

HABITAT

IN THE

VINEYARD

**A Step-by-Step Guide for
the Walla Walla Valley**

PRESENTED BY:



**WALLA WALLA COUNTY
CONSERVATION DISTRICT**
ESTABLISHED 1941

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Habitat in the Vineyard

A Step-By-Step Guide for the Walla Walla Valley

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Conservation Biological Controls in the Vineyard

The practice of integrating beneficial insects into crops for pest control is known as Conservation Biological Control. Providing food sources and year round shelter is the key to increasing beneficial insect activity in your vineyard. Many predator and parasitoid species can keep the most common wine grape pests (Grape Leafhoppers, Mites, and Cutworms) under control. Pollinators and other insects are critical for the health of agriculture and surrounding landscapes. Preserving or restoring plant communities that provide food and overwintering sites are essential to increase the abundance and diversity of natural pest enemies.

Restoring field edges, drive rows and other uncropped areas to benefit wildlife, improves water quality and soil health, reduces erosion, manages weeds, provides wind-breaks and adds aesthetic value to the vineyard. Habitat plantings can be hedgerows, wildflower meadows, or drive row plantings of native grass and forbs. Habitat plantings are often funded by conservation programs or required for certification programs such as [Biodynamic](#), [Organic](#), [LIVE](#), [Salmon Safe](#), or [Bee Better Certification](#).

Much of the native shrub steppe in eastern Washington has been removed to make way for agriculture. Loss of habitat leads to the loss of services from insects that have co-evolved with native shrub steppe plants. Regionally native plants are adapted to Walla Walla Valley's climate, soils and will withstand the extremes in our weather.



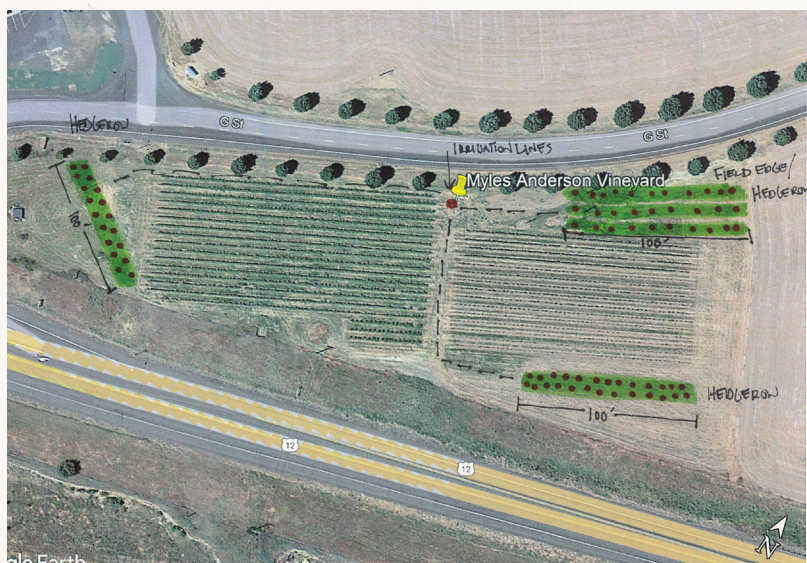
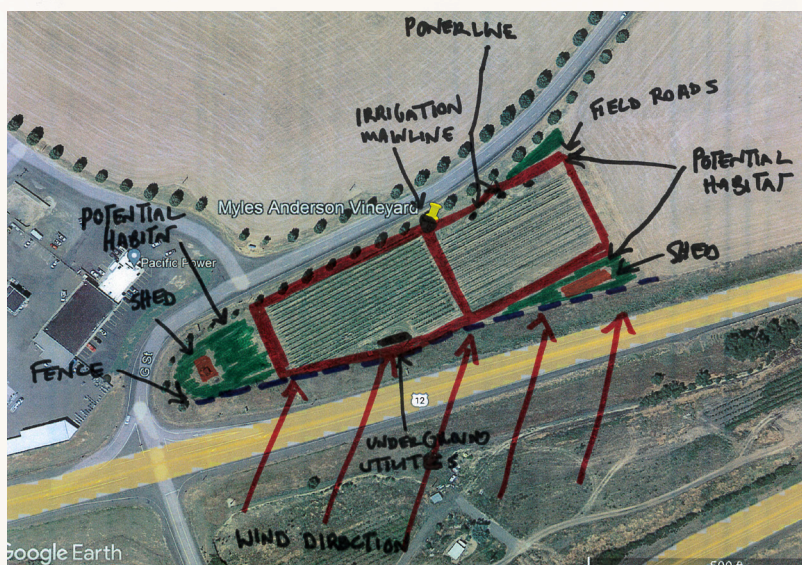
Bee visiting Indian Blanket Flower (*Gallardia aristata*) NRCS Oregon
Figure 38



