without interrupting the workflow of the staff in the main building.

The Interpretive Center will be the home base of a visit to the MREA. This space will also serve as the hub for information about the many demonstration areas around the grounds and is the launch pad for self-guided walking tours available to the visitor. It will also house the gift shop and provide gallery space for educational exhibits that teach, inspire and invite participation. The building will also include a flexible multi-purpose space for use as a large classroom that can also be sectioned into smaller classrooms, dormitory space and a kitchen.

As an independent building, the Interpretive Center’s design provides an opportunity to add

aesthetic variety to the MREA campus and demonstrate different building styles and techniques that fit within the MREA mission. In this design we recommend that part of the Interpretive Center be constructed of recycled shipping containers. Reused shipping containers provide a useful and dramatic environment in which to tell the story of energy use and generate conversation around alternative transportation and energy conservation. Shipping container architecture demonstrates not only the principle of one calorie in/one calorie out, it also provides a good example of succession design, as the shipping containers can be moved or recycled.

The PV training roof that now sits alone in front of the REI main building will be incorporated into the design of the Interpretive Center along with other roof styles. This will provide more teaching options for PV installation workshops.

Outside, on the south side of the Center, is a children's discovery area where children explore natural materials in a relaxed atmosphere. Surrounded by edible shrubs and trees, playground structures will be designed that introduce the concepts of recycling, energy use and basic physics in a way that is fun, educational and most of all, entertaining. During the fair, all family-oriented activities and tents will be set up around this area and it will be a respite for both parents and kids.

To the northwest of the Interpretive Center, a solar carport provides premium parking spaces for charging electric cars during the year and can serve other functions during the fair.

The area south of the carport is the main tent area, where we suggest semi-permanent structures like yurts that are phased in year by year. These offer beauty and flexibility and can be used for classroom space, fair demonstration, temporary housing or offices. They can also be used offsite.

FAIR PARKING/OAK SAVANNA---ATTRACT

Area E

In designing this element of the MREA site, our challenge was to find a way to restore an ecological balance to this 10-acre field which is used intensively for 3 days during the MREA fair in June, and barely used the other 362 days of the year.

Imagine walking toward the parking area and seeing an Oak Savanna; an example of past generations of inhabitants who lived on this land, endured recurring fires, and persisted in building a community. Here we see the plant community: dominant canopy trees, a large variety of edible shrubs and other plants growing alongside each other. In past history, herds of animals would roam the savanna, migrating from place to place as the seasons changed. Today, we find herds of vehicles dwelling on the land during the June fair time. These vehicles arrive en masse and leave just as quickly. The trees will stand firm, anchoring the plant and animal community and holding water in the soil to prevent erosion. The plant communities in the Oak Savanna will also provide shade relief, carbon sequestration, oxygen production, markers/guides for direction and flow of both vehicles and people, wildlife habitat, safe places where people can 'picnic' and an opportunity to educate and demonstrate how the earth's natural systems are used and shaped by energy.

If we think of trees in terms of renewable energy, by harvesting sunlight a tree is able to generate \$31,250 worth of oxygen, provides \$62,000 worth of air pollution control, recycles \$37,500 worth of water, and controls \$31,250 worth of soil erosion. For the 42 parking spaces lost initially, the young tree guilds would generate about 81 liters of oxygen a day. When they mature to a 39” diameter, they would be generating 444 liters of oxygen daily. We designed to allow for 42 dominant overstory trees including hickory and chestnut in the ten-acre parking area as we reintroduce the natural oak savanna system. Each tree will be donated in honor of someone as in the memorial driveway and planted at intersections of contours and parking rows to collect water and give structure to the parking scheme. Surrounding each donated tree will be shrubs and log benches to protect the trees from cars. This will displace about one car per tree in the immature stage and will evolve into a more complex ecosystem by adding understory trees and vines as off-site parking and/or alternate forms of transportation become more widely used.

The Oak Savanna will also attract wildlife, which will become the main inhabitants of the site during most of the year. As the guilds grow and are expanded with understory species and lowgrowing plants, and with the addition of five bird-of-prey roosts over the ten acres, we would anticipate seeing the following wildlife inhabit the site: Fox, Bluebirds, Sparrows, Swallows, Robins, Cardinals, Ground squirrel, Junkos, Black firefly, Common walking stick, Colletid bee, Black horned tree cricket, Blue racer, Gray Tree frog, Tiger salamander, American kestrel, Eastern kingbird, Gray catbird, Easter meadowlark, Indigo bunting, Vesper sparrow, Great horned owl, Barred owl, Eastern screech owl, Red tailed hawk.

