



THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

Conservation Cover (327) for Pollinators:

Western Oregon & Washington

Specifications and Implementation Requirements



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Native wildflower meadow in Oregon, dominant flowers in bloom include slender clarkia, selfheal, and lupine. (Photograph by Eric Lee-Mäder, The Xerces Society.)

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(Photo: Bumble bee on native thistle (Cirsium edule) Mace Vaughan, Xerces Society)

The Xerces Society for Invertebrate Conservation

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Conservation Cover for Pollinators: Western Oregon & Washington Specifications

Definition and Purpose

These instructions provide in-depth guidance on how to establish and maintain permanent vegetative cover to enhance habitat for pollinators. To plan a specific project, use these Specifications to fill out the Implementation Requirements form found at the end of this document.

Client Conservation Objectives

Depending on landowner objectives and project design, conservation cover for pollinators also will enhance wildlife habitat, reduce soil erosion and sedimentation, improve soil, water or air quality, or help manage crop pests by removing weeds that harbor pest insects or by increasing habitat for beneficial invertebrates.

Key Site Characteristics

Site selection for pollinator habitat should take the following into consideration:

- **Pesticide Drift:** Habitat must be protected from pesticides (especially insecticides and bee-toxic fungicides and herbicides). This includes some pesticides approved for use on organic farms. Only sites with no to very low risk for pesticide drift should be established as new habitat.
 - **Accessibility:** New habitat should be accessible to equipment for planting and maintenance operations.
 - **Sunlight:** Most wildflowers and native shrubs grow best in full sunlight.
 - **Slope:** Steep or highly erodible sites should not be disturbed. For re-vegetating such sites, consider Critical Area Planting (342) or other suitable Practice Standards.
 - **Weed Pressure:** Areas with high weed pressure will take more time and effort to prepare for planting. It is also important to note the primary weed composition. Knowing the most abundant weed species on site, their reproductive methods, and whether they are grass or broadleaf, perennial or annual, and woody or herbaceous will help significantly in planning for site preparation and follow up weed management during establishment.
 - **Site History:** Factors such as past plant cover (e.g., weeds, crops, grass sod, and/or native plants), use of pre-emergent herbicides or other chemicals, and soil compaction can affect plant establishment. It is also important to know if sites may have poor drainage, or may flood, as such conditions make habitat establishment more difficult and require a plant mix adapted to the site.
 - **Soils and Habitat:** Most plants listed in the Appendix of this guide are tolerant of many soil conditions and types, however all plants establish better when matched with appropriate conditions.
 - **Irrigation:** To establish plants from plugs, pots, or bare root will require irrigation. Irrigation is generally not needed for plantings established from seed.
 - **Other Functions:** The site may offer opportunities to serve other functions, such as run-off prevention, stream bank stabilization, or wildlife habitat. Those factors can influence plant choice and/or design.
-

Plant Selection

Plant species selection should be limited to plants providing pollen- and nectar-rich forage resources for bees. The inclusion of native bunch grasses is appropriate at a low percentage of the mix by seed per square foot (e.g., 25% or less), but may limit options for use of grass selective herbicides if grass weeds are a primary concern. The Appendix provides example seed mixes for mesic (upland) sites, and a master list of acceptable plants for various locations and/or environments in Western Oregon & Washington.

If you are designing a custom plant list, individual species should be chosen so that there are consistent and adequate floral resources throughout the seasons. In order to achieve this goal, a minimum of three species from each

blooming period (early, mid, and late season) should be included. Plant mix composition (i.e., percent of each species) can be designed to complement adjacent crop bloom time or other abundant species in the landscape, with more plants blooming immediately before and after adjacent crops.

Plant selection should focus on pollen and nectar rich native plants, but non-invasive, non-native plants may be used when cost and/or availability are limiting factors. Please see the Appendix for acceptable non-native plants.

Non-native plants, such as buckwheat or clover, also may be planted as part of a crop rotation or in the understory of perennial crops using the Cover Crop Practice Standard (340) to increase the value of crop fields to pollinators.

Alternate Pest or Disease Hosts: In most cases, native pollinator plants do not serve as alternate hosts for crop pests or diseases, but selected plants should be cross-referenced for

specific crop pest or disease associations. Research indicates that, in general, weedy borders harbor more pests than are found in diverse native plantings.

Site Preparation

Site preparation is **one of the most important** and often inadequately addressed components of project success. It is also a process that may require more than one season of effort to reduce competition from invasive, noxious or undesirable non-native plants prior to planting. *In particular, site preparation should focus on the removal of perennial weeds* (there are more options to address annual or biennial weeds after planting). Regardless of whether the objective is to establish herbaceous or woody vegetation, more effort and time spent eradicating undesirable plants prior to planting will result in higher success rates in establishing the targeted plant community. Site preparation methods are provided in **Table 1**.

Note: If weed pressure is high, then the weed abatement strategies detailed in Table 1 should be repeated for an additional growing season. High weed pressure conditions are characterized by:

- Persistent year-round cover of undesirable plants (covering the entire surface of the site);
- Sites where weeds have been actively growing (and producing seed) for multiple years;
- Sites dominated by introduced sod-forming grasses and rhizomatous forbs (e.g., Canada thistle).

Previously cropped lands (those that have been cultivated for several years) are generally lower in weed pressure.



(Photos: Brianna Borders, Xerces Society)

Figure 1. The site on the left was prepared with a single glyphosate treatment, leaving a significant stubble layer and un-killed weedy grasses. It is not ready for planting. The site on the right was treated for an entire growing season with repeated glyphosate treatments (applied whenever new weeds appeared). The stubble has been removed with a flail mower and it is ready for planting. To prevent buried weed seed from being brought to the surface where it could germinate, neither site was cultivated.

