



**Native Plants for Native  
Pollinators  
in the  
Waneta Terrestrial Compensation  
Area**

**2014 Final Report**

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Prepared for  
**Waneta Terrestrial Compensation Program  
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**Kootenay  
Native Plant  
Society**

# Native Plants for Native Pollinators in the Waneta Compensation Area

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## Acknowledgements

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We give thanks to the many people for their contributions to the project. Evan McKenzie generously shared excel files of plant observations from numerous field surveys in the WTCP area and helped compile them into the database and print checklist. These observations contribute extensively to our understanding of the vegetation of the study area, particularly of rare plants, plants of intact ecosystems, and species that were common after the Pend d'Oreille fire. Jennifer Vogel provided information on invasive plants in the study area, contributed observations of previously undocumented species, and accompanied us on a field day to collection of previously undocumented species, including the red-listed pink water speedwell. Mike Hounjet submitted collections of a number of species for identification and inclusion on the list, including the non-native clustered dodder. Brenda Beckwith edited and designed the print version of the checklist. Kendrick Marr of the Royal BC Museum reviewed specimens submitted to him, and will facilitate their accession into the RBCM Herbarium.

We are extremely grateful to Lynn Westcott (Westcott Environmental Services) for sharing her passion and knowledge of native bees. She carefully reviewed material and photographs for us, and co-authored the poster we distribute as part of the program.

## Photo Credits

All photos in the report by Eva Johansson and Valerie Huff, except as noted.



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## **Project Goals and Objectives**

Supporting Native Pollinator Populations with Native Plants in the Waneta Area is part of the Native Plants for Native Pollinators project of the Kootenay Native Plant Society, with a focus on the Pend d'Oreille valley and The Native Plants for Native Pollinators project is a response to the high-profile concern about the precipitous decline in native pollinators. Native pollinators co-evolved with native plants in our ecosystems – plants depend on pollination for reproduction and pollinators feed on nectar and pollen provided by plants. The project builds on the Native Bee Survey of the Lower Columbia River (Westcott and Irvine 2009) recommendations for including native pollinator habitat in land management planning.

The project deepens West Kootenay residents' knowledge and understanding of local biodiversity, particularly of the plant biodiversity of the Pend d'Oreille and the importance of plant-pollinator interactions.

The objectives of the project were as follows:

1. Create public awareness tools about native plants and pollinators
  - a. Produce and distribute a pocket-sized plant checklist of plants in the Waneta area.
  - b. Create a website section with plant lists and propagation information.
  - c. Offer school programs to interested schools, as well as presentations to community groups
  
2. Support successful plant propagation and restoration
  - a. Propagate seed (collected in 2013 by J. L. Crowe students in the Waneta area) at the J. L. Crowe greenhouse, and make these plants available on a cost-recovery basis.
  - b. Collect seed from selected species for future propagation

