OPPORTUNITIES IN ECOLOGICAL REUSE & ENVIRONMENTAL EDUCATION AT THE TOWN OF ROSALIA, WASHINGTON UST FIELD PILOT SITE

Report submitted to:

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The Wildlife Habitat Council (WHC) commends the Town of Rosalia for its commitment to improving habitat for wildlife through the initiation of a wildlife habitat enhancement program at the Rosalia, WA UST Field Pilot Site.

We thank Jim and Diane Nebel, Mike Boatsman, and Mike Shepherd for their hospitality during WHC's visit to Rosalia. WHC also thanks US EPA's Office of Underground Storage Tanks for their support.

The **WILDLIFE HABITAT COUNCIL (WHC)** is an independent, nonprofit assemblage of corporations, conservation organizations, and individuals dedicated to protecting and enhancing wildlife habitat.

Created in 1988 and based in the greater Washington DC area, WHC strives to promote responsible environmental stewardship within the corporate management culture through the provision of expertise and resources to companies concerned with the protection of wildlife habitat on private landholdings. Over 2 million acres of private land is currently managed for wildlife through WHC-assisted projects in North America and around the world.

WHC also works to broaden understanding of wildlife values through the incorporation of environmental education, volunteer participation, and community outreach programs.

NONDISCLOSURE STATEMENT

This document contains confidential and proprietary information. WHC will not distribute this report to others without express written consent from the Town of Rosalia and US EPA's Office of Underground Storage Tanks. We also recommend that discretion be used when distributing this document to others.

This report is intended solely as a guidance tool for implementing wildlife habitat enhancement programs on corporate sites. WHC therefore cannot assume responsibility for local, state, and federal regulatory programs and authorizations. WHC strongly recommends that site managers consult with state and federal experts with regard to regulatory requirements in the region prior to implementing any activity in a regulated habitat. WHC can assist with the identification of appropriate regulatory contacts, if necessary.

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BY MARCIA MASLONEK

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EXECUTIVE SUMMARY

The Rosalia UST Field Pilot site is part of EPA's USTfields Program. This Initiative funds states and tribes to conduct pilot projects in brownfields communities to assess and clean up petroleum contamination from federally-regulated underground storage tanks (USTs) at idle or abandoned commercial properties. In 2002, EPA's Office of Underground Storage Tanks (OUST) competitively selected 40 state and tribal USTfields Pilots, and the Rosalia, Washington site was one for EPA Region 10. In this and other pilots, the state works with the local community or the tribe as well as its EPA Region to address identified sites. Each pilot is awarded up to $100,000 of Leaking Underground Storage Tank (LUST) Trust funds to assess and clean up petroleum-contaminated sites; as a result, the sites will be ready for future reuse. The Town of Rosalia consists of approximately 600 people whose leaders and citizens were determined to clean up the abandoned gas station site and restore the station's infrastructure. They received funding from the Washington Department of Ecology, Whitman County, EPA, and private donors to remove five underground storage tanks and petroleum contamination at the site, restore the old station, and create habitat for native species.

The State of Washington has been working closely with the Town of Rosalia to address the Old Jensen Texaco Station site on Whitman Street. This former gas station site is located in the middle of Rosalia's business district. It operated from 1923 until the mid-1980s and has since been abandoned. Rosalia is a small rural farming town surrounded by vast wheat fields, along with an economically depressed downtown commercial center. Using USTfields Pilot funds, the state of Washington partnered with the Town of Rosalia to conduct a site assessment and clean up petroleum contamination on this property. Clean up has now been completed and the town now plans to redevelop the site into a visitor and community center with native landscaping and green infrastructure. This would enable the site to serve as a focal point for economic, cultural, and educational development. The site will also serve as the interpretive center for the nearby Steptoe Battlefield, a state park listed on the National Register of Historic Places.

A total of five (5) underground storage tanks (USTs) and associated piping were removed from the site in June 2003. Two 4000-gallon gasoline USTs were located immediately adjacent to the east wall of the building. There was also a 1000-gallon UST on the north side and the two original (circa 1923) 300-gallon USTs on the south side. A site assessment conducted at the time of the UST removal identified petroleum contaminated soils at each of the tank locations.

The site assessment, remedial investigation, and subsequent cleanup actions were conducted in accordance with the Washington State UST Regulation (Chapter 173-360) and the Washington State Model Toxics Control Act (MTCA) Cleanup Regulation (Chapter 173-340-450). Remedial actions at the site consisted of the excavation and off-site treatment and

disposal of impacted soils. Approximately 550 tons of gasoline-contaminated soils were removed. Benzene, Toluene, Ethyl Benzene, and Xylenes were found at the site in concentrations above established cleanup levels. Soils were excavated to a depth of 27 feet below ground surface, the approximate depth of groundwater in this area.

Contamination was shown to attenuate with depth with a distinct zone of contamination within a sandy-silt lens at a depth of 15 feet below ground surface, 12 feet above the groundwater table. Soils just above the groundwater interface were shown to have levels of Benzene and Total Petroleum Hydrocarbons (TPHs) slightly in excess of cleanup levels. It is likely that petroleum contamination has impacted groundwater.

The excavation of the remaining petroleum contaminated soils is not practical without destroying the historic building this project was intended to restore. In-situ treatment options have been considered but will not be pursued until additional groundwater data is evaluated. Natural attenuation of the remaining contamination may prove to be an adequate and appropriate cleanup alternative. However, that determination will require groundwater-monitoring information that is not yet available.

The petroleum contamination associated with this site is 20 to 80 years old. Although there have been no reported or readily identifiable off-site impacts, it has been a remarkable and meaningful accomplishment to have cleaned up the majority of the contamination associated with this site and to have substantially mitigated potential impacts to downgradient receptors.

The Wildlife Habitat Council (WHC) entered into a cooperative agreement with EPA's Office of Underground Storage Tanks (OUST) in 2003 to help maximize the ecological benefits of reusing petroleum brownfields. One goal of the agreement is to demonstrate how federal, state, and local governments, industry, and community groups can use ecological enhancements to facilitate the restoration of petroleum brownfields for a variety of uses, including wildlife habitat.

WHC aims to work with the USTfield Pilots to develop opportunities for increasing the use of ecological enhancements in the redevelopment plan. Recommendations on how to collaborate with all stakeholder groups to implement ecological enhancements are developed at a site. An emphasis is placed on identifying how sites frequently thought as unusable can be developed into urban pocket parks and community centers for education and native landscaping. The Wildlife Habitat Council commends the Rosalia, Washington team for its efforts to incorporate native landscaping and wildlife habitat into their redevelopment plans for this abandoned service station property.

To assist the Town of Rosalia in augmenting the existing plans for landscaping, redevelopment and community outreach, the team that leads up the revitalization of this site invited a WHC biologist for a second visit in January of 2005. The initial visit was conducted in 2003. The following report summarizes the plans that have been made for the Rosalia USTfield Pilot site, as well as recommendations for expanding upon those endeavors. This report will focus on three key topics have been identified as priorities for the Rosalia Team, which include the following:

- Establishing a Learning Landscape Representing the Palouse Ecosystem;
- Implementing Low Impact Design as Part of the Redevelopment Plan; and
- Sustainably Managing the Landscape through Community Partnerships and Environmental Education.

1. OVERVIEW OF SITE VISIT

The Rosalia Team met with Lesley Kordella, WHC Wildlife Biologist, on February 1st, 2005. The meeting began with a discussion at a local restaurant across the street from the Rosalia property, where attendees revisited and reviewed projects initiated by Jim and Diane Nebel, leaders in the redevelopment of the site. Following the meeting, the group toured the site and reviewed areas of priority for landscaping and infrastructure. These areas included the existing Hall Memorial Garden, the proposed area for native landscaping surrounding the Hall Memorial Garden, and the proposed parking area now covered by gravel behind the old gas station building. The visit ended with a discussion between Lesley Kordella, Jim and Diane Nebel, Mike Boatsman, Site Manager of Washington's Department of Ecology's Toxics Cleanup Program, and Mike Shephard, Leaking Underground Storage Tank Manager of US EPA Region 10, as well as others in attendance from the Town of Rosalia Team leading redevelopment efforts on the site. The following sections summarize recommendations based on this site visit for native landscaping, environmental education based projects, and other environmental initiatives at the Rosalia USTfield Pilot. Images of each area cited for these projects are included in **Appendix III**.

2. ESTABLISHING A LEARNING LANDSCAPE EXPLANATION OF PALOUSE ECOSYSTEMS AND CONCEPT DESIGN

The Rosalia planting project provides a unique opportunity to create a landscape that is both a beautiful complement to the extraordinary building revitalization, but also an opportunity for learning. Just like the visitor's center itself, the landscape can act as a way to connect the visitors to the interesting story of Rosalia. The following sections explain how to prepare the site, acquire plants and adding elements to the landscape that will engage the visitor in exploring Rosalia's "Story of Place"—to glimpse the distinct natural history and equally rich human history of the region. Just as the history is conveyed in the Visitor's Center through artifacts from the service station and the blacksmith's shop that once occupied the site, the "story of place" will continue to be conveyed through the plants that have been so much a part of the lives of humans and wildlife thought the history of this area.

Garden Concept Design: "A Landscape of Travelers"

The landscape design for the Rosalia Visitor's Center incorporates many elements that the Rosalia Team had originally hoped to provide in an aesthetically pleasing garden for the Center including:

- A "Bee Happy" garden where children could explore the relationship of plants and pollinators,
- The use of several cultural artifacts including the blacksmith's (garden) shed, the original homestead side walk, and several cast iron elements from the old filling station,
- The existing large pine and lilac plantings as part of the landscape design,
- A picnic area where weary travelers might rest before returning to the road, and
- The addition of a water feature to add the dimension of sound to the landscape, along with providing wildlife with a water source.

After several additional brainstorming sessions with WHC staff, the group also decided to incorporate native plant communities of the distinctive Palouse ecosystem, which could be used to educate the visitors about the unique geology and ecology of the region.

The landscape design, incorporating all of the above elements was developed by WHC to provide Rosalia with a landscape that is as welcoming to wildlife as it is to human visitors. This "Landscape of Travelers" which features native plants of the Palouse grasslands, scrub thickets, ridges, and slope communities, contains plants that are beautiful for decorating the suburban environment. The plants are also useful in supporting the wildlife of the region, providing nectar, seeds, berries, and essential cover for birds, mammals, butterflies, and a host of pollinators.