Table 1: Site Preparation Methods

METHOD: NON-SELECTIVE (NON-PERSISTENT) HERBICIDE	
Where to Use <ul style="list-style-type: none"> • Conventional farms and organic farms* • Areas with a low risk of erosion • Areas accessible to sprayer 	Timing <ul style="list-style-type: none"> • Total time: 6+ months (ideally 12+ months) • Begin: early spring (late fall is better, after first rains of the winter germinate the first weed growth) • Plant: fall
Basic Instructions: <ol style="list-style-type: none"> 1. Mow existing thatch as needed at least two weeks before beginning herbicide treatments to expose new weed growth to the herbicide spray. It is preferable to use a flail mower, that chops debris into smaller pieces. 2. Apply a non-selective, non-persistent herbicide as per label as soon as weeds are actively growing in the early spring. It is even more effective to start in the late fall, when winter weeds are germinating. 3. Repeat herbicide applications throughout the spring, summer, and early fall, as needed (whenever emerging weed seedlings reach 4 – 6 inches). 4. For any herbicide-resistant weeds, mow the area to prevent flowering and seed development as necessary. 5. Plant pollinator seed mix (and any transplants) in the fall, waiting at least 72 hours after the last herbicide treatment. Refer to the Planting Methods section of this document for specific recommendations. <p><i>NOTE: Do not till. Avoid any ground disturbance that may bring up additional weed seed. An additional year of site preparation is recommended if weed pressure is particularly high. Avoid use of herbicides that are bee-toxic (e.g., Paraquat and Gramoxone).</i></p> <p><i>* Choice of herbicides must be acceptable to OMRI for organic operations or, if not, used outside of certified ground AND approved by an organic certifier.</i></p>	
METHOD: SOLARIZATION	
Where to Use <ul style="list-style-type: none"> • Organic and conventional farms • Areas with a low risk of erosion • Areas accessible to mowing equipment • Locations with full sun 	Timing <ul style="list-style-type: none"> • Total time: 6+ months • Begin: spring • Plant: fall
Basic Instructions: <ol style="list-style-type: none"> 1. Mow, rake or lightly harrow, or disc and smooth the site in the spring (raking off debris, if necessary). 2. After smoothing the site, irrigate thoroughly and lay UV stabilized plastic (such as high tunnel plastic) burying the edges to prevent airflow between the plastic and the ground. Weigh down the center of the plastic if necessary to prevent the wind from lifting it. Use greenhouse repair tape for any rips that occur during the season. 3. Remove the plastic in early-fall before the weather cools and the area beneath the plastic is recolonized by nearby rhizomatous weeds. 4. Immediately plant pollinator seed mix and/or install transplants. Refer to Planting Methods section of this document for specific bed preparation recommendations. <p><i>NOTE: Solarization may not be as effective in years when summer sun or high temperatures are limited. Do not till after solarizing the plot. Avoid any ground disturbance that may bring up additional weed seed. An additional year of site preparation is recommended if weed pressure is particularly high.</i></p>	

Planting Methods

Recommended planting methods are site-specific. Pre-project site conditions, especially weed competition, may affect planting success and should be addressed prior to planting. Factors such as equipment availability, weed pressure, and cost should be taken into consideration when choosing a planting method. Installing and maintaining habitat should fit into general farm-management practices as much as possible.

Planting seeds, rather than plugs, can be a less expensive way to establish wildflowers. Seeding requires **excellent** site preparation to reduce weed pressure because weed control options are limited when the wildflowers start to germinate. **Seed of most native wildflowers are best planted in late fall in western Oregon and Washington**, when winter rains are just starting.

If possible, seed should be ordered in individual lots, not as a mix. Individual lots help ensure that all species are ac-

counted for and, because size of wildflower seed varies dramatically, seed separated by species gives you the greatest flexibility in planting method. For example, native seed drills have hoppers to accommodate seed of different sizes, and even when broadcasting seed it is useful to divide the seed into batches of small and large seed.

Grain drills, unlike native seed drills, are usually not designed to handle the wide variation in wildflower seed size. However, with simple modifications most types of grass-seed planters or granulated fertilizer spreaders can be used with good results, especially if you plant small seeds at one setting (gate opening) and large seeds at another. **Table 2** outlines several possible seeding methods, including broadcast seeding, drills and the use of transplants.

Newly planted areas should be clearly marked to protect them from herbicides or other disturbances.

Table 2: Methods for Planting Wildflower Seed

METHOD: BROADCAST SEEDERS OR HAND BROADCASTING (THROWING SEED)	
<p>Pros</p> <ul style="list-style-type: none"> • Inexpensive • Easy to use • Can often accommodate poorly cleaned seed • Many models and sizes of broadcasters are commonly available, including hand-held crank and larger tractor or ATV-mounted models 	<p>Cons</p> <ul style="list-style-type: none"> • Requires a smooth seed bed • Seed should be pressed into the soil after planting • Difficult to calibrate • Some models of broadcast seeders cannot accommodate large seeds
<p>Basic Instructions:</p> <p>Remove as much stubble as possible prior to seeding, creating a smooth, lightly-packed seedbed. The soil surface can be lightly hand-raked or harrowed to break-up crusted surfaces, but <u>do not cultivate the site (cultivation will bring up additional weed seed)</u>.</p> <p>Seeds of similar sizes can be mixed together and bulked up with an inert carrier ingredient such as sand, fine-grained vermiculite, clay-based kitty litter, gypsum, or polenta (fine cornmeal). Use two to three parts bulking agent for each part seed by volume. These inert carriers ensure even seed distribution in the mix, visual feedback on where seed has been thrown, and make calibration easier.</p> <p>The broadcast seeding equipment used should have a flow gate that closes down small enough to provide a slow, steady flow of your smallest wildflower seed. Models with an internal agitator are also preferred. Planting should begin with the flow gate set to the narrowest opening, to allow at least two perpendicular passes over the seed bed for even distribution. Very large seed can be planted separately with the flow gate set to a wider opening.</p> <p>For small sites (e.g., less than 1 to 2 acres), seed can also be hand broadcast (similar to scattering poultry feed). When hand broadcasting, divide the seed into at least two batches, bulk the seed mix with an inert carrier, and sow each batch separately. Scatter the first batch evenly over the site while walking in parallel passes across the site. Then to ensure seed is evenly distributed, walk in passes perpendicular to the previous passes to scatter the second batch.</p> <p>Regardless of how it is broadcast, do not cover the seed with soil after planting. A water-filled turf grass roller (available for rent at most hardware stores) or, ideally, a cultipacker should be used to press the seed into the soil surface. Natural precipitation or light overhead irrigation can also help ensure good seed-soil contact. Floating row-cover can be used if necessary to protect seeds and small seedlings against predation.</p>	