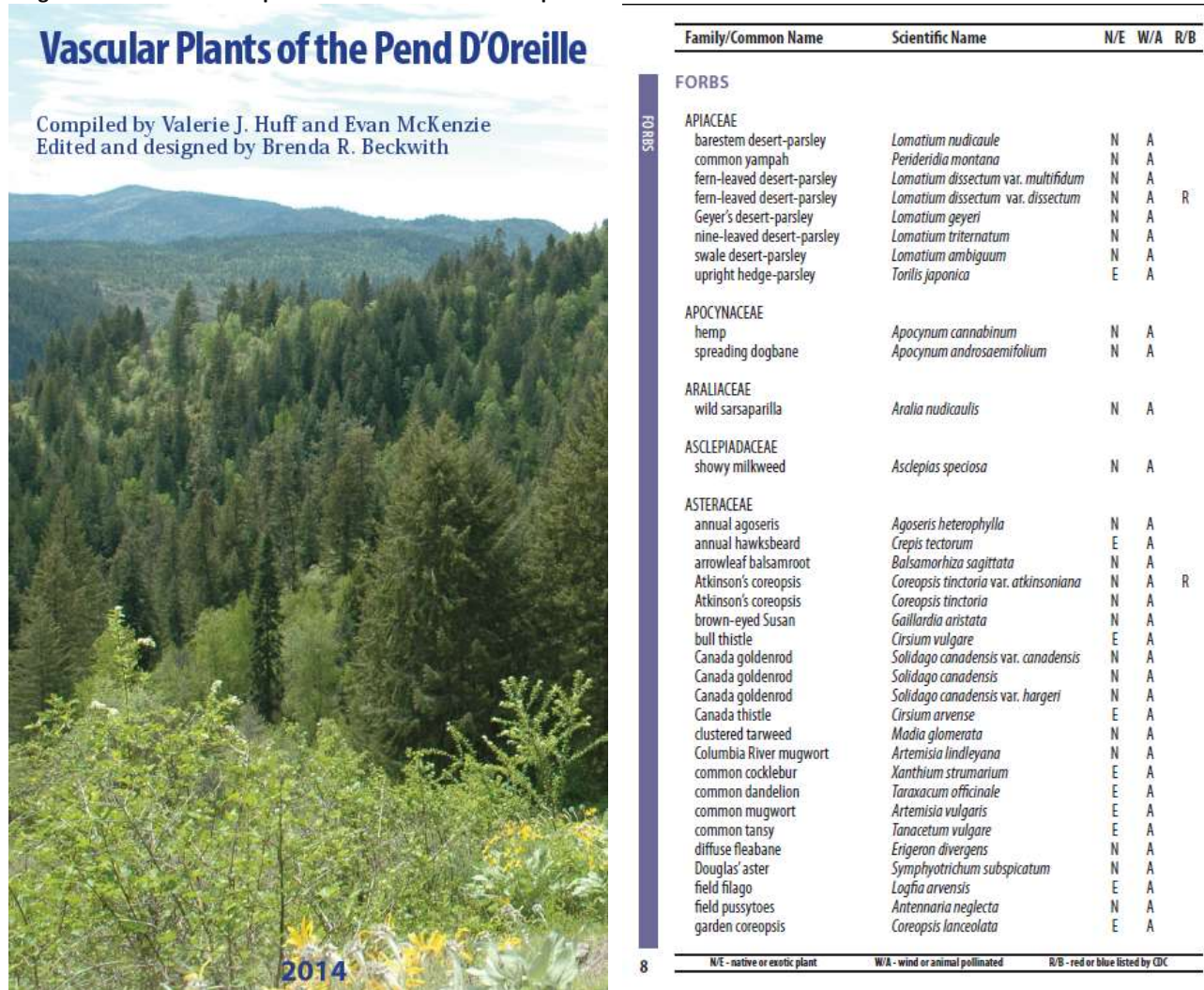
## **Public Awareness Tools**

### **Plant Checklist**

A list of all plants known to occur in an area is a basic tool that is useful for amateur naturalists and field biologists alike. Plants are the primary producers in ecosystems, and provide habitat and food for the animals that occur in an area. An understanding of the plant community is an essential guide to changing plant communities as well as changes to the other life forms they coexist with.

The checklist of the plants of the Pend d'Oreille valley is compiled from a thorough review of plant collections that exist in provincial herbaria as well as observations and collections made in the area by numerous individuals. Herbarium specimens are the gold standard for confirming a species presence, and allows for ongoing evaluation of geographic distribution and taxonomic verification and revision. Observations from field work are also important, as not all species are represented in herbarium collections.

Figure 1. Cover and excerpt of the checklist of vascular plants of the Pend d'Oreille.



