

## Designing and Installing an Agricultural Hedgerow to Restore Native Pollinator Habitat

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### SUMMARY

This project was carried out at the University of Washington Farm at the Center for Urban Horticulture, located in the Union Bay Natural Area (UBNA) just north of Wahkiakum Lane. A 300 foot long native plant hedgerow was researched, planned, designed, and ultimately installed just south of the farm; in the future, this hedgerow will attract native pollinators, including bees, to the area and provide additional habitat and forage that was previously unavailable in the immediate vicinity. Bees, both honey bees (*Apis mellifera*) and native wild bees that pollinate farm crops, will now have additional food and nutrition from the flowering shrubs, as well as a sheltered, secure place to hibernate, lay eggs, and raise their young. In addition to pollinator habitat, this hedgerow will also act as a windbreak, a visual and auditory barrier for the farm, keeping it separated from passersby on Wahkiakum Lane, and it will provide educational opportunities for youth and students at the Center for Urban Horticulture, and recreational visitors.

### WHAT IS THE ISSUE

Pollinating insects, which include bees, butterflies, moths, flies, some wasps, and beetles, are globally in decline. This is particularly important in the context of agriculture, where approximately three quarters of crop species require pollination to produce foods such as fruits, vegetables, and nuts for consumption. Honey bees have been the focus of the majority of study, but native bees, including bumble bees (*Bombus* spp), mason bees, (*Osmia* spp), and halictid bees (family Halictidae) are also capable of, and quite efficient at, pollinating agricultural crops. In the Pacific Northwest, native and honey bees are under significant pressure from habitat loss (including fragmentation), climate change, increased urbanization, pests, and chemicals; by planting native plants known to provide habitat and food to these bee species, decline can be slowed and agriculture can benefit from enhanced crop yields.

Previous student work surveyed the species and abundances of native bees that are already present near the farm. There is currently a notable absence of several large groups: long-horned bees (*Melissodes*), green metallic bees (*Lasioglossum* and *Agapostemon*), and megachilid bees, particularly mason (*Osmia*) and leafcutter (*Megachile*). Planting species to enhance habitat for these species was recommended; this hedgerow installation project aims to incorporate components that will benefit these and other native pollinators of the Pacific Northwest.

## HOW WAS THE PROJECT CONDUCTED

A review and thorough study of literature was undertaken as the first step of this project, to ensure familiarity with the most relevant of the vast number of native pollinators in the Pacific Northwest, and their habitat and nutrition needs. Additionally, significant research was done into the potential composition of the proposed hedgerow. Ultimately, the decision was made to use only Pacific Northwest native plant species; even though pollinators do forage on introduced and exotic plants, co-evolutionary relationships and phenology show a more robust relationship between native plants and pollinators. Experiments have also shown that pollinators preferentially feed on native plants as opposed to exotics in newly constructed agricultural hedgerows. Trees and shrubs were selected to build the hedgerow versus smaller herbaceous plants; this is because of the quicker establishment of the shrubs, higher tolerance to extreme environmental conditions, and encroaching weedy grasses from the surrounding matrix.

Communication with faculty and staff familiar with UBNA and the UW Farm Manager also helped inform decisions on what to plant in the hedgerow. Shrubs and trees that have a higher tolerance to a wide range of extreme environmental conditions were selected, since the area of UBNA just south of the farm gets very hot and dry in the summer, and can flood in the winter during heavy rains.

As mentioned above, previous student work showed a limited number or even absence of five types of native bee: long-horned bee, two species of sweat bee, mason bee, and leafcutter bee. The hedgerow was designed with these bee groups in mind, but also considered additional common native bees such as bumble bees.

The designated hedgerow area was mowed and tilled during the summer of 2015, in preparation for planting the following fall or winter. Ultimately, planting took place in February 2016, and at planting time a thin layer of mulch was applied to visibly mark the area. Volunteers from both the Society for Ecological Restoration – UW Chapter, ESRM 100, and the UW Farm helped plant the hedgerow. Later in the spring, more mulch was applied to keep weedy grasses and other invaders away, the bases of plants were hand-weeded, and a drip irrigation system was installed to keep plants well-watered during the first three growing seasons.

## MAJOR ELEMENTS

The hedgerow was designed as a 300 foot long, 8 foot wide strip along the southern edge of the farm; however, during planting some deep flooding prevented planting in the middle of the site. The hedgerow ended up as two strips, each 140 feet long, with a gap at the center that can be filled in by future work parties, if desired. A variety of plants were installed: a center spine of Douglas' hawthorn (*Crataegus douglasii*), surrounded by a mix of flowering trees and shrubs including crabapple (*Malus fusca*), red-flowering currant (*Ribes sanguineum*), red-osier dogwood (*Cornus sericea*), Indian plum (*Oemleria cerasiformis*), Lewis' mock orange (*Philadelphus lewisii*), Nootka and pea fruit rose (*Rosa nutkana* and *R. Pisocarpa*), tall Oregon grape (*Berberis aquifolium*), oceanspray (*Holodiscus discolor*) and

evergreen huckleberry (*Vaccinium ovatum*). Plants were installed two to three feet apart, to ensure a dense, interwoven hedge once all have grown to maturity.

In the future, student groups such as Society for Ecological Restoration are encouraged to add more herbaceous and forb cover to the hedgerow as fitting. As well, hand weeding around plant bases and mulching as necessary will keep weedy grasses at bay; since the surrounding area of UBNA contains many undesirable species that can easily set seed in the hedgerow area. This will continue until shrubs are large enough to shade out or withstand invasion.

This hedgerow project was selected by UW's Campus Sustainability Fund (CSF) for an educational sign or plaque, funded by the graduation gift of the College of the Environment. This sign will contain some information about pollinators, native plant choices to provide habitat, and project background. It will be installed close to the hedgerow, accessible from Wahkiakum Lane so that visitors to UBNA will be able to read and learn about the project.

There will also be ample opportunity to incorporate the pollinator hedgerow into education and activities of the future Children's Garden. With immediate proximity to the hedgerow, the children will be able to learn about plant care, observe pollinators in the garden, and practice their plant identification skills.

## RESOURCES

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