Table 2 (Cont.): Methods for Planting Wildflower Seed

METHOD: DROP SEEDERS OR FERTILIZER SPREADERS (DROPPING SEED)	
<p>Pros</p> <ul style="list-style-type: none"> • Inexpensive • Easy to use • Even seed dispersal • Can accommodate both large and small seed • Many models and sizes are commonly available (hand-powered turf grass seeders are most common, but larger tractor-drawn “pasture-seeder” models also exist) 	<p>Cons</p> <ul style="list-style-type: none"> • Requires a smooth, level seed bed • Seed should be pressed into the soil after planting • Hand-powered models are time consuming for large areas (over ½ acre) • Calibration requires trial and error
<p>Basic Instructions:</p> <p>Remove as much stubble as possible prior to seeding, creating a smooth, lightly-packed seedbed. The soil surface can be lightly hand-raked or harrowed to break-up crusted surfaces, but do not cultivate the site (cultivation will bring up additional weed seed).</p> <p>Seed of similar sizes can be mixed together and bulked up with an inert carrier ingredient such as sand, fine-grained vermiculite, clay-based kitty litter, gypsum, or polenta (fine cornmeal). Use two to three parts bulking agent for each part seed by volume. These inert carriers ensure even seed distribution in the mix, visual feedback on where seed has been thrown, and make calibration easier. Planting should begin with the drop gate set to the narrowest opening, to allow at least two perpendicular passes over the seed bed for even distribution. Very large seed can be planted separately with the drop gate set to a wider opening.</p> <p>Do not cover the seed after planting. A water-filled turf grass roller (available for rent at most hardware stores) or, ideally, a cultipacker should be used to press the seed into the soil surface. Natural precipitation or light overhead irrigation can also help ensure good seed-soil contact. Floating row-cover can be used if necessary to protect seeds and small seedlings against predation.</p>	
METHOD: NATIVE SEED DRILLS (DRILLING SEED)	
<p>Pros</p> <ul style="list-style-type: none"> • Convenient for planting large areas • Seed box agitators and depth controls are designed specifically for planting small and fluffy native seeds at optimal rate and depth • Can plant into a light stubble layer • Seeds are planted in even rows, allowing for easier seedling recognition • Does not require seed to be pressed into soil surface after planting (e.g., cultipacking) 	<p>Cons</p> <ul style="list-style-type: none"> • Expensive and not readily available in some areas • Difficult to calibrate for small areas (less than 1 acre) • Requires a tractor and an experienced operator to set planting controls • Seed with a lot of chaff can clog delivery tubes • Seed can be buried too deep if planting controls are not set correctly.
<p>Basic Instructions:</p> <p>Plant only when the soil is dry enough to prevent sticking to the coulters. Under wet conditions, small seed is likely to stick to mud-caked parts of the drill, rather than the ground.</p> <p>Keep seed separated by species until ready to plant. Prior to planting, seed should be organized into batches of large smooth seed, small smooth seed, and tufted seed that does not flow easily. Loosely fill seed boxes (do not compact seed into them) with the appropriate seed batch for each box. Seed quantities that do not cover the agitator should be planted using some other method, since the drill is difficult to calibrate for small volumes of seed.</p> <p>As a general rule, the planting depth for a particular seed should be no more than 1.5x its diameter. To achieve this for most wildflower seed, set the depth controls to plant no deeper than ¼ inch (consult with the seed vendor for specific guidelines on very sandy soils). Small wildflower seed should be planted on the soil surface. Stop periodically to check planting depth.</p>	

Table 2 (Cont.): Methods for Planting Wildflower Seed

Operate the drill at less than 5 mph, stopping to check periodically for any clogging of planting tubes (usually observed as a seedbox that is remaining full). Clogging is most common with fluffy seed, or seed with a lot of chaff. Avoid backing up the drill as it will likely cause clogging.

For information on native seed drill calibration, see NRCS publication:
<http://www.plant-materials.nrcs.usda.gov/pubs/mipmctn10591.pdf>

METHOD: TRANSPLANTING FORBS AND WOODY PLANTS

Pros

- Provides mature nectar and pollen resources more quickly
- Does not require specialized planting equipment (except for large trees)
- Preferred for plants with limited seed availability, which are expensive or difficult to establish from seed
- Transplants can be established more easily in weedy sites with adequate mulching

Cons

- Expensive and time consuming for large areas
- Transplants typically require irrigation during establishment

Basic Instructions:

Regular shovels are adequate for transplanting most container stock. However, dibble sticks or mechanical transplanters are sometimes helpful for plug-planting. Power augers and mechanical tree spades can be helpful for larger plants.

Plant size at maturity should be considered when planting. Most woody shrubs can be spaced on 4' – 10' centers (depending upon size at maturity), with most herbaceous plants spaced closer on 2' – 3' centers. It is helpful to measure the planting areas prior to purchasing transplants, and to stage the transplants in the planting area prior to installing them in the ground.