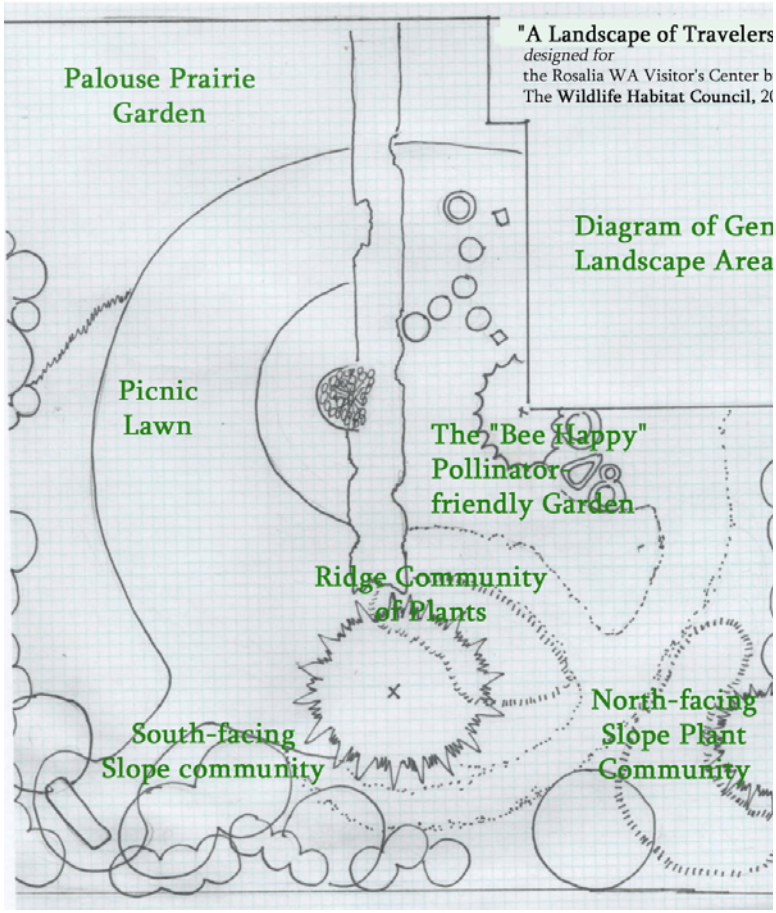
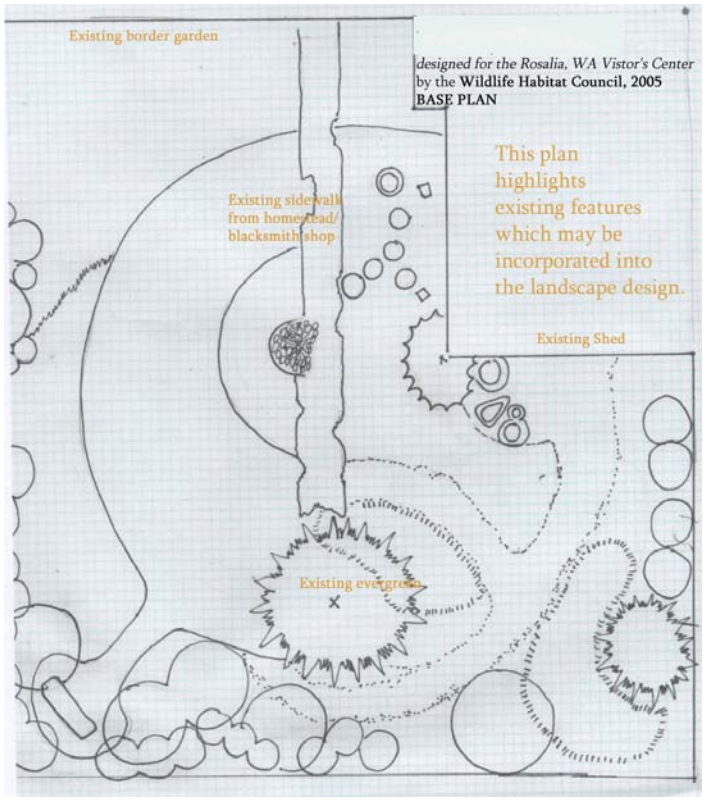


Figure 1. The diagram above illustrates the general areas of the new landscape design.

Although the garden areas will "flow" seamlessly together to the eye of the visitor, the landscape is divided into distinct planting zones, several of which represent unique natural communities of plants that occur on the Palouse. These natural communities (the Palouse Prairie or grasslands, the South-facing Slope Community, the Ridge Community, and the North Facing Slope Community) are filled with wonderful plants, worthy of study and admiration. By grouping them together, that study and appreciation is made easier, as the Rosalia Visitor's Center seeks to convey the region's "story of place" to its visitors. .

Figure 2. Existing Feature to Be Incorporated into Landscape Design



The design also incorporates many existing elements that will help to "tell the story of place" as visitors explore the garden. The large evergreen and lilac plantings already thriving on the site will become part of various 'landscape vignettes;' providing an essential 'backbone' to the newly planted garden. The old shed will be used to display cultural artifacts (described in more detail in section 2.2.1.4.), and the well -worn homestead sidewalk, which bisects the garden, is incorporated as a means of "transporting the garden visitor to a slower time in the history of Rosalia, when stagecoaches stopped at this site, instead of automobiles."

2.1 SITE PREPARATION AND PLANT ACQUISITION

2.1.1 Plant Acquisition

When acquiring native plants, care should be taken to obtain the plants, which are propagated within a nursery setting, and not wild-collected. For a comprehensive list of nurseries specializing in the plants of the Palouse, consult The Washington Native Plant Society at
6310 NE 74th Street, Suite 215E, Seattle, WA 98115
206-527-3210 or 1-888-288-8022
E-mail: wnps@blarg.net or log on to their webpage at
http://www.wnps.org/landscaping/nurserylist.html

2.1.2 Site Preparation

Before planting, the basic outlines of the garden areas, along with the picnic lawn, should be clearly marked using stakes and landscaper's tape or fluorescent paint. If the grass is to be left in place for the picnic lawn, care should be taken to protect it by not covering it with debris as surrounding planting beds are installed. In all likelihood, an over-seeding and revitalization may have to be undertaken to bring the grass back to full health. (Please note: WHC strongly encourages the Rosalia Team to thoughtfully consider organic lawn and integrated pest management practices, as such will provide the best environment for both picnickers and wildlife that use the area when it is finished). WHC also suggests encouraging on-going collaboration with local master gardeners to assist in soil amendments and overall management. One suggested contact is:

Tonie Fitzgerald Extension Faculty, Horticulture
222 North Havana
Spokane Washinton 99202-4799

509-477-2164
tjfitz@wsu.edu

2.2 REPRESENTING THE PLANT COMMUNITIES OF THE PALOUSE

The Town of Rosalia, is situated in what is known as the Palouse bioregion. This bioregion lies along the western edge of the Rocky Mountains and covers an area of 16,000 km^2 in southeastern Washington, west-central Idaho, and northeastern Oregon. It has a temperate climate and receives most of its precipitation as rainfall. Elevations range from 1,200 to 6,000 ft (366 to 1,830 m) with hills and low mountains in the eastern section of the area. Historically, the bioregion was dominated by perennial grass prairie. Yet, since 1870, the area has experienced extensive agricultural development as 94% of the Palouse bioregion's grasslands and 97% of its wetlands have transformed into crops, hay, or pasture.

The Palouse bioregion's grasslands had three distinct zones, each with its own distinct species. Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Pseudoregneria spicata*) dominated the wetter, eastern zone of the Palouse prairie. A drier zone incorporated the western edge and was dominated by bluebunch wheatgrass as well. A sparser shrub

community supported the third zone, which was located in the Snake and Clearwater River canyons.

Riparian zones located with the bioregion hosted plains cottonwood (*Populus deltoides*), quaking aspen (*P. tremuloides*), mountain maple (*Acer glabrum*), and red alder (*Alnus rubra*). Forest communities in the eastern edge of the area grew ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) as well as oceanspray (*Holodiscus discolor*) and serviceberry (*Amelanchier alnifolia*; Tisdale 1986). In addition to those mentioned above, below is a list of some other native species to the Palouse bioregion:

Table 1. Native Species of Wildlife to the Palouse Bioregion

COMMON NAME	SCIENTIFIC NAME
Burrowing Owl	*Athene cunicularia hypugea*
Ferruginous Hawk	*Buteo regalis*
Grasshopper Sparrow	*Ammodramus savannarum*
Gray Partridge	*Perdix perdix*
Swainson's Hawk	*Buteo swainsoni*
Chinook salmon	*Oncorhynchus tshawytscha*
Steelhead	*Oncorhynchus mykiss* spp.
Elk	*Cervus elaphus*
Mule Deer	*Odocoileus hemianus*
Washington ground squirrel	*Spermophilus washingtoni*
White-tailed jack rabbit	*Lepus townsendii*
Spalding's catchfly	*Silene spaldingii*
Jessica's aster	*Aster jessicae*
Broadfruit mariposa	*Calochortus nitidus*
Palouse thistle	*Cirsium brevifolium*
Palouse milkvetch	*Astragalus arrectus*
Palouse goldenweed	*Haplopappus liatriformis*
Black hawthorn	*Crataegus douglasii*
Bluebunch wheatgrass	*Pseudoregneria spicata*
Camas	Camassia quamash
Cheatgrass	*Bromus tectorum*
Grand fir	*Abies grandis*
Idaho fescue	*Festuca idahoensis*
Medusahead	*Taeniatherum caput-medusae*
Snowberry	*Symphori-carpos* spp.
Western larch	*Larix occidentalis*
Western red cedar	*Thuja plicata*