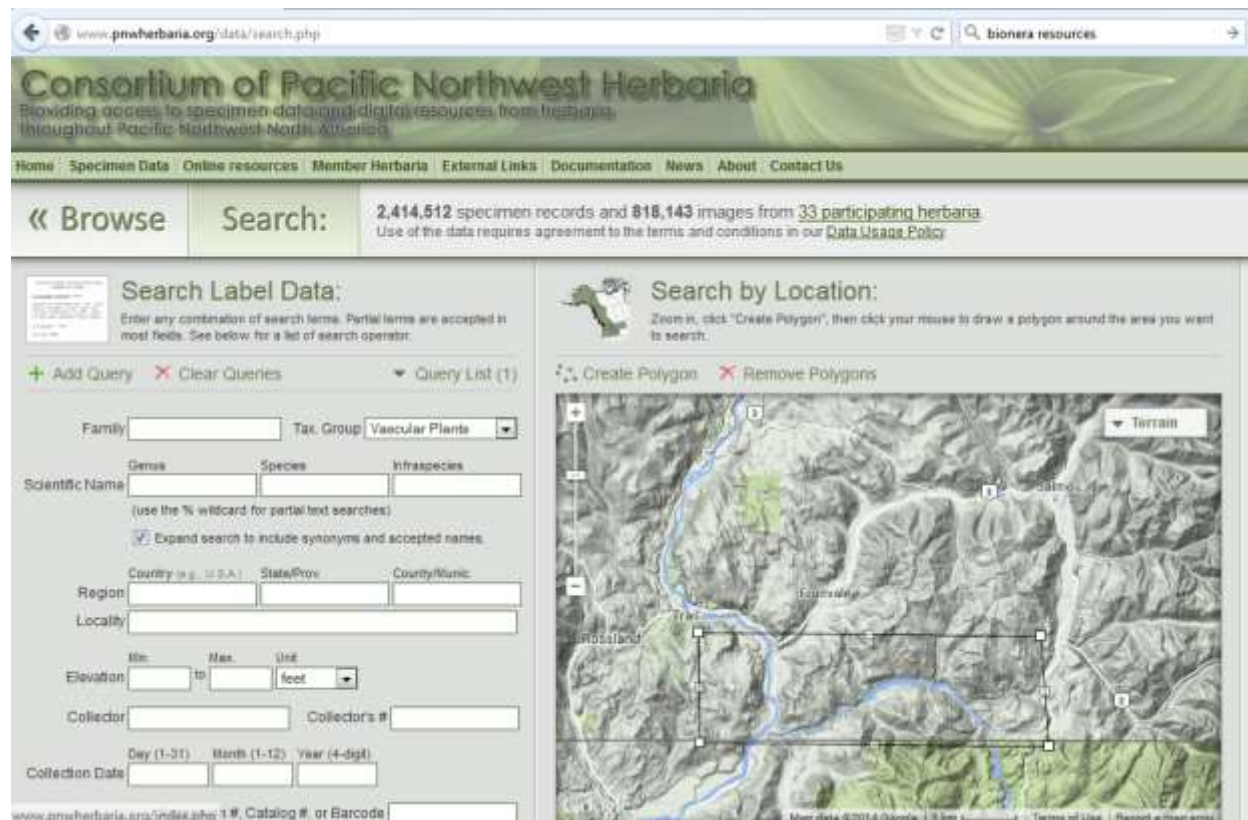
Herbarium collections from the area were searched through the Consortium of Pacific Northwest Herbaria, an on-line portal to the specimen records from regional herbaria. An initial area-based search was conducted and all vascular plant records were downloaded into an access database. The lists were reviewed for location accuracy, as older collections often have less accurate locations. A review of the area description was done before adding a species to the master list. Red and blue-listed species have their location masked on the website. Confirmation that the specimen location was in the study area was made by careful checking of herbarium records, including verification by the individual collector, where possible.

Evan McKenzie shared plant observations from numerous field surveys done in the study area over the years. Jennifer Vogel provided records of invasive plants from CKIPC inventories, and Valerie Huff and Jennifer Vogel spent a day in the field surveying a wetland and recording non-native species found on

the roadsides. Mike Hounjet reported on the presence of various species found on-site. Field surveys by Valerie Huff and Eva Johansson supplemented the findings

Several new collections were made during these surveys, and these have been submitted to the Royal BC Museum herbarium in Victoria, BC. These observations were added to the project database.