Transplanting can occur any time the ground can be worked, but should be timed to avoid prolonged periods of hot, dry, or windy weather. Regardless of when planting occurs however, the transplants should be irrigated thoroughly immediately after planting. Holes for plants can be dug and pre-irrigated prior to planting as well. Follow-up irrigation is dependent upon weather and specific site conditions, but generally even native and drought tolerant plants should be irrigated with at least 1" of water per week (except during natural rain events), for the first two years after establishment. Long, deep watering is best to encourage deep root system development and shallow irrigation should be avoided. Drip irrigation is useful, and other methods that allow for deep watering can be successful. It is advisable to irrigate at the base of plants and avoid overhead irrigation that would encourage weed growth. Once plants are established, irrigation should be removed or greatly decreased. Non-native plants may require more frequent irrigation, and may still require supplemental irrigation once established.

Most of the plants in the Appendix are adapted to a variety of soil conditions and do not need any specific amendments. However, in areas where the soil is compacted, degraded, or depleted, compost should be used during planting. Compost should be free from weed seeds, aged properly, and mixed thoroughly with soil in the holes during planting.

In cases where rodent damage may occur, underground wire cages around roots are recommended. Plant guards may be needed to protect plants from above ground browsing or antler damage by deer. **Newly planted areas should be clearly marked to protect them from herbicides or other disturbances.**

Mulching (2" to 3" deep) is recommended to reduce weed competition and to retain moisture during the establishment phase. Recommended materials include wood chips, bark dust, weed-free straw (e.g., rice straw), nut shells, grape-seed pumice, or other regionally appropriate mulch materials that contain no viable seeds.

Planting Method Photos



(Photos: Brianna Borders, Xerces Society)

Figure 2. For broadcast seeding, seed of **similar size** is mixed together (left). Sand or another inert carrier is added (at a ratio of at least 2:1) and then mixed (middle left), and the mix is divided into separate batches (middle right) for broadcasting in perpendicular passes over the planting site. When hand-broadcasting seed, walk in perpendicular passes over the entire planting area (Right).



(Photos: Brianna Borders, Xerces Society)

(Photo: Regina Hirsch, University of Wisconsin)

Figure 3. Native wildflower seed should be planted directly on the soil surface (left). After broadcasting, roll the site with a cultipacker (middle) or turf roller (right).



(Photos: New Hampshire NRCS)

Figure 4. Hand-crank “belly grinder” type seeders (left) are low cost and can broadcast seed more evenly than hand-scattering on larger sites. Similarly, lawn fertilizer spreaders (right) are another commonly available tool for broadcasting seed. In both cases, models with internal agitators are preferred to prevent clogging. For best results divide the seed into separate batches, grouping seed of similar sizes for planting together with the flow gate adjusted accordingly. It can be difficult to plant very large and very small seed together in a single seed mix using mechanical broadcasters. Use an inert carrier (such as sand) and walk in at least two perpendicular paths to ensure the most even seed distribution possible.

Planting Method Photos (Cont.)



(Photo: Jessa Guisse, Xerces Society)

Figure 5. Native seed drills are the ideal tool for large planting sites (5+ acres). Typical models can plant in a light stubble layer, have depth controls for optimal seed placement, and have separate seed boxes for different sizes of seed. **Such drills need an experienced operator and careful calibration.**

Maintenance During Establishment (Short-Term)

Weed control is critical in the first and second years after planting. If the site is well prepared, then less effort will be required for weeding after project installation. Maintenance practices must be adequate to control noxious and invasive species and may involve tools such as mowing, burning, hand hoeing, or spot spraying with herbicides.

Weeds should be prevented from going to seed in, or adjacent to, the project area during the first two years (and possibly three) after planting to help ensure long-term success. Familiarity with the life cycle of weeds will facilitate appropriate timing of management activities. Since young wildflower and weed seedlings may look alike, care should be taken to properly identify weeds before removal.

Common weed-management strategies include:

- **Mowing / String Trimming:** Mowing or string trimming can be utilized to keep weedy species from shading out other plants, and to prevent them from going to seed. Mowing is especially useful when establishing wildflower plots of perennial species. When planted with perennial seed mixes, sites can be mowed occasionally (ideally 8" high) during the first year after planting to prevent annual and biennial weeds from flowering and producing seed. Perennial wildflowers are slow to establish from seed, and are usually not harmed by incidental mowing in the first year after planting. Mowing can also be used on plots of re-seeding annuals at the end of the growing season to

help shatter wildflower seedpods, and to reduce woody plant encroachment. Mowing and string trimming can also be useful around woody transplants to manage nearby weeds.

- **Spot Spraying:** Spot spraying with herbicides can be effective, relatively inexpensive, and require minimal labor, even on larger project areas. Care should be taken so that herbicides do not drift or drip onto desirable plant species. Spot spraying is usually performed with backpack spraying, or occasionally with rope-wick implements (when weed growth is substantially taller than newly established wildflowers).
- **Selective Herbicides:** Grass-selective herbicides can be used to control weedy grasses in broadleaf plantings. Contact a local crop advisor or Extension specialist for appropriate herbicide selection and timing, or see the *Pacific Northwest Weed Management Handbook*.
- **Managing Irrigation:** Most wildflowers established from seed thrive with little or no supplemental irrigation. Keeping irrigation to a minimum helps native wildflowers out-compete non-native weedy species that sometimes have higher soil moisture requirements. Similarly, when irrigation is needed for transplants, it should be supplied at the base of the transplant when possible (through drip irrigation, for example) to avoid watering nearby weeds.
- **Hand Weeding:** Hand-weeding (including hoeing) can be effective in small areas with moderate weed pressure.



(Photos: Eric Mader, Xerces Society)



Figure 6. In the first spring after seeding the previous fall, this planting site is dominated by annual and biennial weeds like wild radish (left). Mowing the site periodically during the first year (ideally at 8” or higher) will prevent these short-lived weeds from producing more seed, and allow sunlight to reach the slower-growing natives (right), which are generally unharmed by the occasional mowing.