INNOVATION INCUBATOR - CREATE

Area F

The Arts and Business Incubator helps budding small business owners and artisans who are just starting out. These entrepreneurs are creating innovative, energy-efficient products while using and recycling sustainable resources to run their business. Here is the opportunity to support the owner through the incubator process while teaching energy conservation about light industrial business, a microcosm of the bigger picture.

Putting artists and technologists together creates a poly-culture of talent that will fuel innovation. One of the common obstacles that limit the acceptance of alternative energy is the belief that these systems are ugly. Bringing artists into the alternative energy community will help pave the way toward the development of more appealing alternative energy design.

Business incubators are programs designed to accelerate the successful development of entrepreneurial companies through an array of business support resources and services, developed and orchestrated by incubator management and offered both in the incubator and through its network of contacts. “In 2005 alone, North American incubation programs assisted more than 27,000 companies that provided employment for more than 100,000 workers and generated annual revenues of \$17 billion.” (Linda Knopp, 2006 *State of the Business Incubation Industry*. Athens, Ohio: National Business Incubation Association, 2007.)

The MREA may collaborate with the owners to teach, learn and share various services and

products. Wind turbines will provide energy for the lighting and other electrical needs. Below the turbine(s) would be a display of several sculptures demonstrating renewable principles. In this manner, the wind turbine itself becomes a sculpture. The space provided in this area is then shared by artists as well as innovators. Interpretive signage will be seen along a self-guided tour which includes the inside and outside of the building area.

The opportunity to develop small businesses using sustainable practices presents itself through many venues. The diversity of small businesses includes artists, offices and workshops, which may be complementary. This would create a living demonstration for the small scale, possibly off-grid, business model and would create a local business community for sustainable energy. Resources may be shared for community efficiency rather than self-sufficiency. These resources may include space, ideas, time, finances, etc.

Tilt Up Wind Turbine

The tilt up wind turbine will be relocated to this area, and used as a power source for the building. Solar panels, a living roof, and other alternative energy functions may be built into the building as well and may generate enough excess power to sell back to the grid.

Sculpture Garden

The vision for this area is artists and innovators working together to create a more aesthetic environment. A sculpture garden designed to inspire other business builders is planned to the west of the building. The tilt up turbine may be positioned in such a manner as to be used as a massive sundial, as well as an anchor for other artistic additions. As visitors view the area, they will be inspired by the manner in which the turbine(s) placement invokes sculptural beauty by its presence. In the same area other sculptures will be added, the theme being sustainability and beauty. As people consider installing energy technology in their environment, they will be inspired to beautify the view as well as utilize natural resources.

Greenhouse

During another phase a greenhouse may be added to the area. This will allow a further option for those who work in this area to grow their own food or to grow plants to sell or use on the property. As a demonstration, this may show others how to build, run and use a greenhouse in a sustainable manner. These ideas may be utilized for the small-scale home environment continuing through to the large-scale corporate environment.

Compost system

Finally, this area houses the demonstration of the large-scale composting system. During and after the Energy Fair a great deal of garbage is collected and placed in rows to be composted using large machinery run on bio-fuels. In this manner, the piles will be turned on a regular basis, thus reducing the labor-intensive effort of an individual. This demonstrates how businesses and communities can handle waste by recycling on-site resources that can be utilized again on the property.

HOMESTEAD – LIVE

Area G

We are experiential beings. The more we can experience something in a way that is personal and familiar, the more likely those experiences will have lasting impact in our lives. The Homestead is more than a model; it is an actual home, retro-fitted with affordable technologies that visitors can implement in their own lives.

The House

The Homestead is located in the area of the MREA grounds where a residence once stood. On a walk around this area today, you can see evidence that not so long ago someone cultivated and cared for this area and they planted trees and perennial vegetables that still exist today. We have incorporated these abandoned and useful elements into a new Homestead the size of a typical suburban lot as an example of what can be done with conditions that mirror those of the typical visitor. The house could be an older home that is moved to the site, demonstrating reuse, or it could be a manufactured home made by one of the local manufacturers in Pittsville or Wausau, showing the energy efficiency and production efficiencies of manufactured housing. Regardless of whether it's a new or existing house, the home should be about fifteen hundred square feet, the size of a typical home built in the 1970's, and outfitted to showcase domestic scale alternative energy and sustainable technologies. Looking like it could fit into a neighborhood in Anytown, USA, this house gives visitors a clear picture of sustainable living that is innovative, accessible and aesthetically familiar. It tells the story of how each one of us can make very tangible and effective changes to the way we live and provide for our basic needs without compromising the environment, our comfort or our quality of life. While part of the house will be made available for tours and demonstration purposes, in order to make use of the capital and energy required to build and maintain it, we recommend that the Homestead serve as home for a new MREA groundskeeper. As the various systems on this eighteen-acre site mature, the groundskeeper will be essential to its ensured success as the plants become established and the design is implemented. The Homestead is the logical place for this person to live, just as a farmer lives on the land he or she farms.