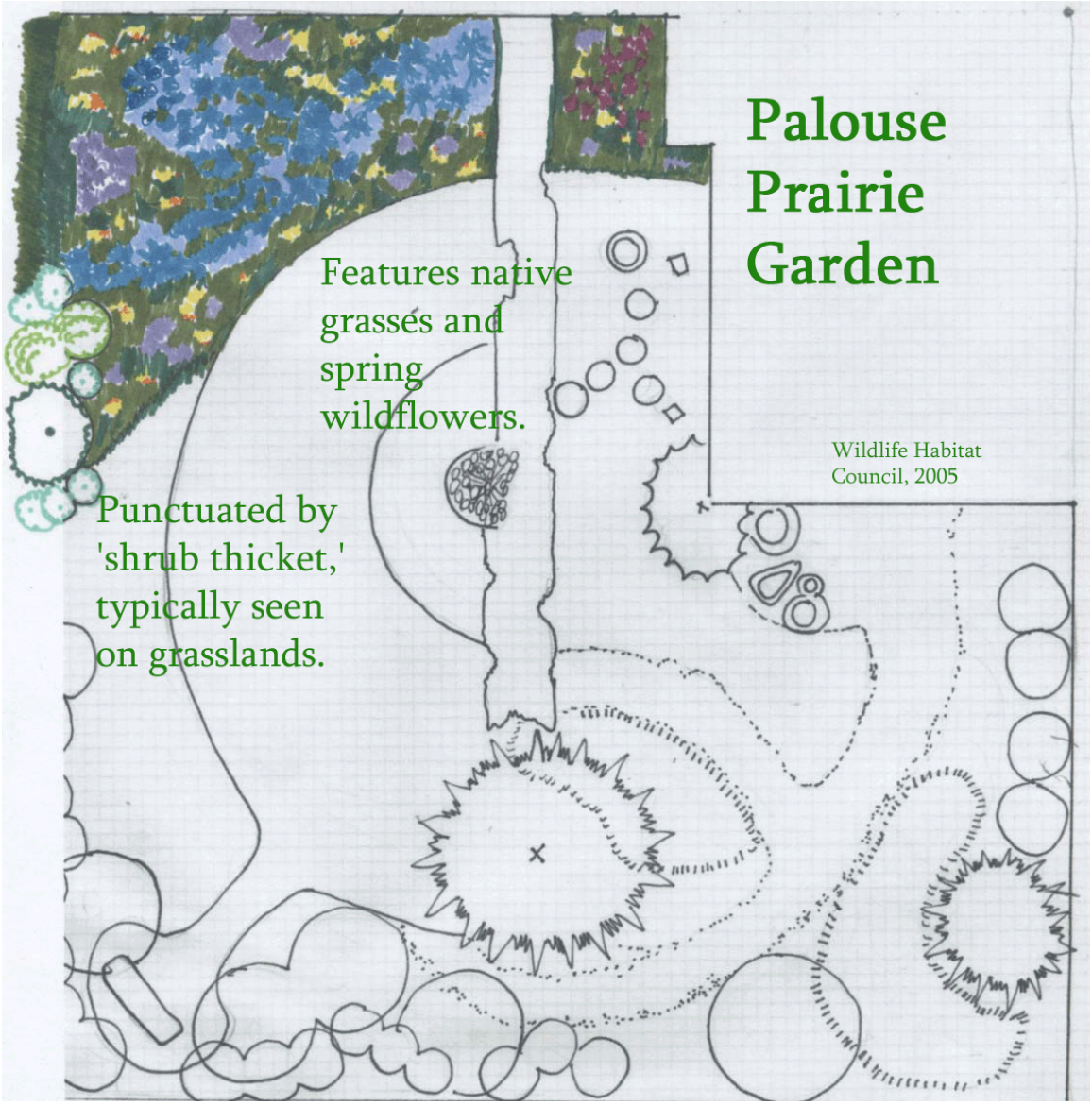
2.2.1.1 Palouse Prairie Garden

The most prominent community on the Palouse is the grassland, or prairie community of flora, dominated by perennial bunchgrasses. Bunch grasses, as the name implies, tend to from clumps, rather than mats of turf. Common bunch grasses of the Palouse before European colonization were wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idaoensis*). In contrast to the short grass prairies of the Great Plains, fire and grazing by large herbivores, such a bison, were not a common occurrence in the Palouse before European settlement. However, after colonization, the Europeans introduced both grazing and fire to the grasslands of the Palouse, replacing many of the native grasses with annual herbs and non-native species.

The grasslands, or prairie, of the Palouse hosts a wide array of herbaceous perennial wildflowers, which predominantly bloom in springtime. As the snow melts and spring rains warm the grounds, the plants begin to grow; with some species blooming as early as February. By July, most species will have bloomed and set seed, falling into dormancy in advance of the dry period in late summer and early autumn. Vigilant naturalists can look carefully to see thick stems growing close to the ground, which hold precious moisture and new buds, waiting for next year's spring rains.

Travelers to the Rosalia Visitor's Center would be welcomed to the native plants landscape through this beguiling mix of grasses and wildflowers in a garden area inspired by the grasslands of the Palouse (see concept diagram below).

Figure 3. Palouse Prairie Garden Design



The Palouse Prairie should feature a matrix of the native wheat grass (*Agropyron spicatum*), Idaho fescue (*Festuca idahoensis*), curly blue grass (*Poa seunda*), giant lyme grass (*Leymus condensatus*), interpolated with a mixture of the following wildflowers:

Table 2. Palouse Prairie Wildflowers

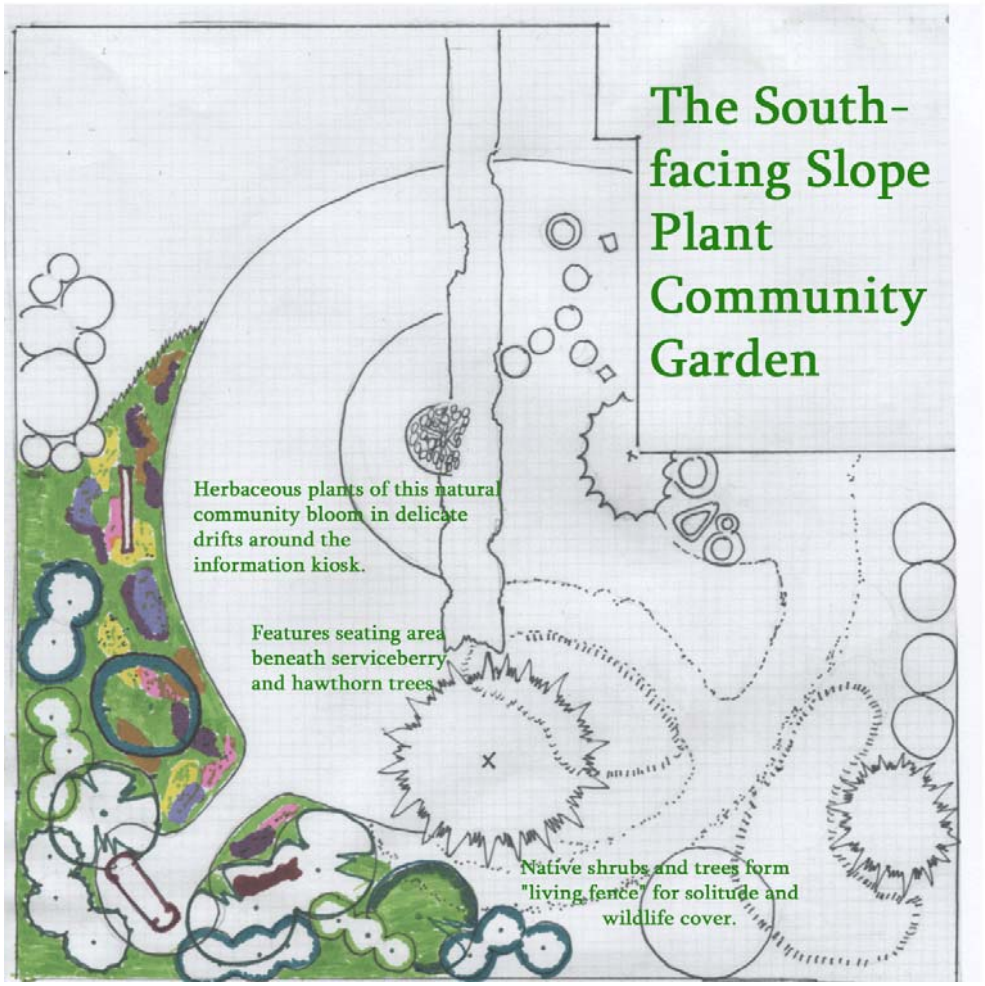
COMMON NAME	SCIENTIFIC NAME
Spalding's Milkvetch	*Astragalus spaldingii*
Slender phlox	*Phlox gracilis*
Long-leaf Phlox	*Phlox longifloia*

Table 2. Continued

Wood's Rose	*Rosa woodsii*
Stellaria nitens	*Shiny Starwort*
Needle and Thread	*Stipa comata*
Blue-eyed grass	*Sysyrinchium inflatum*
Biscuitroot	*Lomatum grayi*
Arrowleaf balsamroot	*Balsammorhiza sagittata*
Prairie Star	*Lithophragma parviflora*
Shooting Star	*Dodecatheon spp.*
Red Kittentail	*Bessya rubra*
Prairie Smoke	*Geum triflorum*
Bluebells	*Mertensia longiflora*

2.2.1.2 The South-facing Slope Plant Community Garden

Figure 4. South-Facing Slope Landscape Design

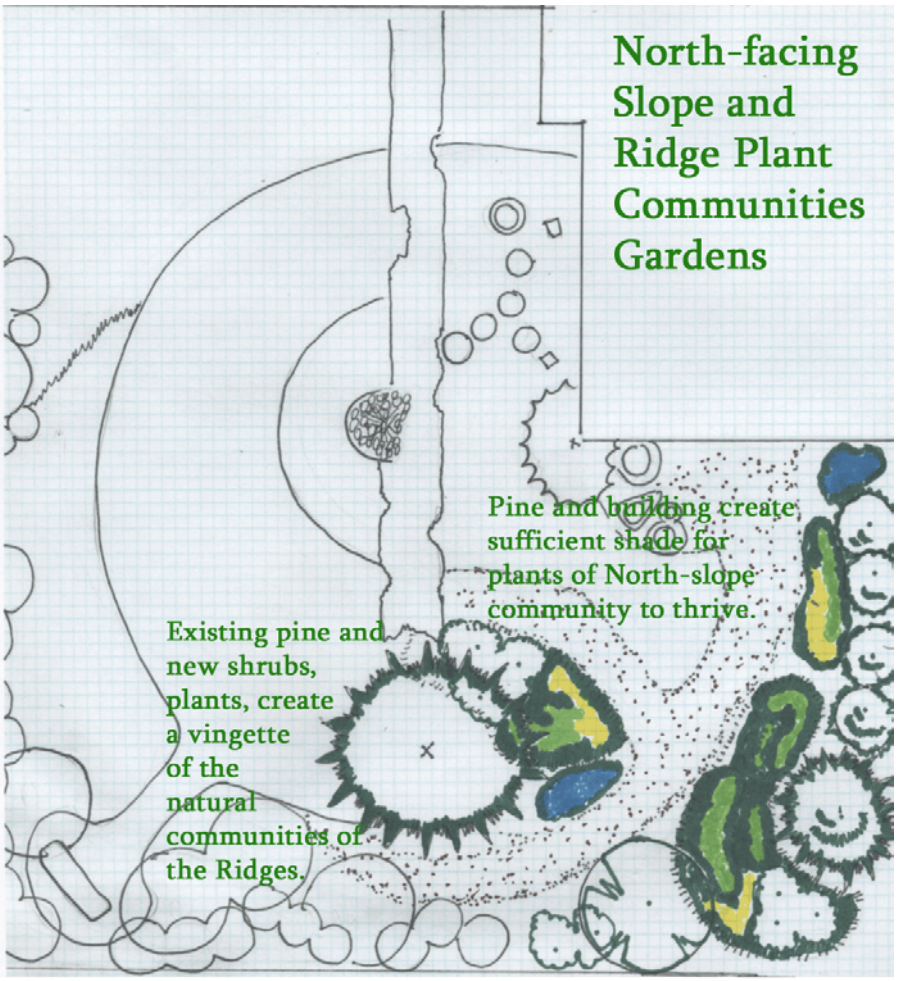


On the Palouse, the south-facing slopes are exposed to strong sunlight and become dry early in the growing season. Although the plant communities found on these buttes are very similar in composition to the surrounding grasslands, there are more shrubs such as hawthorn (*Crataegus douglasii*), mock orange (*Philadelphus lewisii*) and serviceberry (*Amelanchier alnifolia*) mixed in with the grasses and wildflowers. Common wildflowers to this area, in additional to those mentioned in section 2.2.1.2 are lupine (*Lupinus sericeus*) and paintbrush (*Castelleja hispida*).

In the garden design, the small hawthorns and serviceberry trees create a soft, low canopy for a bench made of recycled materials in a seating area that provides a scenic view of the landscape. Native shrubs such as Oregon grape (*Mahonia aquifolium*), golden current (*Ribes aureum*), Nootka rose (*Rosa nuticana*), woods Rose (*R. woodsii*), fringed sage (*Artemesia frigida*), and snowberry (*Symphiocarpus aibus*) can be used to create a living fence along the back border of the property to provide privacy and wildlife habitat.