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Planning

Crafting a plan for site prep, planting, maintenance and long-term farm goals will be worth the effort up front. Using a [habitat assessment form](#) and [Google Earth](#) to create a map of potential project sites and surrounding fields is a good place to start. The map can be used to locate existing habitat areas around fields, irrigation, utilities, field roads and any future building sites. Walking around, observing and digging holes will provide information that mapping will not such as soil type, weed infestation, wind direction, sunlight and state of potential planting sites. Use [Web Soil Survey](#) to look up soil type and information about salinity, drainage, depth to water table and your sites' soils and physical properties.

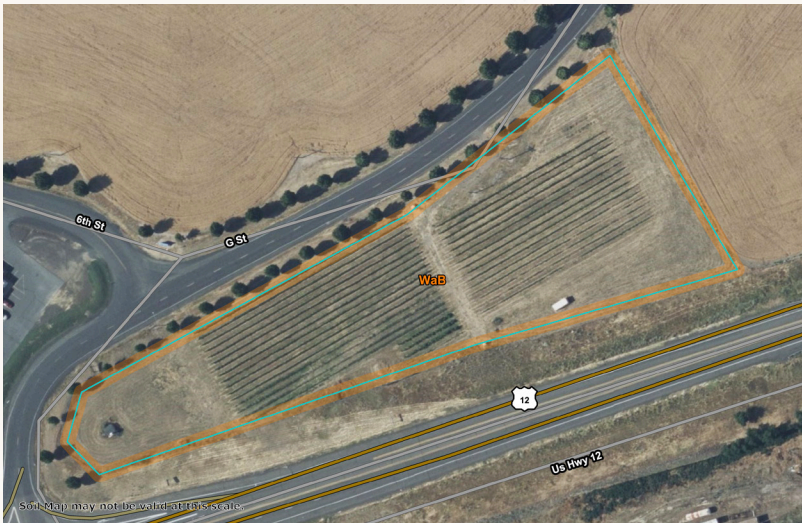


[TOP] Google map of vineyard mapping out potential planting sites and permanent structures.
 [BOTTOM] Google map of vineyard with habitat site and measurements.

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Web Soil Survey

Web Soil Survey can be used to identify soil types, land use history, sun and wind patterns, hydrology, drainage and any changes in micro-climates can give an idea of any limitations of the site.



Soil Survey

Walla Walla County Area, Washington

- WaB — Walla Walla silt loam, 0 to 8 percent slopes

Map Unit Setting

- National map unit symbol: 2dc4
- Elevation: 300 to 3000ft
- Mean annual precipitation: 12 to 15 inches
- Mean annual air temperature: 48 to 54 degrees F
- Frost-free period: 130 to 180 days

Map Unit Conversion

- Walla Walla and similar soils: 100 percent
- Estimates are based on observations, descriptions, and transect of the mapunit.