The Systems & Technology

The systems and technology that run the Homestead are small-scale affordable options that have been donated by members of the MREA and by the vendors that come to the fair each year. It provides them with an opportunity to showcase their ingenuity in a real-life scenario and to a much greater audience than just the annual fair-goers. Here we have a combination of low-tech and high tech options for heating, cooling and lighting the home. A passive solar attached sunroom/greenhouse can collect the free heat from the sun and distribute it into part of our home (via simple convection) on sunny days and the resident can also grow seedlings and plants during the cold Wisconsin winters. By simply orienting the house for maximum day lighting, we have minimized the need to turn on lights during the early morning and early evening. Wind and solar power are the main source of home heating and electricity needs and the excess is sold back to the grid for a profit. These technologies are displayed inside the home using cut-a-ways or "truth windows" in the walls and floors to showcase how they work and to give visitors the ever-important visual picture of how these systems might apply in their own homes.

Outside Systems

The resident groundskeeper uses a bicycle and an electric vehicle for transportation, both of which he keeps in a small solar carport next to his home. He has a small tool shed where he keeps a small push-mower, a scythe and many other well-made “lifetime” tools for managing his property. The former septic tank of the old home site has now been lined and converted into a cistern that collects rainwater from the home, which is then used to water the extensive Permaculture gardens via a solar powered pump. By using composting toilets and a simple greywater system, our home has no need for a septic system. All “waste” is turned into resource and in so doing we have closed the human ecological loop.

Outside Life

Fortunately, we have a great deal of existing vegetation planted by the former inhabitants of the site and we can use this to our advantage as we move toward establishing Permaculture gardens that will be maintained by the resident as he grows most of his own food. Already present are pine, spruce, apple, asparagus and rhubarb just to name a few. There is small outdoor kitchen with a sink and canning area, a cob oven and of course, a barbecue. His gardens are designed so that he has a continual flow of food by using the principles of Permaculture and biointensive gardening. His gardens hug the foundation of his house, which in turn helps keep the foundation cool. A short distance from the home is a small, contained area that houses our chicken coop and rabbits in raised hutches. Below the rabbits, chickens scratch the bunny pellets into crumbly soil. In the shade on the north side of the chicken coop, we have edible mushrooms growing on old logs above a water trough, fed by the runoff from the coop roof. Also in this sheltered area sits a vermicomposting “bin” that is sunken into the ground to insulate the worms during the winter. Between the rabbits, chickens and worms, there is no garbage to dispose of. The lawn is made up of edible greens so mowing is done infrequently. The gardens on the edge of the property are made up of many culinary and medicinal plants, which the residents(s) can use to maintain their optimal health.

The Pole Barn/Lab Workshop

To the east of our caretaker’s home sits a pole barn. This has been expanded from its original 30x40 feet to 40x80 feet, retrofitted with locally harvested cordwood infill and repurposed as the lab workshop. Here, all classes and activities involving solvents, oils and other messy technologies will be conducted. This is both a hands-on classroom and a maintenance workshop for the property.

New Wind Area

Alongside the pole barn, to the east, stands a tall working wind turbine. This brings energy to the site to be utilized for electricity as well as a teaching tool for workshops held in the labworkshop. The practice turbines have been also been re-located east of the pole barn, so they can be available for demonstration during a workshop or class. There is enough room in this area to add more turbines, for practice or as generators of electricity as the need arises. As the visitor views the Homestead he learns about many of the options that are available for him to use in his own environment.

A MAZING PARK - PLAY

Area H

Here dwells a whimsical swirl of biofuel. At the furthest point on the campus lies a playful arrangement of woody plants which once established, will require minimal maintenance. Children will enjoy running through the area, while their parents may leisurely view the interspersed mechanical tools.

Advantages of this arrangement are that, once established, the Park will maintain itself. Not only is this a habitat for creative play and imagination, but it also serves as an area for harvesting biomass, using it onsite, and allowing workshops for educational purposes. As they are moving through the maze, the family will encounter a nutcracker, a pelletizer, and an oil press, among other mechanisms. These machines will be used to prepare the hazelnut products to be used at biofuel stations as well as in biofuel furnaces. This demonstrates the Permaculture principle of stacking through the many uses occurring at the same time. Many varied yields are harvested from this system. Energy is recycled through careful planning and planting in addition to the utilization of resources developed at this site. Traditionally, hazelnuts have been utilized for many purposes. Besides use in food products and biofuel, other uses include medicinal and utilitarian.

This is an opportunity to share resources with the community through creating a fun space for people to gather, explore and learn as they enjoy the atmosphere – a Park that grows and educates families for today and into the future.