**Figure 2. Screen shot from the Consortium of Pacific Northwest Herbaria website, showing area-based search for vascular plants.**



Scientific and common names for all species follow the BC Plant Species Codes and Selected Attributes (Version 7 (2012)), available at [www.for.gov.bc.ca/hre/becweb/resources/code-standards/standards-species.html](http://www.for.gov.bc.ca/hre/becweb/resources/code-standards/standards-species.html). Plant origin (whether the plant is native or non-native in BC) also comes from this source. Rare and endangered species status is from the BC Conservation Data Centre, BC Species and Ecosystems Explorer: [www.env.gov.bc.ca/atrisk/toolintro.html](http://www.env.gov.bc.ca/atrisk/toolintro.html).

The list is comprised of 466 species and subspecies from 70 different plant families. This includes 25 provincially rare and threatened species, as ranked by the BC Conservation Data Centre. 73% of the plants are native, while 27% are exotic species.

Plants in the checklist are also categorized by pollination syndrome: those which are primarily wind-pollinated and those which are animal pollinated. Plants that are animal pollinated produce pollen and/or nectar to attract pollination services. These plants may provide important food resources for pollinators. Wind pollinated plants include gymnosperms, graminoids (grasses, sedges and rushes), and

poplars. Many plants, regardless of pollination syndrome, provide habitat for pollinators. An example of this is hollow-stemmed plants such as grasses and raspberry canes, where stem-nesting bees make their homes and overwinter. Yet others are larval host plants for butterflies and moths. It is well known that milkweed is required by monarch butterfly caterpillars; other larval host plants include hemp and spreading dogbanes for the dogbane tiger moth, sulfur buckwheat for the green copper, and pine species for the Western Pine Elfin.

Plants in the checklist are also categorized by pollination syndrome: those which are primarily wind-pollinated and those which require animals for pollination. Plants that are animal pollinated produce pollen and/or nectar to attract pollination services. These plants may provide important food resources for pollinators. Wind-pollinated plants include gymnosperms, graminoids (grasses, sedges and rushes), and poplars. Many plants, regardless of pollination syndrome, provide habitat for pollinators. An example of this is hollow-stemmed plants such as grasses and raspberry canes, where stem-nesting bees make their homes and overwinter. Yet others are larval host plants for butterflies and moths. It is well known that milkweed is required by monarch butterfly caterpillars; other larval host plants include hemp and spreading dogbanes for the dogbane tiger moth, sulfur buckwheat for the green copper, and pine species for the Western Pine Elfin.

We have attempted to collect data from as many sources as possible, but in no way can the list be considered complete. We encourage interested people to help us expand our understanding of the flora of the valley, and welcome reports of new taxa to us for inclusion on our web-based list. We also encourage the documentation of new records by collecting specimens for inclusion in provincial herbaria.

## Species at Risk

The Conservation Data Centre of British Columbia Ministry of Environment evaluates and ranks the conservation status of species and ecological communities<sup>1</sup>. Species are assigned a Conservation Status Rank after being evaluated on a number of factors, including population size, number and conditions of occurrences, environmental specificity and threats. Conservation planning for red and blue-listed plants is important to maintain BCs biodiversity.

### Red List

Those plants which are Extirpated (no longer occurring in BC), Endangered or Threatened. Endangered plants face imminent extirpation. Threatened plants may become endangered if limiting factors are not reversed. 13 red-listed taxa were reported from the Pend d'Oreille:

#### Apiaceae

*Lomatium dissectum* var. *dissectum* (fern-leaved desert-parsley)\*

#### Asteraceae

*Coreopsis tinctoria* var. *atkinsoniana* (Atkinson's coreopsis)

*Hemizonella minima* (small-headed tarweed)\*

*Solidago gigantea* (giant goldenrod)

#### Brassicaceae

*Erysimum asperum* (prairie rocket)

#### Fabaceae

*Astragalus microcystis* (least bladder milk-vetch)

#### Juncaceae

*Juncus confusus* (Colorado rush)\*

#### Onagraceae

*Clarkia rhomboidea* (common clarkia)

#### Poaceae

*Elymus curvatus* (awnless wild-rye)

*Hesperostipa spartea* (porcupinegrass)

*Muhlenbergia andina* (foxtail muhly)

#### Scrophulariaceae

*Lindernia dubia* var. *dubia* (yellowseed false pimpernel)

*Veronica catenata* (pink water speedwell)\*

### Blue List

Blue-listed plants are considered to be of special concern (formerly vulnerable) because of characteristics that make them sensitive to human activity or natural events. Blue listed plants are at risk, but are not Extirpated, Endangered or Threatened. 12 blue listed taxa were reported for the Pend d'Oreille.