2.2.1.3 The North-facing Slope and Ridge Communities Gardens

Figure 5. North-Facing Slope Landscape Design



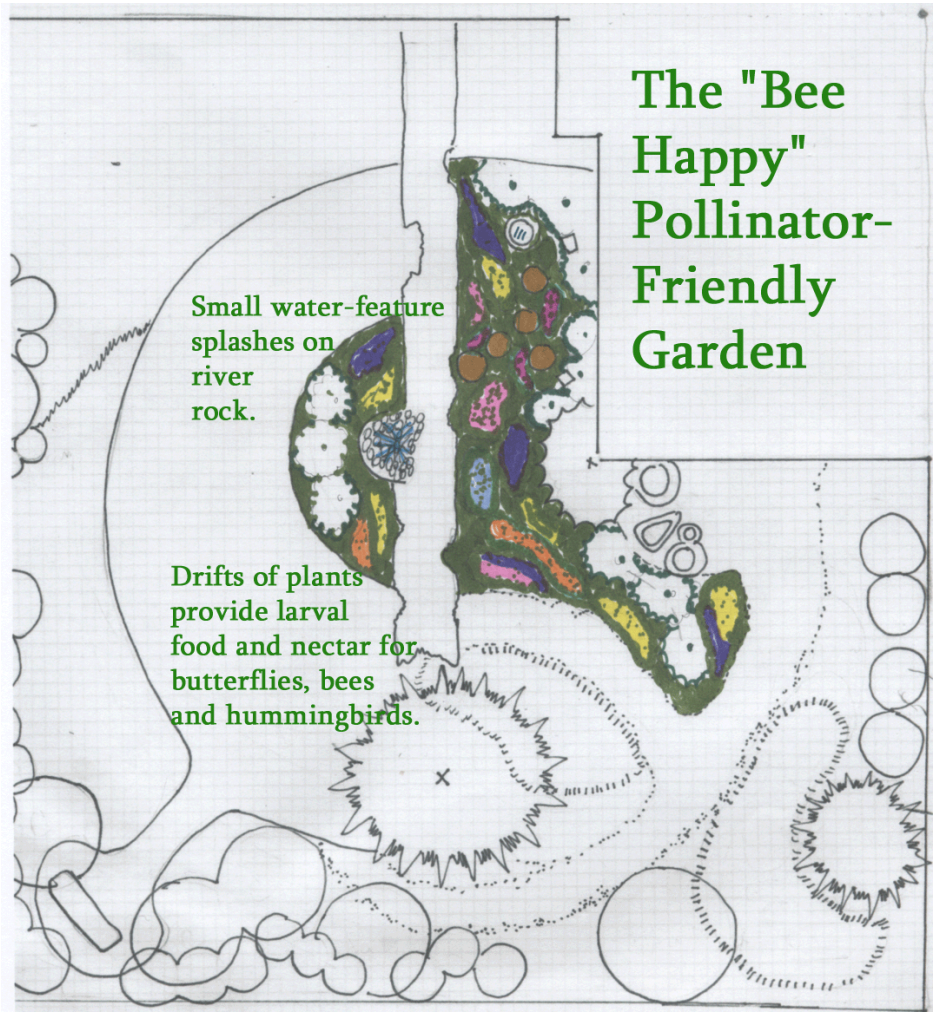
The large existing pine tree at the end of the old sidewalk will be incorporated into the 'vignette' of the plant community of the Palouse Ridge, as Ponderosa pines are common to that ecotype. On the ridge tops of the Palouse buttes, moisture is limited and there is often open space beneath the Ponderosa pines that dominate the community. One of the few shrubs that is common to the under story is the snowberry (*Symphocarpus albus*). Two or three snowberry shrubs could be added to the drip-line area of the tree (being careful to avoid planting directly near the trunk, where dense roots and denser shade make growth nearly impossible). Wildflowers common to this community that will thrive in the needle fall are include spring beauty (*Claytonia lanceolata*), trout lily (*Erythronium grandiflorum*), ragged robin (*Clarkia pulchella*), and yellow bells (*Fritillaria pudica*). A berm could be created using soil and

rubble from the site to add a slight gradient change to the garden, symbolically representing the "butte" landscape feature; pieces of basalt could e used to create rugged outcropping stones to further add to the rugged appearance of this area.

In the far corner of the landscape, with shade provided by the tall pin and the structure of the shed, the perfect environment is created for the plants of the north-facing slope community. This garden features plants that require less direct sun than those of the south-facing slope community—although some species are found in both plant communities, such as the serviceberry (*Amelanchier*), ninebark (*Physocarpus malvaceus*), and mock orange (*Philadelphius lewisii*). These plants of the understory are accompanied by the ocean spray or cream bush (*Holodiscus discolor*), a plant with arching, extremely fragrant white flowers, which are completely edible. Other large trees common to the north-facing slopes, along with the Ponderosa pine are the Douglas fir (*Pseudotsuga menziesii*), the larch (*Larix occidentalis*), and the grand fir (*Abies grandis*); the trees often grow close together creating a very dense, shady canopy.

Wildflowers of the north-facing slope community include those of the buttes and ridges, along with wake robins (*Trillium ovatum*, *Trillium petiolatum*), fairy bells (*Disporum trachycarpum*), Solomon's seal (*Smilacena racemosa*), and the calypso orchid (*calypso bulbosa*).

Figure 6. 'Bee Happy' Pollinator-Friendly Garden



The Bee-Happy Garden will be a highly colorful section of the landscape, featuring a variety of native plants, native plant cultivars and the irises and other flowers donated to the site from local gardeners (which were originally planted in the memorial garden). This area would highlight plants that contain nectar for butterflies, bees and other pollinators, or those that are particularly attractive to hummingbirds. Larval food sources, those plants eaten by the caterpillars of local butterflies, should also be included. The garden also contains the lilac bushes already growing on the site; lilac is one of several larval food sources of the tiger swallowtail butterfly (*Papilio glaucus*). For a comprehensive list of the butterflies of Whitman County, consult the USGS website page:
http://www.npwrc.usgs.gov/resource/distr/lepid/bflyusa/chklist/states/counties/wa_75.htm

Using the above website, you can reference larval and nectar food preferences for the various butterflies, being sure to include some of those native plant species in the Bee Happy Garden.

A small recirculating fountain could be added in this area (refer to the section on water sources for more information), providing additional interest for young garden explorers. This area could also feature a bird bath or two to provide additional enticements to wildlife; one of the birdbaths could be filled with stones and sand and kept moist to provide an elevated puddling area for butterflies, who could not drink from open water. A bee block could also be added to this area to raise awareness of pollinators living in the garden.	

The Rosalia staff should consider adopting Pollinator Friendly Practices at the site to ensure the health of some of the smallest fauna to frequent the habitat garden (see **Appendix I** and **II** for complete details on Pollinator Friendly Practices).

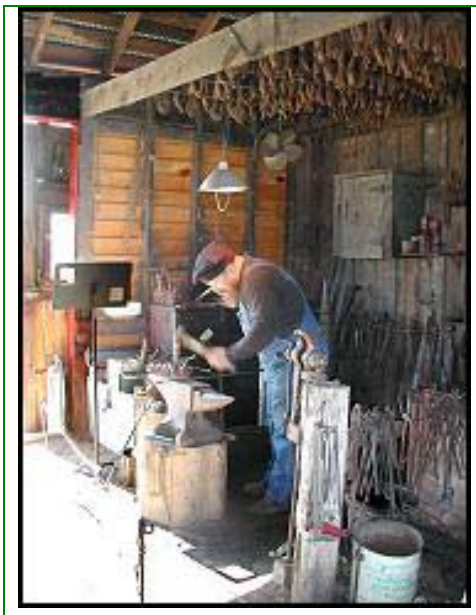
2.3 ADDITIONAL DESIGN COMPONENTS

2.3.1 Incorporating Cultural Artifacts

WHC suggests the incorporation of service station artifacts into the garden whenever they can be used in a decorative and/or useful fashion. For example, the pump island bases shown at the right, if they demonstrate sufficient structural integrity, may be used to form the base for a garden bench. If the bases are made of steel, a plate can be welded directly to the base top to which a bench surface made of wood, stone, metal or recycled plastic may be attached. If the base is cast iron, the metal mounting plate should be bolted into the base.

Recycled plastic, made originally from petrochemical products may be the best choice for a bench top; the surface does not retain summer heat (like metal), does note require resurfacing (like wood) and is relatively inexpensive to chose color and customization options (unlike stone). Rosalia Visitor's Center may also consider holding a "call for entries" among artists in the Pacific Northwest to design the bench, proving an opportunity to recycle cultural articles in to useful works of arts for the Visitor's Center. For inspiration, check out the archived article on the "Sit on Art" Exhibit held at Berkeley in 2001, where sculpture and garden furniture met:

http://www.sculpturesite.com/exhibits/previous/SitOnArtARCHIVE.htm



The garden/tool shed in the landscape may also be incorporated, as a cultural artifact itself, or as a display area for antique tools from the era when the site was the personal residence and blacksmith shop. Such a display could reinforce the educational theme of how transportation has changed through the town's history, in some cases, mirroring the resident's relationship to the land itself. The shed could also be sued to display vintage gardening tools from the period when the site was a homestead and be made even more attractive by the use of potted herbs and wildflowers at the doorway to the shed. A "vignette" of artifacts and plants can be created that is both educational and decorative.

The shed, or some section of it, could also be used for the most practical purpose of storing equipment necessary to care for the landscape and to carry out education programs such as:

- Long handled shovels (ideal for planting large trees and shrubs),
- Short handled shovels (ideal for planting smaller plants and edging borders),
- Gardening gloves in various sizes (include sizes for children),
- Organic fertilizer and mulch for planting sites,
- Water resistant or rubber boots in various sizes (include sizes for children),
- Pump equipment (winter storage for recalculating pump),
- Identification signs of types of plants and their ecological purposes (interpretive materials),
- Booklets or education materials on native plants of the Palouse or on Plant/Pollinator Relationships for students to take home,
- Camera and/ or film for documentation of the phases of growth of the garden and for documentation of education programs for *Corporate Lands for Learning* certification,
- Loppers for physical removal of aggressive or invasive species, and
- A push mower for the small amount of grass that would need to be tended on a regular basis.

2.3.2 Paving of Parking Area

The Rosalia Team indicated they would consider implementing low impact design for the proposed parking area behind the existing station building. Low impact development (LID) is an alternative concept of site design and development. The primary goal of LID is to maintain or replicate the predevelopment hydrology of the site through the use of unique and innovative design techniques. LID strategies reduce the footprint of the site, specifically negative impacts on the local watershed, and offer environmental and economic benefits. There is an opportunity to employ LID concepts at the Rosalia site's proposed parking area, which may involve one or two vehicles. Several alternatives are available for consideration and each one has advantages as well as disadvantages. Regardless of the technique, the overall LID principle is the reduction of impervious cover at the site.