(Photo: Don Keirstead, New Hampshire NRCS)

Figure 7. Flourishing wildflowers and pollinator habitat in year 2 after planting.

Operations and Maintenance (Long-Term)

Control herbivores as needed, but remove tree guards or other materials that could impede plant growth as soon as possible after establishment. In most cases, irrigation can be removed from transplants by the end of the second year after planting. Continue to protect habitat from pesticides and herbicides except when necessary to control noxious or invasive plants. On-going herbicide use (spot-treatment) or occasional hand weeding may be necessary to control noxious weeds. Maintain the long-term plant diversity of pollinator habitat by re-seeding or re-planting as necessary.

Wildflower plantings generally need to be managed over time to maintain open, early successional characteristics. The actual management will depend on the size and location of the habitat. Possible management tools/techniques include mowing or burning. If mowing is used, be sure all equipment is clean and free of weed seed. Do not mow or burn during critical wildlife nesting seasons (between March 15 and July 15). After establishment, no more than 30% of the habitat area should be mowed or burned in any one year to ensure sufficient undisturbed refuge areas for pollinators and other wildlife.

Finally, note that some common farm-management practices can cause harm to bees and other beneficial insects. Insecticides are especially problematic, including some insecticides approved for organic farms. Therefore, if insecticide spraying is to occur on the farm, it is critical that the Conservation Cover planting area is outside of the sprayed area and/or protected from application and drift.

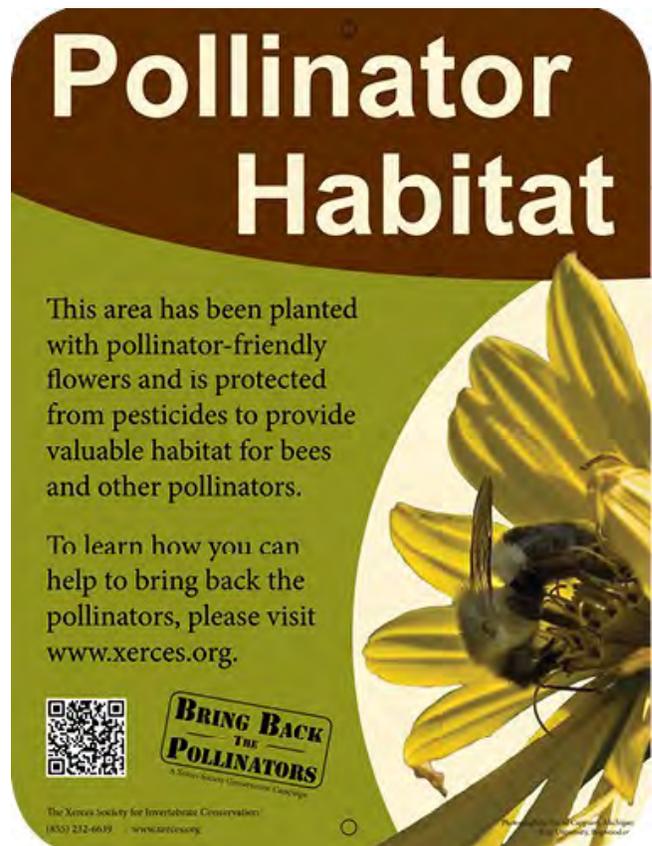


Figure 8. Newly planted areas should be clearly marked to protect them from herbicides or other disturbances. Using signs such as the one above can be a useful tool to designate protected pollinator habitat.

Appendix: Seed Mixes, Plant Lists and Sources, and References

Example Seed Mixes

The following sample seed mixes are formulated for a 1-acre planting area. For larger areas, increase the rate accordingly. To create custom seed mixes, see master plant list on page 13 and the references section for a downloadable seed mix calculator.

All Native Seed Mix for Dry Sites in Willamette Valley and Puget Trough

This mix of native plants is designed to provide season-long pollen and nectar resources on any sunny mesic to slightly dry upland site. **Note:** To further reduce weed potential around cranberry marshes, pollinator sites should be created in upland areas with a mowed buffer separating the habitat from the marsh areas.

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT ²	LBS / ACRE	PRICE / LB	TOTAL PRICE	BLOOM TIME
Farewell to Spring	<i>Clarkia amoena</i>	7.0%	4.20	0.18	\$90.00	\$15.99	Spring
Large Camas	<i>Camassia leichtlinii</i>	1.0%	0.60	0.26	\$140.00	\$36.59	Spring
Big Leaf Lupine	<i>Lupinus polyphyllus</i>	2.0%	1.20	1.87	\$50.00	\$93.34	Spring
Riverbank Lupine	<i>Lupinus rivularis</i>	0.5%	0.30	0.45	\$80.00	\$36.05	Spring
Western Yarrow	<i>Achillea millefolium var. occidentalis</i>	1.0%	0.60	0.02	\$25.00	\$0.46	Early Summer
Oregon Sunshine	<i>Eriophyllum lanatum</i>	7.0%	4.20	0.16	\$160.00	\$25.02	Early Summer
Seablush	<i>Plectritis congesta</i>	8.0%	4.80	0.16	\$50.00	\$7.97	Early Summer
Meadow Checkermallow	<i>Sidalcea campestris</i>	1.5%	0.90	0.39	\$95.00	\$37.24	Early Summer
Slender cinquefoil	<i>Potentilla gracilis</i>	5.0%	3.00	0.09	\$120.00	\$11.12	Early Summer
Globe Gilia	<i>Gilia capitata</i>	4.0%	2.40	0.10	\$95.00	\$9.85	Summer
Self Heal	<i>Prunella vulgaris</i>	10.0%	6.00	0.65	\$50.00	\$32.67	Summer
Large Flowered Phlox	<i>Collomia grandiflora</i>	2.0%	4.80	0.16	\$50.00	\$7.97	Summer
Showy Milkweed	<i>Asclepias speciosa</i>	1.0%	0.60	0.36	\$200.00	\$72.60	Summer
Showy Tarweed	<i>Madia elegans</i>	5.0%	3.00	0.62	\$85.00	\$52.89	Summer
Puget Sound Gumweed	<i>Grindelia integrifolia</i>	4.0%	2.40	0.82	\$100.00	\$82.32	Late Summer
Canada Goldenrod	<i>Solidago Canadensis</i>	15.0%	9.00	0.13	\$160.00	\$20.91	Late Summer
Hall's Aster	<i>Symphotrichum hallii</i>	4.0%	2.40	0.04	\$250.00	\$9.90	Fall
Douglas or Pacific Aster	<i>Symphotrichum subspicatum</i> or <i>S. chilense</i>	4.0%	4.80	0.08	\$250.00	\$19.80	Fall
California Oatgrass	<i>Danthonia californica</i>	6.0%	3.60	1.12	\$47.00	\$52.65	n/a
Prairie Junegrass	<i>Koeleria macrantha</i>	6.0%	3.60	0.07	\$50.00	\$3.39	n/a
Roemer's Fescue	<i>Festuca romeri</i>	6.0%	3.60	0.31	\$35.00	\$10.98	n/a
TOTALS		100%	60	7.34	-	\$639.71	