Description of Walla Walla

Setting

- Landform: Hills
- Parent material: Loess

Typical profile

- H1 - 0-8 inches: silt loam
- H2 - 8 to 52 inches: silt loam
- H3 - 52 to 60 inches: silt loam

Properties and Qualities

- Slope: 0 to 8 percent
- Depth to restrictive feature: More than 80 inches
- Drainage class: well drained
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
- (0.57 to 1.98 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: none
- Frequency of ponding: None
- Calcium carbonate, maximum content: 5 percent
- Maximum salinity: Nonsaline to very saline (0.0 to 2.0 mmhos/cm)
- Available water supply: 0 to 60 inches: High (about 11.3 inches)

Interpretive Groups

- Land capability classification (irrigated): 3e
- Land capability classification (nonirrigated): 2e
- Hydrologic Soil Group: B
- Ecological Site: R008XY103WA - COOL LOAMY 10-16 PZ
- Hydric soil rating: No

Budget and Plant Selection

Your time, money and available resources (labor, equipment, irrigation) are part of the budget. Budgeting can help determine timeline, size and location of project. There will be costs associated with site prep, planting, seeding, irrigation and on-going maintenance. Much of the work can be done with hand tools but access to a tractor, seeders, tillage and mowing equipment can be helpful. The best options for vineyards in the Walla Walla Valley are native grass and wildflower meadows, tractor row seeding or permanent hedgerow plantings. Overall cost in materials and labor are similar for wildflower meadows or hedgerows. A hedgerow planting should be at least 100' long, and 10-20' wide. A meadow planting (or several smaller plots) needs to be at least .5 acre to be effective.

“Field studies in the Sacramento Valley highlighted that hedgerows can enhance pest control and pollination in crops, resulting on a return on investment within 7 to 16 years, without negatively impacting food safety.”

¹ *Rachel F. Long, Kelly Garbach & Lora Morandin, 2017*

Once planting location, size and timing is determined, it is time to choose plants and locate sources of seed or plants . Knowing the main pests that you want to manage (Leafhoppers, Cutworms, Mites) and which predatory and parasitoid species prey on these pests will narrow down your plant selection. Correctly identifying pests, their lifecycle, what stage they do the most damage and habitats are key to their control. The species best suited to the Walla Walla Valley do well in low annual rainfall (under 12”) withstand wind, extreme temperatures that provide bloom throughout the season, overwintering habitat, and are not known to harbor grape pests. It is advised to reach out to nurseries at least 6 months before you intend to plant to reserve plants. If planting a hedgerow, one gallon pots are the easiest size to obtain, plant and have good viability.

Regional sources for native plants are *CTUIR Tribal Native Plant Nursery*, [*Plants of the Wild*](#), [*Tapeteal Nursery*](#), [*BFI Native Seeds*](#), *Grain Growers* for native grass and forb seed. Wild-flower meadows can be created by seeding or transplanting plugs.

Plant Name
(Hedgerow Planting)