Soil type will be a factor for any LID option. Porous soils will permit water infiltration and help maintain the site's hydrologic profile. Since the Rosalia site is relatively small, one option might simply be to have a grass parking area. Additionally, grass can slow runoff, which also improves water infiltration and groundwater recharge. Real and anticipated usage, along with the amount of rainfall, should be considered when employing a grass lot. Grass parking areas are typically reserved for overflow or light traffic areas and will require regular maintenance of grass cutting. An additional consideration for grass parking areas is handicap accessibility. Grass pavers, unlike a simple grass lot, include subsurface trenches that temporarily store water before allowing it to permeate into the ground. Grass pavers are more complex and costly, but are very effective at stormwater runoff control.

Another option is permeable pavers. Although permeable pavers traditionally have higher initial costs than conventional surfaces, the reduction or elimination of associated storm water runoff systems, extended life cycle, and reduced maintenance costs can result in significant long-term savings. Permeable pavers include paving blocks, cobbles, mulch, brick, and natural stone. Permeable pavers can significantly reduce the amount of impervious surface area at the site, which dramatically reduces surface runoff. Additionally, these types of materials might hinder snow removal due to the edges associated with the paving blocks or brick or the uneven surface of the mulch or cobbles.

Porous pavement might also be viable for the Rosalia site. Porous pavement is similar in appearance to asphalt or concrete except that it contains minute openings in the pavement. These pores allow water runoff to infiltrate into the underlying soils. This alternative is well suited for low traffic or overflow parking areas as well. One problem that some studies have shown with porous pavement is that the holes congest easily with debris thereby reducing the effectiveness of the filtration. As a result, porous pavement requires an area that will not be sanded during wintertime conditions. And, like many LID alternatives, porous pavement is initially more expensive than conventional methods.

Finally, despite the low impact development option, all techniques encourage the practice of reducing the size of the area impacted. Parking stalls can be reduced in size and still allow appropriate room for the vehicle. The table below, taken from the non-profit Low Impact Development Center's website (www.lowimpactdevelopment.org/), provides a guide in a general comparison of initial costs. It is widely accepted that LID alternative techniques can cost up to 30% when the entire stormwater runoff management system, including long-term maintenance costs, is taken into consideration.

2.3.2.1 Cost Guides *(taken from Low Impact Development Center, Inc.)*

Data or studies that compare construction, maintenance, and life cycle costs for stormwater management systems are limited. The wide range of site conditions and design requirements also makes it difficult to determine the life cycle cost benefits. It is recommended that each potential application be evaluated on a site-by-site basis. However, a range of cost estimates for the basic installation of permeable paver materials is given in the table below for comparison purposes. The wide range of costs for the paver systems should be noted.

Paver System	Cost Per Square Foot (Installed)
Asphalt	$0.50 to $1.00
Porous concrete (pavement)	$2.00 to $6.50
Grass/gravel pavers	$1.50 to $5.75
Interlocking paving blocks (permeable pavers)	$5.00 to $10.00*

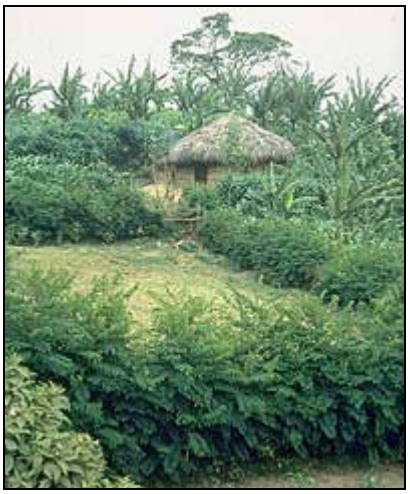
**dependent on depth of base and site accessibility, per conversation with Maryland Unilock® representative (2002)*

Users should also keep in mind that a more accurate price comparison would involve the costs of the full stormwater management paving system. For example, a grass/gravel paver and porous concrete representative stated that when impervious paving costs for drains, reinforced concrete pipes, catch basins, outfalls and stormwater connects are included, an asphalt or conventional concrete stormwater management paving system costs between $9.50 and $11.50 per square foot, compared to a permeable paving stormwater management system at **$4.50** to **$6.50** a square foot. The savings are considered to be even greater when pervious paving systems are calculated for their stormwater storage; if designed properly, they can eliminate retention pond requirements.

2.3.3 Fence

The Rosalia site is looking for low profile fencing around the native landscaped area that will be attractive as well as protective, say for example, for keeping bicycles out. The options for fencing are limited. The best choice may be a low profile, two-railed wooden fence. While being relatively low maintenance, the wooden fence still provides an aesthetically appeasing quality while providing functionality. Another option could be a low profile stone wall. The stone wall, however, would be more labor intensive to install and may prove to require more upkeep. Finally, another alternative to artificial fencing could be a "living fence" or native plants, shrubs and bushes, which could protect the landscaped area while providing habitat and food sources for birds, insects and other wildlife.

Two-railed wooden fence (http://www.boxlakelumber.com/)



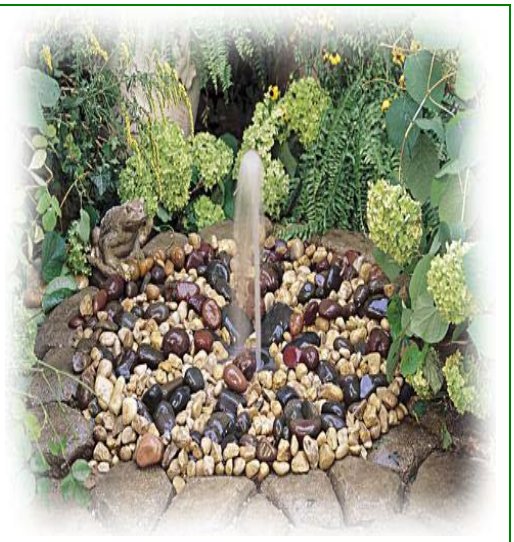
Living fence (http://journeytoforever.org/farm_tree.html)

Note: This is a local, non-profit group that works to restore the Palouse bioregion: http://www.palouseprairie.org/

2.3.4 Water source

A small feature to provide moving water will not only provide additional wildlife value, but will also add sound and movement to the garden to delight visitors. This effect can be obtained with a recalculating pump in a relatively small space. There are solar-powered pump kits for small water features, or the pump could be run on a current if a line is available in the garden. Because the area will not be entirely fenced in, a water feature that incorporates standing water may not be desirable, as a depth of three inches or more can produce a drowning hazard to small, untended children. WHC suggests that Rosalia

The Visitor's Center should consider using the recirculation pump and filling the small 'pond/puddle' space with decorative river rock. The water hits the rocks, makes a cheerful noise before sinking into the recirculation bin, yet is still accessible for wildlife to bathe and drink, while safety concerns for visitors are minimized. A sample of a recalculating river rock pump, with stones placed in a highly decorative fashion, may be seen in the photo to the right.



Stones placed in a random patter give more the effect of a "natural spring" to the human-made water feature. Several of the round iron lids remaining from the original station may also be placed into the fountain rock design to add additional cultural interest.

Table 3. Electronic Sources for Water Feature Supplies

Resource	Website
The Plow and Hearth Garden fountain sets and pumps; solar-powered pumps for small fountains	http://www.plowhearth.com
BP Solar Contains cells, accessories and components if you plan to build your own solar fountain	http://www.bpsolar.com/homesolutions/
Little Giant Offers pumps and fountain heads, along with solar powered kits for small and large water features.	http://www.littlegiant.com/

2.4 INTERPRETING THE STORY OF PLACE- A TRAIL THROUGH TIME & PLACE

The Rosalia Visitor's Center landscape—both the natural history and human history combined—form the "page" upon which this unique "story of place" is written. From taking a walk through the landscape, visitors of all ages can better understand not only the City of Rosalia's role as stewards of the environment, but their own as well. Once this story is documented, refined, and articulated, it can be repackaged in a variety of ways for a variety of learners, and also incorporated in to the bus tour and outreach education programs. Most importantly, it will be documented for the Rosalia staff and volunteers to draw from into the future. Once organized and documented, it can easily be disseminated in the garden on a sign or though brochures, and/or guided seasonal walks for visiting groups (with either Rosalia volunteers or scouts acting as guides or 'docents'), or in public relations materials and certification applications.

Specified trails are an important part of any habitat used for CLL programs, partially because they provide a mechanism for showcasing the important parts of a habitat, but also because they keep people from destroying the habitat by offering a defined way of exploring the natural area. When developing nature trails, WHC recommends considering the needs of all learners at local schools invited to use the trail by discussing special needs students with your local school or Education Advisory Committee (EAC), if you have one. It is not often feasible or even possible to make an entire site accessible to all students. However, often with a little planning and design consideration, certain relatively simple accommodations can be made to bring all learners closer to this rich experience of the natural world. (Please refer to Table of Resources for constructing trails and Learning Experiences for Challenged Visitors in the previous section.)

2.4.1 Add Interpretive Stations

Rosalia should work to develop an interpretive plan for "telling the story" of the land and the people who have used it, and those who use it and care for it now. Interpretive stations will enhance the educational experience of the trail for learners of all ages. Interpretive

stations at certain points along the trail can be valuable educational tools. However, they are not necessary to tell the story of place as visitors wind along a trail. This "story" can also be told by guides during a nature walk. An interpretive station **may** be a sign in the ground, however in a small landscape such as this, it may be simply a small numbered "stopping point" along a trail, where a trail guide passes on information, or where a self-guided trail walker refers to a numbered brochure for information on what they are seeing, or what they should be looking for. This technique works well for both aesthetic reasons and budget concerns.

Visitors pick up a map at the first station that has a description of sites that correspond to small, unobtrusive, numbered sign in the landscape, working counterclockwise, and beginning in the Palouse Prairie Garden. Such a trail map and walking tour could be stored in a kiosk, along with a sign and map of the landscape, welcoming visitors to the trail. (This kiosk is tentatively drawn discretely into the garden plan between the Palouse Prairie Garden and the South-facing Slope Garden so as not to obstruct the spring wildflower display on the prairie meadow.)

At numbered posts along the trail, the visitor or group could pause and read the appropriate corresponding passage from the walking tour, or at these spots, a docent guide could tell the group a given story or encourage them to make observations. This walk-and-pause system, with corresponding "points of interest" on a printed brochure or disseminated through a guide, actually allows for seasonal and program flexibility: The passages can be easily updated for seasonal change, to include text such as poem passage about autumnal color, or the arrival of spring. Rosalia could meet the needs of many different learners over many different seasons by, in essence, keeping different seasonal scripts on hand.

It is impossible to design a one-size-fits-all educational experience since one display or brochure cannot be perfectly engaging for young children and adults as well. So the content and the story to be told on a sign or brochure, for instance, must be carefully crafted, thoughtfully considering the average or "target" audience. Rosalia staff might consider aiming language for any permanent sign at the middle school age level. Language should be clear and concise, being careful to define scientific words such as species, biodiversity, and pollination. When written at this level, signs and brochures can be enjoyed by a wide range

of walkers, and can also be used as stopping points with younger children, especially if pictures of some type are included on the brochures.

In Table 4, WHC suggests topics for stopping points that could be considered along the trail loop along the Landscape Trail to educate the public and support other organized education efforts on the site.