*Costs may vary by year and seed producer

Low Cost Conservation Cover Seed Mix (Native and Non-Native Species)

This low cost mix provides fewer season-long pollen and nectar benefits, and may be less resistant to weed encroachment. For large sites or where financial resources are limited, it may be a preferred option. Do not use adjacent to intact natural areas.

COMMON NAME	SCIENTIFIC NAME	% OF MIX	SEEDS / FT ²	LBS / ACRE	PRICE / LB	TOTAL PRICE	BLOOM TIME
California Poppy	<i>Eschscholzia californica</i>	7.0%	4.20	0.63	\$15	\$9.46	spring
Lacy Phacelia	<i>Phacelia tanacetifolia</i>	6.0%	3.60	0.71	\$15	\$10.69	spring
Big Leaf Lupine	<i>Lupinus polyphyllus</i>	1.0%	0.60	0.93	\$50	\$46.67	spring
Baby Blue Eyes	<i>Nemophila menziesii</i>	6.0%	3.60	0.61	\$15	\$9.12	spring
Oregon Sunshine	<i>Eriophyllum lanatum</i>	6.0%	3.60	0.13	\$160	\$21.44	early summer
Seablush	<i>Plectritis congesta</i>	8.0%	4.80	0.16	\$50	\$7.97	early summer
Western Yarrow	<i>Achillea millefolium</i>	6.0%	3.60	0.11	\$25	\$2.76	early summer

(Cont.) Low Cost Conservation Cover Seed Mix

Self Heal	<i>Prunella vulgaris</i>	6.0%	3.60	0.39	\$50	\$19.60	summer
Farewell to Spring	<i>Clarkia amoena</i>	6.0%	3.60	0.15	\$90	\$13.70	summer
Globe Gilia	<i>Gilia capitata</i>	5.0%	3.00	0.13	\$95	\$12.32	summer
Blanketflower	<i>Gaillardia aristata</i>	5.0%	3.00	0.71	\$15	\$10.60	summer
Alfalfa	<i>Medicago sativa</i>	7.0%	4.20	0.81	\$3	\$2.42	summer
Canada Goldenrod	<i>Solidago canadensis</i>	7.0%	4.20	0.06	\$160	\$9.76	fall
Hall's Aster	<i>Symphyotrichum hallii</i>	6.0%	3.60	0.06	\$250	\$14.85	fall
Prairie Junegrass	<i>Koeleria macrantha</i>	10.0%	6.00	0.11	\$50	\$5.64	-
Romer's Fescue	<i>Festuca romeri</i>	8.0%	4.80	0.42	\$35	\$14.64	-
TOTALS		100%	60	6.13	-	\$211.65*	

*Costs may vary by year and seed producer

Master Plant Lists**Recommended Native Wildflowers for Pollinators**

COMMON NAME	SCIENTIFIC NAME	LIFE † CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Early Season Blooming Species					
Big Leaf Lupine	<i>Lupinus polyphyllus</i>	P	3 ft	Medium	
Common Camas	<i>Camassia quamash</i>	P	2 ft	High	Slow to establish from seed (blooms 3.5 to 4.5 after planting). Best planted as a bulb.
Large Camas	<i>Camassia leichtlinii</i>	P	2 ft	High	Slow to establish from seed (blooms 3.5 to 4.5 after planting). Best planted as a bulb.
Riverbank Lupine	<i>Lupinus rivularis</i>	B	4 ft	Medium	Short lived and very aggressive; include at a low rate in seed mixes. Bloom second summer after seeding.
Rose checkermallow	<i>Sidalcea virgata</i>	P	4 ft	Medium	
Early to Mid Season Blooming Species					
Meadow Checkermallow	<i>Sidalcea campestris</i>	P	4 ft	Medium	
Oregon Sunshine	<i>Eriophyllum lanatum</i>	P	2 ft	Low	Easy to establish from seed
Slender Cinquefoil	<i>Potentilla gracilis</i>	P	2 ft	Low	
Slender Clarkia	<i>Clarkia gracilis</i>	A	2.5 ft	Low	
Seablush	<i>Plectritis congesta</i>	A	2 ft	Medium	
Poached Egg Plant	<i>Limnanthes douglasii</i>	A	1 ft	Medium - High	
Western Yarrow	<i>Achillea millefolium</i> var. <i>occidentalis</i>	P	2 ft	Low	
Mid Season Blooming Species					
Farewell to Spring	<i>Clarkia amoena</i>	A	2 ft	Medium	Easy to establish from seed
Globe Gilia	<i>Gilia capitata</i>	A	3 ft	Low	
Large Flowered Collomia	<i>Collomia grandiflora</i>	A	3 ft	Medium	
Self Heal	<i>Prunella vulgaris</i>	P	1.5 ft	Medium	Easy to establish from seed
Showy Milkweed	<i>Asclepias speciosa</i>	P	3 ft	Medium	Slow to establish from seed
Mid to Late Season Blooming Species					
Puget Sound Gumweed	<i>Grindelia integrifolia</i>	P	4 ft	Medium	
Showy Tarweed	<i>Madia elegans</i>	A	4 ft	Low	