Spacing

Big Sagebrush

Artemisia tridentata

6^{FT} |————|

Rabbit Rubberbrush

Ericameria nauseosa

4^{FT} |————|

Showy Milkweed

Asclepias speciosa

2^{FT} |—|

Munro's Orange Globemallow

Sphaeralcea munroana

2^{FT} |—|

Tall Buckwheat

Erigonum ellatum

2^{FT} |—|

Arrow-Leaf Buckwheat

Erigonum compositum

2^{FT} |—|

Snow Buckwheat

Erigonum niveum

4^{FT} |————|

Silver Buffalo Berry

Shepherdia argentea

10^{FT} |—————|

Black Hawthorn

Crataegus douglasii

8^{FT} |————|

Ocean spray

Holodiscus discolor

6^{FT} |————|

Golden Currant

Ribes aureum

6^{FT} |————|

Pacific Ninebark

Physocarpus capitatus

4^{FT} |————|

Douglas Spirea

Spiraea douglasii

4^{FT} |————|

Oregon Sunshine

Eriophyllum lanatum

2^{FT} |—|

Skunk Sumac

Rhus tribolata

4^{FT} |————|

Mock Orange

Philadelphus lewisii

8^{FT} |————|

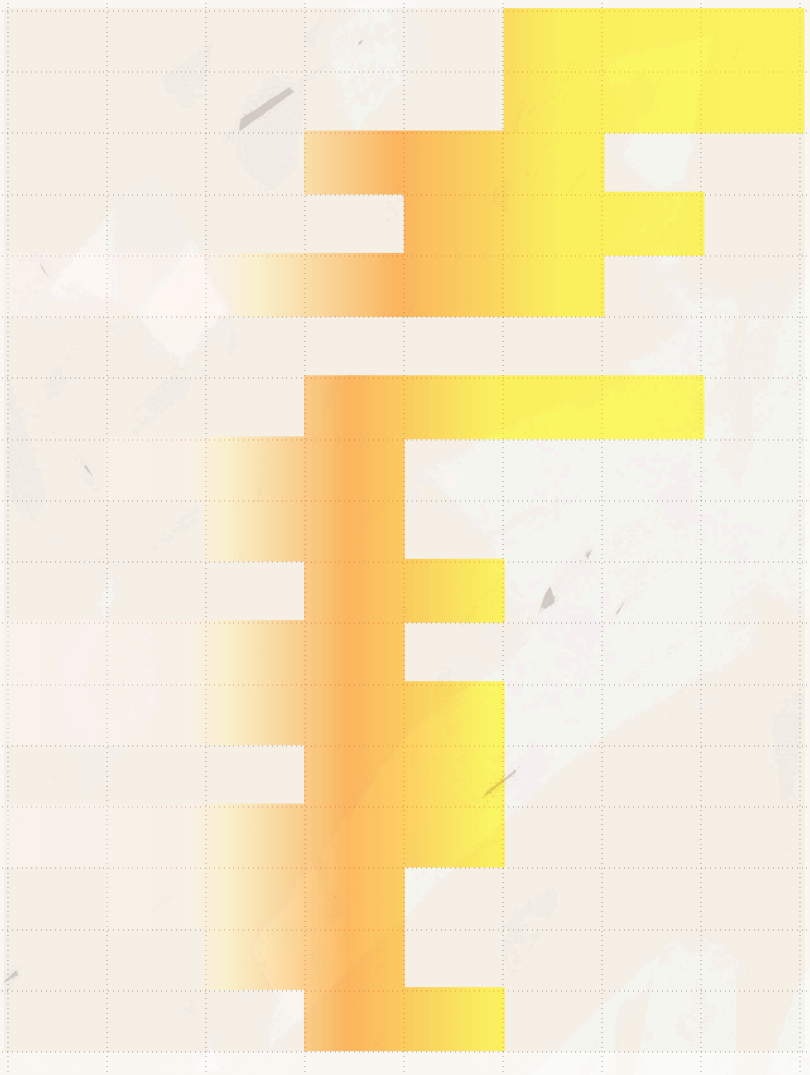
Nootka Rose

Rosa nutkana

6^{FT} |————|

Bloom Timeline

Mar Apr May Jun Jul Aug Sept Oct



Plant Name (Meadow Planting)

Seeding Rate
or Spacing

Water
Needs

Yarrow

Artemisia tridentata

seed

1 lb/acre



Munro's Orange Globemallow

Ericameria nauseosa

seed

3 lb/acre



Rabbit Rubberbush

Ericameria nauseosa

seed

3 lb/acre



Blanketflower

Erigonum ellatum

seed

7 lb/acre



Blue Flax

Erigonum compositum

seed

5 lb/acre



Alfalfa

Medicago sativa

seed

6 lb/acre



Sainfoil

Onobrychis viciifolia

seed

44 lb/acre



Small Burnet

Sangusorba minor

seed

26 lb/acre



Oregon Sunshine

Eriophyllum lanatum

seed

3 lb/acre



Sunflower

Helianthus annuus

seed

30 lb/acre



Bluebunch Wheatgrass

Pseudoroegneria spicata

seed

8 lb/acre

Antelope Bitterbrush

Purshia tridentata

plug

6^{FT}



Rabbit Rubberbush

Ericameria nauseosa

plug

4^{FT}



Big Sagebrush

Artemisia tridentata

plug

6^{FT}



Snow Buckwheat

Erigonum niveum

plug

4^{FT}



Tall Buckwheat

Erigonum ellatum

plug

4^{FT}



Arrow-Leaf Buckwheat

Erigonum compositum

plug

4^{FT}



Yarrow

Achillea millefolium

plug

2^{FT}



Plant Guide

Black Hawthorn

Crataegus douglasii



Figure 10

Bloom Time May - Jun

Growth rate: Slow

Mature Height: 12-15'