Table 4. Conveying the Story of Place: Educational Stopping Points for "A Landscape of Travelers"

The following "pause points" were laid out to correspond to a counterclockwise stroll through the landscape, beginning in the Palouse Prairie, continuing past the South facing slope garden, through the Ridge and North Facing Slope Communities and Garden Shed Area and concluding through the Bee Happy Pollinator Garden. This is only an example; Rosalia may wish to adapt this model or change it entirely.

	Suggested Pause-point Topic
1.	A LANDSCAPE OF TRAVELLERS: Visitors should be introduced to the concept of "A Landscape of Travelers": • This landscape supports the migratory birds that move through the area, it also support a host of butterflies, bees and other pollinators and resident birds. • This landscape has supported people, from the First Nations, to the European settlers to modern society. • This landscape has changed much over tens of thousands of years—that story is the natural history of the Landscape of Rosalia. • This landscape has also changed in many ways due to human intervention on the land—and that human history (both the negative and the positive impacts) is also a part of the 'story of place' that must be explored to understand the ecology of this (or any other) region.
2.	THE PALOUSE PRAIRIE: Visitors should be invited to pause in the Palouse Prairie garden to appreciate the various wildflowers in boom. *(A poster on the visitor's center kiosk might display showy species and common grasses, as well.)*. The ecology of the prairie, one of the rarest ecosystems in the United States, could be mentioned—how the plants are specially adapted to the soil and water cycle of this region. The Camas could also be mentioned here, and how important it was to the Native Americans who moved throughout the area (the tribes of the Nez Perce, the Cayuse, the Couer d'Alenes and the Spokanes all ebbed and flowed onto the Palouse at various times of the year in various regions). They depended on the camas as a staple food. The Camas also is linked other famous travelers who were introduced to it through the Nez Perce, Lewis and Clark, who. upon seeing it on June 12, 1806 Merriweather Lewis wrote, "the quamash is now in blume and from the colour of its bloom at a short distance it resembles lakes of fine clear water, so complete in the deception that on first sight I could have sworn it was water."

Table 4. Continued

3.	A LANDSCAPE OF CHANGE: Another pause-point somewhere along the trail should address the unique geological history that influenced the current ecology of the Palouse. The rolling topography of the region began forming over 6 million years ago as tiny-wing-borne soil particles began to build up around vegetation, forming hills called LOESS. Much of the rich soil of the loess was eventually devoted to agriculture, forever altering the ecosystem by introducing alien species and decreasing the space for native Palouse verities of plants that, in turn, supported associations of animals and microorganisms that co-evolved in this region.
4.	THE WEB OF LIFE: This is why the landscape of Rosalia features NATIVE PLANT species: it is an effort, not dissimilar to the building restoration, to promote keeping the "story of place thriving and growing." The native plants support the wildlife and remind us of how people, too, are supported by the living landscape. In the South facing slope garden, plants with many medicianl properties can be found, as well as plants with berries and seeds for both humans and wildlife (service berry, Hawthorne).
5.	READING THE LANDSCAPE: In the Ridge Garden, where we see a new plant community, we are reminded that "different plant communities grow in different locations" because of a biotic (non-living) influences within the ecosystem, such as topography (which way a slope faces, how much light is available) hydrology (how much water is readily available for the plant to use) and geology (what kinds of rock and soil support the plant, is the soil rich? Or poor?). For the keen observer, a change in topography or soil will be mirrored by a change in the plant community. Notice how trees were not prevalent in the Prairie community, where water is more scarce? But small trees and shrubs begin to appear on slope communities, with larger trees occurring on ridge tops where water becomes a bit more plentiful? In the North-facing slope community, where water does not evaporate quickly, larger trees and shrub grow more densely, and ferns cover the under story—in stark contrast to grassland ecosystem of the Palouse Prairie.
6.	REST STOP FOR WILDLIFE: Throughout the year, wildlife will 'travel' through the garden, harvesting nectar and berries, and finding shelter in the plants. Among these animals is the nectar-loving Roufus Hummingbird, which breeds in the Palouse region and winters in south Texas and Mexico to escape the lack of food over the winter months.
7.	THE HUMAN HIGHWAY THROUH HISTORY: Humans, traditionally have ebbed and flowed through the region as well. The Native Americans collected food from the lower elevations to the higher elevations throughout the year, as it became available.
8.	THE HUMAN HIGHWAY THROUH HISTORY: European settlers moved through the land, too, first the explorers, then farmers and others. The Visitor's Center's history as a blacksmith shop could be highlighted as a way to connect people with this era—blacksmith items placed on visual display in the shed would allow modern-day travelers to appreciate what moving through the area on stagecoach might have been like.

Table 4. Continued

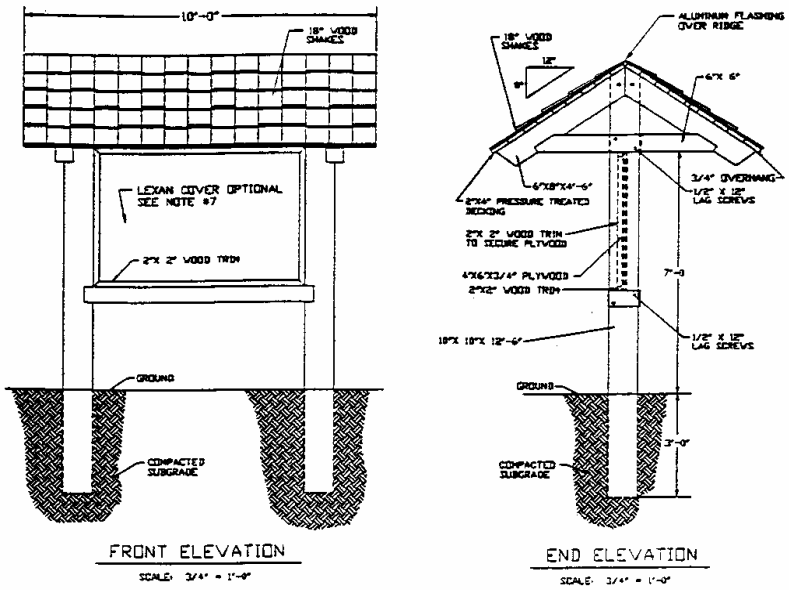
9.	BEE HAPPY HOMESTEAD WALKWAY: the old walkway of the original homestead takes the garden walker back to the Visitor's Center through the Bee Happy Pollinator Garden, dedicated to providing larval and nectar food sources for the region's pollinators (along with providing beauty for garden visitors!). This delightful area reminds us that we can indeed have a world in which there is a place for wildlife and for people—we simply must commit ourselves ***to learning from the past, working in the present, and preserving nature for the future.***
10.	BEYOND THE BACKYARD: Brochures should be provided to travel to "wild areas" to participate in birding, wildflower hikes, botanical drawing classes and other activities that will encourage a deeper appreciation and respect for the Palouse ecosystems.

"Within the Web of Life there are intimate and essential connections between plants and the earth, between plants and other plants, between plants and animals….Nothing in nature exists alone."
--Author and Scientist Rachel Carson

Keep in mind that once any type of sign, or written "trail walkabout", is in place, it does not mean that everyone has to use the natural area in that fashion; many will simply see the landscape as a "pretty backyard", other focused educators can always conduct a free style education program of their own design. But the signed or numbered trail is always a welcome site for those visitors who want to have guidance and to learn about the site immediately and independently. Adequate printed material may also reduce the need for volunteers and will encourage teachers to take the lead in conducting activities on site, as they will feel more comfortable with what they are seeing and experiencing.

A kiosk placed near a trail head (*examples are shown in Figure 7, below*) could include the walking tour described above, or species checklist for butterflies common to the site. With proper input and guidance, eagle scouts or high school students may be able to develop a nature trail guide.

Figure 7: Kiosk Design



Notes:

1. All wood should be pressure treated.
2. All hardware and nails need to be galvanized.
3. Cedar wood shakes should be approximately 18" x 1/2 with a 5 ½" exposure.

Source: Appalachian Trail Conference. 1995. *Planning a Trailhead Bulletin Board.*

2.5 SUSTAINABLY MANAGING THE LANDSCAPE THROUGH COMMUNITY PARTNERSHIPS WITH SCOUTS AND MASTER GARDENERS

Rosalia should consider working with scout groups on its habitat landscape establishment and *CLL* projects. WHC encourages the pursuit of such a relationship that would be productive for both parties, providing hands-on experiential learning for the scouts, while helping the small Rosalia staff implement stages of its habitat and education plan. In pursuing Merit Badges, scouts could assist with:

- Improvements and routine maintenance to the tiny "nature trail" that loops through the property,

- Addition of more native plants to the garden by starting seeds or transplanting plugs (small starts) of native species from native plant nurseries, and other routine landscape maintenance tasks,
- Documentation of the butterflies, pollinators, and birds who visit the site, and
- Assisting in the development and publication of self-guided tours for school groups, scout and nature groups, garden clubs, and individuals.

By working with the scouts over the coming years, Rosalia may be able to both meet the needs of the scouting community (merit badge goals and requirements) while also meeting program development needs for its own habitat management plan; scouts can also assist in yearly wildlife counts. Both Boy and Girl Scouts must complete certain keys tasks in order to acquire Merit Badges in various areas of study. Many of these tasks dovetail with the work that must be completed in order to enhance the habitat area to prepare it for wider educational use by the general public. The Education Advisory Committee should then proceed with investigating the most pressing needs of scouts in the region as they complete badge requirements. For a complete listing of merit badge requirements for boy scouts, consult the following website:

www.meritbadge.com

Below is a list of sample of badge requirements that may dovetail with landscape/education program goals.

Table 5. Merit Badge Correlation with Landscape Enhancement/Monitoring Goals

Merit Badge Requirement	Possible Vulcan Habitat/CLL Goal
For the **Forestry** Merit Badge, scouts must identify native trees, listing both human uses and wildlife uses, and explain how these trees fit into the local ecology.	This information may be used to augment the Rosalia staff's knowledge of the plants in the habitat and the general neighborhood; scouts could be invited to share their knowledge with visitors during a community day event; information can be used to tag trees in the landscape or create "walking tour" of the site neighborhood.

Table 5. Continued

For the **Forestry** Merit Badge, scouts must identify five additional native plants, listing both human uses and wildlife uses, and discuss the habitats in which they were found.	This information could also be used to augment the Rosalia team's knowledge of plants on the site, to assist in yearly monitoring of species, and to create a walking tour of the site for each season.
For the **Public Speaking** Merit Badge, scouts are required to give three to five-minute talks that incorporate visual aids.	Scouts could act as hosts for 'nature trail' events, passing on their knowledge of, for example, the wildflowers they studied for the Merit Badge.
For the **Soil and Water Conservation** badge, scouts can seed at least a 1/5 acre site for conservation purposes.	Scouts could assist in planting the wildflower meadow with an appropriate mixture of ***native*** species.
Scouts are urged to construct, erect, and monitor nest boxes in the **Fish and Wildlife Management** badge.	Assist the team in placing bee boxes or a bat box on the site. Scouts could also maintain an information kiosk containing interesting information regarding wildlife studies and sighting on the Rosalia landscape.
In the **Fish and Wildlife** badge, scouts are to observe 25 species of wildlife, noting where and when they were seen. Scouts can assist in on-site bird counts, breeding bird surveys, insect surveys, estimations of deer populations, and general tracking of wildlife sightings.	This information can be used to augment monitoring documentation of species for the Rosalia team, informing them of species that visit their site—and the surrounding neighborhood.