#### Balsaminaceae

*Impatiens ecalcarata* (spurless touch-me-not)

#### Boraginaceae

*Mertensia paniculata* var. *borealis* (tall bluebells)

*Plagiobothrys cognatus* (sleeping popcornflower)

#### Caryophyllaceae

*Stellaria obtusa* (blunt-sepaed starwort)

#### Cyperaceae

*Carex tenera* (tender sedge)

*Carex vulpinoidea* (fox sedge)

#### Fabaceae

*Acmispon americanus* var. *americanus* (Spanish-clover)

*Glycyrrhiza lepidota* (wild licorice)

#### Onagraceae

*Gayophytum humile* (dwarf groundsmoke)

#### Poaceae

*Melica bulbosa* (oniongrass)\*

*Sphenopholis intermedia* (slender wedgrass)

#### Ranunculaceae

*Delphinium sutherlandii* (Sutherland's larkspur)

## Data Sources

Red and blue listed species locations are not generally publically available for searching. The plants listed here were identified in the Pend d'Oreille based on searches of herbarium records, supplemented by reports from field work.



Herbarium specimens are necessary for the confirmation of a species presence in a given area, and help in ongoing evaluations of a species conservation status.

\*Species marked with an asterisk are based on reports by botanists during field work conducted over the last 10 years and are not supported by a collection at a herbarium. These species should be prioritized for collection of voucher specimens.

1. B.C. Conservation Data Centre. 2013. BC Species and Ecosystems Explorer. B.C. Ministry of Environment, Victoria B.C. Available: <http://a100.gov.bc.ca/pub/eswp/> (Accessed June 1, 2014).

## Outreach Materials

### Poster: Protecting Native Pollinators in the Columbia Basin

This educational poster was written for the Native Plants for Native Pollinators program by V. Huff, E. Johansson, and L. Westcott. The poster has been distributed to 10 schools and has been used in numerous presentations and public events in the West Kootenay. Copies have also been made available to schools in the Smithers area, where entomologist Lynn Westcott uses them for her presentations.

Figure 3. Poster developed with entomologist Lynn Westcott for residents interested in helping native pollinators



## Rack Cards: Native Plants for Native Pollinators

We produced and distributed a series of rack cards describing native pollinators and native plant habitat propagation for high value pollinator plants. The rack cards were distributed at presentations and public events. 65 pollinator garden starter kits, including rack cards and locally collected seed have been distributed to residents at presentations and events.

Figure 4. Native Plants for Native Pollinators Rack Card for shrubby penstemon, a plant with special value to native bees.

**Native Plants for Native Pollinators**  
*in the wild*

**shrubby penstemon**  
*Penstemon fruticosus*



image © V. Huff

Low, woody shrub with tubular, lavender-purple flowers.

- HEIGHT** 30 cm – 45 cm
- BLOOM TIME** May to June
- HABITAT** Dry rocky bluffs and open forests
- POLLINATORS** “Special value to native bees” according to the Xerces Society for Invertebrate Conservation. Hummingbirds and butterflies also use it as a nectar source.
- DID YOU KNOW** Several First Nations used shrubby penstemon for a wide variety of medicinal purposes.

Native plants need  
native pollinators... and so do we!