† Life Cycle abbreviations: P = perennial, A = annual, B = biennial

COMMON NAME	SCIENTIFIC NAME	LIFE CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Late Season Blooming Species					
Canada Goldenrod	<i>Solidago canadensis</i>	P	3 ft	Medium	
Douglas Aster	<i>Symphotrichum subspicatum</i>	P	4 ft	Medium	
Pacific Aster	<i>Symphotrichum chilense</i>	P	4 ft	Medium	
Hall's Aster	<i>Symphotrichum hallii</i>	P	3 ft	Medium	
Western Goldentop	<i>Euthamia occidentalis</i>	P	3 ft	High	Wetland or shoreline species. Grows well along ditches or streams.

Native Grasses and Sedges for Pollinator Seed Mixes

Note: Grasses and sedges should ideally comprise no more than 25% of seed mixes on pollinator sites.

COMMON NAME	SCIENTIFIC NAME	LIFE CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Prairie Junegrass	<i>Koeleria macrantha</i>	P	2 ft	Medium	Tolerates moderate grazing
Roemer's Fescue	<i>Festuca romeri</i>	P	2 ft	Medium	
California Oatgrass	<i>Danthonia californica</i>	P	2 ft	Low	
Tufted Hairgrass	<i>Deschampsia caespitosa</i>	P	3 ft	Medium	

Non-Native Plants for Insectary Meadows and Cover Crops

COMMON NAME	SCIENTIFIC NAME	LIFE CYCLE	MATURE HEIGHT	WATER NEEDS	NOTES
Early Season Blooming Species					
Baby Blue Eyes	<i>Nemophila menziesii</i>	A	1 ft	Medium	
California Poppy	<i>Eschscholzia californica</i>	A	2 ft	Low	
Lacy Phacelia	<i>Phacelia tanacetifolia</i>	A	2 ft	Low	Fall seeded
Early to Mid Season Blooming Species					
Crimson Clover	<i>Trifolium incarnatum</i>	A	2-3 ft	Medium	Fall seeded
Hairy Vetch	<i>Vicia villosa</i>	A	1.5 ft	Medium	Fall seeded; aggressive at high seeding rates
Lanceleaf Coreopsis	<i>Coreopsis lanceolata</i>	P	2 ft	Medium	
Red Clover	<i>Trifolium repens</i>	P	2 ft	Medium	Aggressive at high seeding rates
Mid Season Blooming Species					
Alfalfa	<i>Medicago sativa</i>	P	2-3 ft	Medium	Susceptible to frost heaving
Blanketflower	<i>Gaillardia aristata</i>	P	2 ft	Low	
Borage	<i>Borage officinalis</i>	A	1.5 ft	Medium	Not freeze tolerant; spring seeded in cold climates
Buckwheat	<i>Fagopyrum esculentum</i>	A	2 ft	Medium	
Mid to Late Season Blooming Species					
Common sunflower	<i>Helianthus annuus</i>	A	9 ft	Medium	
Cosmos	<i>Cosmos bipinnatus</i>	A	5 ft	Medium	

Regional Native Seed Vendors and Native Plant Nurseries

Inclusion on this list does not constitute an endorsement or a recommendation. Other vendors not listed below may also have suitable plant materials. Before ordering, ensure that all plants or seeds purchased have **NOT** been treated with systemic insecticides.

- Althouse Nursery** (Transplants Only) • Cave Junction, OR • 541-592-2395 • www.althousenursery.com
- Beaverlake Nursery** (Transplants Only) • Beaver Creek, OR • 503-632-4787 • www.beaverlakenursery.com
- Champoeg Nursery** (Seed and Transplants) • Aurora, OR • 503-678-6348 • www.champoegnursery.com
- Clearwater Native Plant Nursery** (Transplants Only) • Redmond, OR • 541-350-5261 • www.clearwaternatives.com
- Derby Canyon Natives** (Seed and Transplants) • Peshastin, WA • 509-548-9404 • www.derbycannonatives.com
- Fourth Corner Nurseries** (Transplants Only) • Bellingham, WA • 360-592-2250 • www.fourthcornernurseries.com
- Heritage Seedlings** (Seed and Transplants) • Salem, OR • 503-585-9835 • www.heritageseedlings.com
- Inside Passage Native Seeds** (Seeds Only) • Port Townsend, WA • 800-361-9657 • www.insidepassageseeds.com
- Native Grounds Nursery** (Transplants Only) • Brownsville, OR • 541-466-3561 • www.nativegroundsnursery.com
- Oak Point Nursery** (Transplants Only) • Independence, OR • 503-508-9555 • www.oakpointnursery.com
- Pacific Northwest Natives** (Seeds Only) • Albany, OR • 541-928-8239 • www.pacificnw natives.com
- Plantas Nativa** (Seed and Transplants) • Bellingham, WA • 360-715-9655 • www.plantasnativa.com
- Seven Oaks Native Nursery** (Transplants Only) • Albany, OR • 541-738-2607 • www.sevenoaksnative nursery.com
- Sound Native Plants** (Transplants Only) • Olympia, WA • 360-352-4122 • www.soundnativeplants.com
- Storm Lake Growers** (Transplants Only) • Monroe, WA • 360-794-4842 • www.slgrowers.com
- Woodbrook Native Plant Nursery** (Transplants Only) • Gig Harbor, WA • 253-857-6808 • www.woodbrooknativeplantnursery.com

Resources

Plants for Pollinators in Oregon (USDA-NRCS: technical note)
This Oregon NRCS Technical Note describes the biology and habitat needs of native bees and other beneficial insects. An extensive and detailed list of plant species is included on pages 15 to 20.
http://plants.usda.gov/pollinators/Plants_for_Pollinators_in_Oregon_PM%2013.pdf

Pacific Northwest Weed Management Handbook.