Master Gardeners may also have a strong interest in assisting at the site, because of its historical significance and because of the new native plants landscape project. The landscape will provide a sound example of how to effectively use native species in a small homestead sized garden, while also offering natural history and local ecology information

2.6 FORMALIZING A *CLL* PROGRAM

The process for developing an exemplary *Corporate Lands for Learning* (*CLL)* program requires that the site develops a partnership with a local educational institution, scout group or other interested learners. WHC can assist this partnership using the following tools:

- **A Corporate Site Resource Assessment** to evaluate the site for development as an outdoor classroom.
- **A Partner Needs Assessment** to engage participants in a facilitated discussion to determine the level of interest and discuss how to develop the site as an environmental education facility.

- **A Teacher Workshop** that trains local teachers to use the site to help their students meet curriculum standards may be conducted with or without assistance from WHC; or workshops to train volunteer naturalists to conduct tours of the site can be arranged through WHC if necessary.

WHC encourages sites forming *CLL* programs to form Education Advisory committees and Create *CLL* Management Plans. The Education Advisory Committee, made up of representatives, form the Rosalia Visitor's Center, any education partnering organizations, and local conservation, education and history experts, can work together to identify and implement the education plan for the site.

Creating the *CLL* management plan will help the Education Advisory Committee prioritize the *CLL* projects and ensure that the program continually adapts to meet new opportunities. The Rosalia team may wish to develop the *CLL* management plan as they review the recommendations in this report.

Including the following sections in the *CLL* management plan will not only provide direction, but will also ease application for certification for *CLL* when the Rosalia Visitor's Center applies. WHC urges the EAC to consider how the recommendations in this report fit into the development of the *CLL* management plan. The following lays out the components of the *CLL* management plan:

2.6.1 Background

The Background section of the *CLL* Management Plan should describe why Rosalia became interested in a *CLL* program and how *CLL* benefits other programs or objectives established by the site. This section should also provide information about current and future wildlife habitat enhancement projects and how they will support educational goals.

2.6.2 Goals, Objectives, and Methods

The Goals, Objectives, and Methods section of the *CLL* Management Plan states what will be achieved through the *CLL* program. Goals should be broad and long-term, while objectives are measurable and short-term. Objectives help measure progress towards achieving the long-term goals. Methods are the techniques implemented to accomplish the

objectives of a program or project. For example, a goal could be "Students will understand how humans and animals both depend on the natural world for survival," an objective could be "students will identify native plant species the site that are used by birds and pollinators, and also those which have been traditionally used by humans for food, medicine or commerce, and draw conclusions about common elements necessary in the ***habitat*** of any living creature." A 'method' could be "Students will use a simple key, along with historical writings, to identify native plants and learn about their usefulness."

2.6.3 Curriculum

The curriculum section of the *CLL* Management Plan will describe the concepts and methods used to teach the students. If working with school students, the section should also describe how the curriculum is correlated to the State Education Standards, or how the program assists Girl or Boy Scouts in attaining goals in badge requirements. The curriculum can include specific activities from established curricula of Project WILD, WHC's Wings of Wonder: When Learning Takes Flight or other programs identified by the Education Advisory Committee.

2.6.4 Time Line

The time line section of the *CLL* Management Plan explains the process for developing the *CLL* program and provides an additional tool for measuring progress. WHC recommends that the time line extend over three to five years. The EAC will need to create a time line that accurately reflects the scope of each project. A sample time line that the EAC can use as a guide is provided later in this report.

The Rosalia Visitor's Center may apply for *CLL* certification once environmental education activities have been implemented, documented, and monitored for at least one year. This means the earliest the site could apply for *CLL* certification in July of 2006. Certification provides third-party credibility to long-term environmental education efforts that go beyond daily operations at a facility. The minimum requirements for certification are:

- Develop an environmental education program (for learners of any age) that is, in effect, an outdoor classroom inextricably linked to valuable wildlife habitat.
- Demonstrate that the curriculum promotes interdisciplinary environmental education, investigation, critical thinking, or team building.
- Demonstrate how the curriculum meets state, national, or local education requirements (Standards), Merit Badge requirements (for scouting), or other clearly defined criteria or goals.
- Complete a customized visit by WHC's Education Program Manager.
- Maintain and document an environmental education program for at least one year.
- Host students (of any age, formal or informal education) on the site to participate in a curriculum designed to facilitate environmental inquiry at least **eight (8) times** per year.
- Work with educators (from a scout troop, school system or other organization) and partnering organizations.

A site must have an environmental education program in place for one year to achieve *CLL* certification. The deadline for *CLL* certification is July 31. Sites that achieve *CLL* certification receive a *CLL* certification certificate and are included in WHC's *Registry of Certified and Internationally Accredited Corporate Wildlife Habitat Programs*. In addition, the achievement of certification is announced to local and national media. Sites applying for certification are eligible to compete for the *Corporate Lands for Learning of the Year Award*.

3. ADDITIONAL OPPORTUNITIES FOR PROGRAM DEVELOPMENT

Collaborating with local, regional, and national organizations, including non-profits, community groups, schools, youth groups, private landowners, and government agencies, will prove beneficial to realizing program implementation. The following outlines programs that will augment the efforts already initiated by the Ruffner Mountain Wildlife Team. These include:

3.1 NORTH AMERICAN POLLINATOR PROTECTION CAMPAIGN

The Wildlife Habitat Council and North American Pollinator Protection Campaign (NAPPC) offer a unique challenge to advance corporate stewardship and the value of certification. WHC announces the Pollinator Recognition program for certified habitats in 2003 that implement the newly developed "Pollinator Friendly Practices" (PFPs) guidelines. The recognition is offered for certified WHC sites that implement specific land management practices within their habitat and site to promote pollinator populations. The PFPs are an excellent means to improve a traditional butterfly garden, meadow, or other habitat project by addressing biodiversity on a broader scale. In 2003, one exemplary site will be awarded a Pollinator Award by the NAPPC.

According to the NAPPC, pollinators, such as such as bees, beetles, butterflies, moths, bats, and even a few bird species, ensure full harvests and seed production for many agricultural crops. In the U.S. alone, they are responsible for $40 billion worth of products annually. Pollinators are also essential for healthy ecosystems. For instance, approximately 25 percent of birds include fruit or seeds as a major part of their diet. Without pollination of these plants, there would be little to no berry production in our local habitats.

But pollinators are rapidly declining. The USDA Council on Sustainable Development and other agencies recognize that the continuing decline of pollinator populations is becoming "a significant conservation and sustainability issue." According to the NAPPC, the major threat to most pollinators is the destruction and fragmentation of habitat. Remaining habitat is often in small, isolated patches degraded by invasive plants and changes in land management. This has led to the loss of wildflowers required for nectar and pollen, as well as nesting sites. In addition, the extensive use of pesticides impacts both pollinators and their habitat. With so much at stake, WHC calls our corporate partners to action to help conserve this diverse and valuable group of species.

The PFP guidelines were developed in 2002 by WHC with NAPPC members such as Xerces Society and Coevolution Institute. Adopted by the NAPPC, they are used by organizations in support of land management practices in schools, private industry, public spaces,

agriculture, forests, and homes. The guidelines augment existing land use incentives, and are to be used by organizations such as WHC in promoting pollinator friendly land use practices, and are provided in **Appendix I** and **II**. WHC is the first organization to promote the Pollinator Friendly Practices and offer recognition.

The NAPPC Pollinator Friendly Practices guidelines consider six different areas of land use management:

- **Foraging Habitat,**
- **Reproduction,**
- **Shelter,**
- **Invasive/Exotic Species,**
- **Chemical Use, and**
- **Monitoring**.

For each topic, there is a central question to be addressed followed by a detailed approach to the subject. The complete guidelines are available on-line via www.wildlifehc.org/threerivers. For more information, please contact WHC's Tri-state Director Marcia Maslonek at 412-777-2464.

APPENDIX I

Draft 1.0 (for circulation and comment)

NAPPC (North American Pollinator Protection Campaign)
Pollinator Friendly Practices

PFP Guidelines

The NAPPC Pollinator Friendly Practices Guidelines consider six different areas of land use management: Foraging Habitat, Reproduction, Shelter, Invasive/Exotic Species, Chemical Use, and Monitoring. For each topic, there is a central question to be addressed followed by a detailed approach to the subject.

A. Foraging Habitat
Is there sufficient habitat for foraging for pollinators (i.e., native bees, butterflies, bats, hummingbirds, etc.), and are the species used of high value to them?

Beneficial plant species

- ***Which species are used?***
- ***Are cultivars used, and why?***
- ***Are the species used native to the locale? (see also guideline D)***
- ***Is the color an attractant?***
- ***Is the shape of the flower accessible to pollinators (deep or complex flowers may be suited to specific species, e.g., lupines and bumble bees, or open flowers like asters are easily accessible to a wide range of bees with short tongues or small size, as well as flies and beetles)?***
- ***Is there continuous bloom through early spring through fall?***
- ***Is the goal restoration or landscape?***
- ***Are activity times for species matched with bloom time?***
- ***Do they meet a minimum planting size?***
- ***Are the plantings clustered en masse or scattered?***

B. Reproduction
Reproduction considerations depend on the needs of the pollinating species for which the land is being managed. For specific butterfly and moth species, appropriate larval host plants should be used. For native bees, sufficient ground nesting areas, snags, or bee blocks, should be available. For hummingbirds and doves sufficient nesting habitat should be present, whereas bats will require sufficient roosting and maternity habitat.

Reproduction habitat requirements may vary. For example, specific nesting requirements are not well established for many species of native bees. For native bee conservation, general principles should be considered, such as:

- ***the range of hole diameters that wood nesting species are known to use,***
- ***preferred nest site host plants as known,***
- ***basic parameters for ground nesting conditions,***
- ***provision of nesting materials as well as nesting sites. (leaves, petals, plant down, mud, water).***

Habitat connectivity is another important concept in habitat planning that should be considered due to high fragmentation in many regions. For a bee, both nesting and foraging habitat should be close together to benefit the most species and provide optimum conditions.

C. Shelter

Is there shelter in the form of windbreaks, proper plantings, over wintering areas, and so forth ?

Shelter belts could provide nesting sites for hummingbirds as well as bees, such as snags, and additional nectar/pollen sources (maples, wild cherries, linden, and so on). Such areas will also provide cover for butterflies in windy conditions and adverse weather. Shelter is particularly important in urban areas, where lack of vegetation is common and wind tunnels may be severe.

Since foraging areas should be in the sun early in the season, the position of nesting sites needs to be planned carefully in relation to trees or shelter belts. Also, certain species may have specialized shelter needs that need to be considered. For example, exposure to sun at appropriate times of day ensures the success of bee nesting sites.