**Native Plants for Native Pollinators**  
*in your garden*

**shrubby penstemon**  
*Penstemon fruticosus*



image © V. Huff

- LIGHT** Full sun to part shade
- SOIL** Rocky, sandy, or loamy soil
- MOISTURE** Dry to moist
- GROW FROM SEED** Collect seed from capsules once they have dried on the plant. Seeds germinate without treatment, but have low germination and slow growth.
- GROW FROM CUTTINGS** Easy to grow from cuttings. Clip stems off live plants. Remove half the leaves. Place in potting soil. Keep moist until roots form. Plant in your garden. Keep well-watered the first year.
- DROUGHT TOLERANCE** Drought tolerant, but will grow quickly and flower more profusely with care and attention.
- PLEASE** Do not dig native plants from the wild! They rarely survive and weeds can invade disturbed soil.

Create a vibrant pollinator habitat...  
include native plants in your garden!

**Kootenay Native Plant Society**  
kootenaynativeplants.ca | kootenaywild@gmail.com

## Plant-Pollinator Interactions

A series of factsheets about plant-pollinator interactions have been developed, and more are in production. These will be distributed at public events in the upcoming year.

### Showy Milkweed (*Asclepias speciosa*)



Showy milkweed grows in dry to moist locations in sunny areas, as well as along disturbed roadsides. It is a drought tolerant native plant, named for the milky latex sap. It is known from only one location in the study area.

#### Pollinators

The bright pink flowers produce abundant high-quality nectar that supports a tremendous range of pollinators, including honey bees, bumblebees, butterflies and hummingbirds.

#### Monarch butterflies

For monarch butterflies, milkweed is not optional. Monarch caterpillars can only eat milkweed. The caterpillars absorb the plants toxic chemical compounds which makes the caterpillars and the adults distasteful to predators. Recent steep declines in monarch butterflies has been attributed to the loss of milkweed. Restoration and protection of native milkweed is critical to reversing the monarch decline. For more information, see <http://monarchwatch.org>



#### Pollination failure in local milkweed

In about 10 years of monitoring, the local milkweed population has never set seed. Without new individuals to replenish the population, milkweed may disappear from our area. Why isn't it reproducing? There are a number of possibilities:

- Lack of pollinators
- Small, fragmented population
- Existing population may not have enough genetic diversity for outcrossing.

Small and fragmented clonal populations are unable to attract enough pollinators for obligate outcrossing. Fewer plants, fewer pollinators leading to population declines in both.



#### Growing and Restoring Milkweed

In 2014, the Kootenay Native Plant Society and student from J. L. Crowe Secondary grew showy milkweed plants. More than 100 plants were distributed to interested residents throughout the West Kootenay, along with a selection of nectar plants for adult monarchs.

#### Other milkweed visitors

Showy milkweed attracts a wide range of beneficial insects, including ladybugs, hover flies and parasitic wasps. These insects are natural predators of many crop pests.

A few insects have adapted to eating milkweed, and absorbing its toxins as protection from being eaten themselves, including the milkweed longhorn beetle, and the blue cobalt beetle.



#### Photos (from top)

Milkweed outside of Trail, BC (V. Huff).

Two-tailed swallowtail nectaring on milkweed. (G. Neith)

Trail resident receives monarch waystation plants (E. Rushton).

Milkweed long-horned beetle. (V. Huff).

Blue cobalt beetle (E. Johansson)

## Public Outreach

### School programs

Several different school programs were developed as part of the Native Plants for Native Pollinator program for elementary and secondary classes. The material developed includes lesson plans, handouts and worksheets for teachers and students, and background material for Community Educators. Lesson plans, handouts and classroom presentations were developed and reviewed by environmental educator and teacher Rita Corcoran.

We made 12 presentations at eight schools this spring. Classes ranged from Grade 1 to 11.

**Figure 5** Students learning plant identification and inventory skills in the field



We have produced 2 sets of preserved pollinator specimens that are used in classrooms and in the field.

Together with students and seniors we have made approximately 50 bee bundles. Bee bundles are bunches of hollow plant stems that are placed in gardens as native bee nests.

**Figure 6. Students and seniors making bee bundles**



## **Public presentations**

We made presentations to the West Kootenay Naturalists in Trail, Castlegar Garden Club in Castlegar and Learning in Retirement in Nelson, reaching 67 residents. We had booths at Earth Day in Nelson, Earth Day in Castlegar, Nelson Garden Fest and Castlegar Nature and Garden Fest. In total we had 146 direct conversations at outreach booths.