For more information on weed management and control of specific weed species, Oregon, Washington, and Idaho land grant universities have compiled information into this on-line resource.
<http://pnwhandbooks.org/weed/>

Soil Solarization: A Nonpesticidal Method for Controlling Diseases, Nematodes, and Weeds

This fact sheet, produced by the University of California Cooperative Extension discusses the solarization process, including plastic selection, installation, removal, and underlying principles.
www.vric.ucdavis.edu/pdf/soil_solarization.pdf

Seed Quality, Seed Technology, and Drill Calibration

This Washington NRCS Plant Materials Technical Note (no. 7. 2005) features extensive information on calibrating native seed drills, and the use of inert carriers.
www.plant-materials.nrcs.usda.gov/pubs/wapmctn6331.pdf

Xerces Society Seed Mix Calculator

Develop your own pollinator conservation seed mix using this seed rate calculator.
<http://www.xerces.org/wp-content/uploads/2009/11/XERCES-SEED-MIX-CALCULATOR.xls>

Attracting Native Pollinators: Protecting North America's Bees and Butterflies

This comprehensive book on pollinator conservation includes information about pollinator ecology, guides for identifying common bees, and habitat designs for multiple landscapes.
www.xerces.org/announcing-the-publication-of-attracting-native-pollinators/

Pollinator Conservation Resource Center

For additional information on pollinator plant lists, conservation guides, pesticide protection and more.
www.xerces.org/pollinator-resource-center

Conservation Cover (327) for Pollinators: Western Oregon & Washington Implementation Requirements

Client:	Planned By:	Date:
Location:	Farm/Tract:	County:
Client Conservation Objectives:		

Purpose

This Implementation Requirement form documents the process of establishing and maintaining permanent vegetative cover to enhance habitat for pollinators. Other natural resources may also benefit, depending on your conservation objectives and the integration of this habitat with other conservation practices. Installation shall be in accordance with these requirements and any attached drawings. **No changes are to be made without prior approval from the technical specialist who approved the installation plan.**

For detailed instructions on each step in these Implementation Requirements, please see the *Conservation Cover (327) for Pollinators: Western Oregon & Washington Specifications*

Key Site Characteristics

Risk of pesticide drift on site? Low to high Very low to none

Weeds: weed pressure, and primary weed species of concern:

Site history: historic and current plant cover, past use of land, pre-emergent herbicide use, compaction, etc.:

Soils and habitat: soil texture (coarse to fine), drainage, and moisture level:

Irrigation: availability and method (necessary if transplants are to be used):

Other concerns or conservation goals that may affect plant choice or site preparation and planting:

Plant Selection

See the Appendix in the Specifications for plant recommendations and example seed mixes.

Upland Seed Mix Low Cost Cover Mix Custom Seed Mix

Note any species substitutions here or attach copy of custom seed mix:

Transplants may be preferred when seed is not available, weed pressure is high, or when a particular species is difficult to establish by seed. Transplanting can be most cost-effective when using plug plants. Conservation Cover can also include woody plants. See *Hedgerow Planting (422) for Pollinators Specifications: Western Oregon and Washington* for suggested woody plant species.

Note any woody or herbaceous species established from transplants here:

Site Preparation Method

Choose an option and note any adjustments.

- Herbicide Solarization

- Severe weed pressure? (If so, an additional year of site prep or the use of transplants should be considered. See the *Installation Guide*.)

Adjustments:

Planting Method

Choose all options that apply and note any adjustments.

- Broadcasting: by machine or hand Native seed drill
 Drop seeding Transplants

Adjustments:

Maintenance During Establishment

Choose all options that apply and note any adjustments.

- Mowing / string-trimming Managing irrigation
 Spot spraying weeds with herbicide Hand weeding and/or hoeing
 Grass Specific or other selective herbicide Other: _____

Adjustments:

Long Term Site Operations and Maintenance

Control herbivores as needed, but remove plant guards or other materials that could impede plant growth as soon as possible after establishment. In most cases, irrigation of transplants is no longer required by the end of the second growing season after planting. Maintain the long-term plant diversity of pollinator habitat by re-seeding or re-planting as necessary.

After establishment, no more than 30% of the habitat area should be mowed, grazed, or burned in any one year to ensure sufficient undisturbed areas for pollinators and other wildlife. Do not mow or burn during critical wildlife nesting seasons (March 15 to July 15). Continue to protect habitat from pesticide applications and drift (especially insecticides and bee-toxic fungicides). Herbicide spot-treatments and hand weeding may be used to control noxious or invasive plants.

Continued on next page

Design Approval

Client Acknowledgement Statement

The Client acknowledges that:

- a. They have received a copy of the specifications and understand the contents and implementation requirements.
- b. The following information must be provided to NRCS by the client before this practice can be certified as applied:
 - Site preparation performed, seeding/planting method, plant species used, seed per acre, number of plants per acre.
 - Weed control performed
- c. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinance and laws pertaining to the application of this practice.

Accepted by: _____ Date: _____

Certification

I have completed a review of the information provided by the client and certify this practice has been applied.

Certification by: _____ Date: _____

Job title: _____