- For wood nesting species, the nesting blocks need sun on the holes in the morning and not in the afternoon.
- Bumblebees prefer partial shade for nesting.
- Most ground nesting sites should be south-facing, so they get the sun for more of the day.

D. Invasive/Exotic Plant Species

Do native plant species predominate the area and are invasive species actively discouraged?

Invasive species degrade native pollinator habitat, and in accordance with the guidelines of the National Invasive Species Plan, the following points should be in effect:

- Invasive plants on site must be monitored and triggers in place to prompt control measures* (must be 75% native *at least*)
- Is there an attempt to control or remove invasive plants?
- Are exotic species being intentionally planted** (a red flag—may be planted in landscaped areas)? No invasive plant species should be planted.

*Note: Many sites are degraded by invasives such as multiflora rose, garlic mustard, knotweed, etc. If the site is trying to control them and provides all other requirements, it shall be deemed pollinator friendly. However, if a site is overrun and no control activity is implemented, it will not be recognized as pollinator friendly.

**Natives should comprise over 75% of a habitat, preferably more, but with degraded conditions over many areas, a pristine condition may not be possible. Turf-grasses, for example, are not native. Furthermore, species native to one area are not native to adjacent areas, so discrepancies will be carefully evaluated. Many common garden annuals are not native but also not invasive (i.e. zinnias), and provide excellent nectar sources for gardens and backyards. This situation is acceptable, as long as adequate native perennials are also provided.

E. Chemical Use
Is Integrated Pest Management being used?

Integrated pest management is a critical component of safe habitat for pollinators. . Pesticides should not be used. Pesticides will be looked at much more harshly than certain herbicides, depending on active ingredient.

Chemical use considerations:

- Is chemical use monitored?
- Is it reduced/eliminated when possible?
- Where is the chemical use (must not be near the habitat)?
- Why is it used?
- What is the active ingredient?
- Method of application (spot treatment vs broad application, etc.)
- Weather conditions when applied?
- Timing of application?

Some chemicals can be used for the benefit of pollinators, such as in fire ant control and restoration projects; this use should be considered only when appropriate. Herbicides should only be used during the site preparation and establishment phase when there is no feasible alternative. Herbicides should not be used during management if there is an alternative, and if used only for careful spot treatment. Emphasis must be on a thoughtful, educated approach to chemical use, and to a reduction and ultimate elimination of its use.

F. Monitoring/Length of time/Other
Is the site monitored over time with respect to pollinator inventories, other influences on the site such as grazing and pollution, and is the site used for educational and community outreach?

Are inventories of pollinators conducted on a regular basis (NABA counts, photos, etc.)? Though scientific counts are preferred, simple observation such as notes on the number of floral visitors to a patch per 10 minutes, monitored usage of bee blocks, etc., are acceptable and encouraged. Other influences on the site, such as grazing, pollution, construction and shade influences need to be monitored as well.

Length of time

- Has the project been ongoing for at least one year?

Other

- Is the site used for outreach to community or schools?
- Does the site provide interpretive tools such as a reference collection of insects native to the site?

Sample Site Analysis

If an application for Pollinator Friendly Status claimed to benefit solitary bees, here is an imaginary and simplified example of what would be noted in the application:

3.1.1.1 Example: solitary bees in PA

1. Foraging Habitat -- Native, high-nectar flowers planted for bloom from spring to fall. Examples, bluebells, coneflowers, asters planted in large drifts. Old apple orchard nearby and significant flowering shrubs in the forest. Also, pollen and nesting materials (leaf/petal pieces, plant pulp, downy hairs, etc.).

2. Reproduction -- Snag management, bee blocks, ground nesting areas

3. Shelter -- Same as reproduction, plus nearby edge habitat along forest

4. Invasive exotic plants -- No invasives used, honeysuckle being addressed

5. Chemical use --Round-up was used in the planting of the meadow, applied at proper times and only for prep. Weeding by hand first used, except for the thistles. Used sponge to spot treat them with Round-up. No pesticides applied to site.

6. Monitoring/Length of time/Other. --Seasonal surveys conducted of insects, NABA count with community participation, photo documentation of x number of species, school visits each fall, projects in ground for over 2 years, 10% of employees are involved.

APPENDIX II

Certification just got wilder!
"Pollinator Friendly Practices" are here
By Marcia Maslonek

Is your certified corporate habitat ready for something new? Would you like to take biodiversity conservation to the next level? The Wildlife Habitat Council (WHC) and North American Pollinator Protection Campaign (NAPPC) offer a unique challenge to advance corporate stewardship and the value of certification. WHC announces the Pollinator Recognition program for certified habitats in 2003 that implement the newly developed guidelines for "Pollinator Friendly Practices" (PFPs). The recognition is offered for certified WHC sites that implement specific land management practices within their habitat and site to promote pollinator populations.

According to the NAPPC, pollinators, such as such as bees, beetles, butterflies, moths, bats, and even a few bird species, ensure full harvests and seed production for many agricultural crops. In the U.S. alone, they are responsible for $40 billion worth of products annually. Pollinators are also essential for healthy ecosystems. For instance, approximately 25 percent of birds include fruit or seeds as a major part of their diet. Without pollination of these plants, there would be little to no berry production in our local habitats.

But pollinators are rapidly declining. The USDA Council on Sustainable Development and other agencies recognize that the continuing decline of pollinator populations is becoming "a significant conservation and sustainability issue." According to the NAPPC, the major threat to most pollinators is the destruction and fragmentation of habitat. Remaining habitat is often in small, isolated patches degraded by invasive plants and changes in land management. This has lead to the loss of wildflowers required for nectar and pollen, as well as nesting sites. In addition, the extensive use of pesticides impacts both pollinators and their habitat. With so much at stake, WHC calls our corporate partners to action to help conserve this diverse and valuable group of species.

What are Pollinator Friendly Practices?
The PFP guidelines were developed in 2002 by WHC with NAPPC members such as Xerces Society and Coevolution Institute. Adopted by the NAPPC, they are used by organizations in support of land management practices in schools, private industry, public spaces, agriculture, forests and homes. The guidelines augment existing land use incentives, and are to be used by organizations such as WHC in promoting pollinator friendly land use practices. WHC is the first organization to promote the Pollinator Friendly Practices and offer recognition.

The NAPPC Pollinator Friendly Practices guidelines consider six different areas of land use management: Foraging Habitat, Reproduction, Shelter, Invasive/Exotic Species, Chemical Use, and Monitoring. For each topic, there is a central question to be addressed followed by a detailed approach to the subject. The complete guidelines are available on-line via www.wildlifehc.org/threerivers or through Marcia Maslonek, Pittsburgh Director, WHC.

How can a site incorporate the PFPs into existing efforts?

Do you have a butterfly garden or native meadow? This can be an ideal project to integrate the guidelines with efforts as simple as adding plants that various pollinators prefer, to reducing or eliminating chemical use in strategic areas. For instance, a garden can be improved for pollinators by adding a large plot of native host plants for various butterflies or moths, or adding flowers that certain bees prefer such as beardtongue for bumblebees. By planting large masses of a few species, pollinators receive the most reward for the least effort, thus conserving energy. In addition, a meadow or garden can be vastly improved by planting for consecutive blooms, that is, something blooming throughout the seasons to provide food for various species. Different bees and butterflies have specific, often short, flight periods, with some as early as March. By providing a succession of plants that bloom early in the season through late, these species will find food within your habitat when they are active.

Pollinators also need shelter, with some having very specific, yet easy to provide, needs. Solitary bees for instance search for nesting areas in specific types of soil, dead wood, or twigs. Orchard mason bees and others will readily use an artificial "bee block." These are easy to construct from old blocks of wood with holes drilled within, or by leaving out various snags. Students could even create "bee bundles" from straws glued into cans, or from bundles of elderberry stems. Placed in a sunny area near food, bees may quickly use the nests to lay eggs that will then hatch into pupae. Bumblebees will also use properly constructed "bee houses." Many species have a relatively small territory, and thus must find all their food and shelter needs within a small area. By providing nesting shelter within a close distance of sufficient foraging habitat, a local pollinator population can thrive.

All of these efforts, from foraging habitat to nesting shelter, however, can be thwarted by excessive or misplaced chemical use. Native bees, caterpillars, and others will be killed by pesticide use, so must not be used around the designated pollinator habitat if one exists. Other chemicals such as herbicides may be used to control exotic plant infestations that threaten the habitat, but should be applied in a thoughtful and calculated manner, for instance via spot treatment with a sponge. While an elimination of chemical use is best for sensitive pollinators, this may not be feasible, and in the case of fire ant control and exotic plant control could help pollinators. A total elimination of chemical use is not necessarily required to meet the guidelines. However the team must show that they have researched the site's chemical use and modified as needed to minimize the impact on pollinator habitat. Otherwise the team's hard work will be negated. Therefore sites should research and analyze chemical use on the property. For instance, what chemicals are used and why? Where on site are they applied and by what method? What time of day and time of year are they applied? Under what weather conditions are they applied? By asking these questions, the wildlife team and site maintenance may uncover practices that can be altered to minimize wildlife impacts as well as improve health and safety. Application of herbicides should be

done on calm days with no wind to minimize drift and human contact. Chemicals could also be applied early in the morning or on cooler days, before pollinators become active in the heat of the day. If pesticides are required and cannot be eliminated for some reason, they should be applied away from natural areas such as the pollinator habitat, edges, and so forth. An informed wildlife team can work to improve practices on site, and will have a better relationship with the maintenance crew when conducted in a cooperative, team-driven manner.

What will sites receive?

Sites who demonstrate they are following the guidelines will receive additional recognition for their efforts, including designation with a bee logo in both the Registry and certificates. Sites will also be recognized at the Symposium, within the newsletter, and on the web. WHC and the NAPPC may also promote and publicize the sites through additional press releases and articles. Most importantly, through participation sites will be positively contributing to the rising issue of biodiversity conservation.

So are you ready to address biodiversity conservation in a tangible and fun way? Contact Marcia Maslonek, Pittsburgh Director, at 412-777-2464, or your regional biologist for assistance or more information. The Guidelines can also be downloaded from the Three Rivers Habitat Partnership website at www.wildlifehc.org/threerivers. The site also offers useful Pollinator Habitat information, ranging from native plants to bee block details.

What the Three Rivers Habitat Partnership is Doing to Help Pollinators

The Three Rivers Habitat Partnership (TRHP) is concerned about the state of our pollinators. By working with private landowners such as corporations, schools, and homeowners, TRHP helps create and enhance valuable habitat for pollinators. Wings of Wonder is just one example of a partnership for pollinators, where we have linked corporate sites and schools to study migratory butterflies in both their summer and winter grounds.

APPENDIX III

ROSALIA TEAM IN FRONT OF STATION

INSIDE OF ROSALIA STATION SHOWING HISTORICAL DOCUMENTATION

APPENDIX III CONTINUED

GARDEN VIEW ILLUSTRATING HALL GARDEN AREA

REAR VIEW OF PROPOSED LANDSCAPING PROJECT AREA

APPENDIX III CONTINUED

SITE WHERE UNDERGROUND STORAGE TANKS WERE REMOVED

REAR VIEW OF SHADED AREA OF PROPOSED LANDSCAPING PROJECT