**Figure 7. Kootenay Native Plant Society booth at Nelson Garden Fest**



## **Plant Propagation and Restoration**

### **Pollinator Garden Starter Kits**

Pollinator garden starter kits were created for residents interested in growing native plants in their gardens. Kits included seed, seedlings and rack cards describing how to grow them. 65 kits have been distributed to residents at presentations and events.

## **Monarch Waystation Kits**

Monarch Watch, a US non-profit concerned about the precipitous decline in monarch butterflies throughout their range is distributing Monarch Waystation Seed Kits:

“Monarch Waystations are places that provide resources necessary for monarchs to produce successive generations and sustain their migration. Without milkweeds throughout their spring and summer breeding areas in North America, monarchs would not be able to produce the successive generations that culminate in the migration each fall. Similarly, without nectar from flowers these fall migratory monarch butterflies would be unable to make their long journey to overwintering grounds in Mexico. The need for host plants for larvae and energy sources for adults applies to all monarch and butterfly populations around the world.”

<http://monarchwatch.org>

We participated in this initiative by distributing kits of plants grown at the J. L. Crowe Secondary School garden. We distributed more than 200 milkweed and nectar plant seedlings to residents interested in establishing local monarch waystations. Milkweed seed and rack cards were also included in the pollinator garden kits. We will repeat this effort in 2015.

## **School gardens**

We are working with three schools to plan and plant native plant gardens. These gardens will incorporate pollinator habitat.

## **Lessons learned and recommendations**

1. The diversity of plants, both native and non-native, in the Waneta Terrestrial Compensation Area is astounding, and is likely accompanied by an equally diverse pollinator population.
2. The availability of herbarium specimen data on the web is tremendously helpful in discovering what plants are known from a particular area. The area-based search provided by the Consortium of Pacific Northwest Herbaria is a great tool that should be broadly used by biologists and naturalists alike to compile lists of known species. It is equally important to understand the limitations of this tool. It cannot be used to determine locations of listed species; early collections may have vague or incorrect geo-referencing; and the lists only contain species which have been collected and deposited in herbaria and so will not have many species that are present in the area, but have not been collected. This is especially true of non-native species, which are underrepresented in collections.
3. Public access to information from field surveys done in the area is limited. It would be useful to make the results of the studies more broadly available.

4. Pollinator diversity is still virtually unknown for the study area. Bees, which are the main pollinators, have rarely been identified to species. The native bee survey by Westcott and Irvine (2010) identified nine genera. To truly understand the pollinators in the area, further surveys – including identification to specific level, are required. According to L. Westcott (pers. comm.): “By learning the identity of some of the insect pollinators, the habitat needs of the pollinating insects can be addressed in vegetation management plans; for example, leaving dead wood for cavity nesting bees; undisturbed ground for ground nesting bees; dead plant stalks for small carpenter bees and other native bee species that nest in such material. Such actions will support the interconnected networks of plants and pollinators thereby increasing system stability.”
5. It is possible that some of the rare plants as well as some more common plants in the area have close relationships with specialist pollinators who visit exclusively the family or genus to which a particular rare plant species belongs. Specialist bees visit the plants to collect pollen, the primary food source for larval bees. These bees are more likely than generalist bees (who visit flowers of many different plants) to be extirpated due to the loss of the supporting plant community. Further studies of plant-pollinator interactions could be focused on rare plants and known plants (such as hairy golden-aster) with specialist pollinators. Such studies would provide valuable information for managing to preserve the remaining plant diversity in these ecosystems.
6. Non-native species can have significant value to pollinators, providing nectar and pollen for generalist bees, particularly at times of the year when very few native plants are flowering. Some tolerance for ‘weeds’, particularly forbs, is encouraged.
7. In the absence of knowledge of pollinator diversity, we recommend a broad approach of maintaining native plant diversity and maintaining diverse habitat structure, allowing for disturbance to maintain open habitats.