Spacing: 8'

Attracts: Bees, Moths, Butterflies

Silver Buffaloberry

Shepherdia argentea



Figure 11

Bloom Time Apr - Jun

Growth rate: Fast

Mature Height:

Spacing: 8'-10'

Attracts: Bees

Oceanspray

Holodiscus discolor



Figure 12

Bloom Time May - Jun

Growth rate: Moderate

Mature Height: 3-9'

Spacing: 6'

Attracts: Bees, Moths, Butterflies

Golden Currant

Ribes aureum



Figure 13

Bloom Time Mar - Jun

Growth rate: Slow

Mature Height: 4-6'

Spacing: 6'

Attracts: Bees, Bumblebees, Butterflies

Pacific Ninebark

Physocarpus capitatus



Figure 14

Bloom Time Apr - Jul

Growth rate: Slow

Mature Height: 2-6'

Spacing: 6'

Attracts: Bees, Flies, Butterflies

Douglas Spirea

Spiraea douglasii



Figure 15

Bloom Time Jun - Jul

Growth rate:

Mature Height: 1-2 m

Spacing: 4'

Attracts: Butterflies, Bees, Hummingbird

Oregon Sunshine
Eriophyllum lantatum



Figure 16

Bloom Time: Mar - Jul
 Growth rate: Rapid
 Mature Height: 4-24"
 Spacing: 2'
 Attracts: Bees

Skunk Sumac
Rhus tribolata

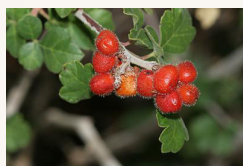


Figure 17

Bloom Time: Apr - Jul
 Growth rate: Rapid
 Mature Height: 3-6'
 Spacing: 4', spreads in thickets
 Attracts: Bees, Moths

Mock Orange
Philadelphus lewisii



Figure 18

Bloom Time: May - Jul
 Growth rate: Slow
 Mature Height: 4-8'
 Spacing: 10'
 Attracts: Bees, Butterflies

Nootka Rose
Rosa nutkana



Figure 19

Bloom Time: May - Jul
 Growth rate: Moderate
 Mature Height: 3-6'
 Spacing: 6'
 Attracts: Bees, Butterflies, Beetles

**Munro's Orange
 Globemallow**
Sphaeralcea munroana

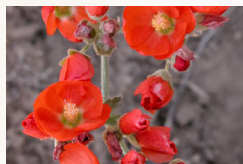


Figure 20

Bloom Time: May - Aug
 Growth rate: Rapid
 Mature Height: 1.5-3'
 Spacing: 6-16"
 Attracts: Bees, Butterflies, Flies

Rubber Rabbitbrush
Ericameria nauseosa



Figure 21

Bloom Time: Aug - Oct
 Growth rate: Rapid
 Mature Height: 2-6'
 Spacing: 4'
 Attracts: Bees, Butterflies

Big Sagebrush

Artemisia tridentata



Figure 22

Bloom Time Aug - Oct

Growth rate:

Mature Height:

Spacing: 6'

Attracts: Bees, Moths, Butterflies, Flies

Yarrow

Achillea millefolium



Figure 23

Bloom Time Jun - Aug

Growth rate: Rapid

Mature Height: 0.5-1.5'

Spacing: 2'

Attracts: Butterflies, Bees

Showy Milkweed

Asclepias speciosa



Figure 24

Bloom Time June - August

Growth rate:

Mature Height:

Spacing: 2'

Attracts: Bees, Butterflies

Wild Blue Flax

Linum lewisii



Figure 25

Bloom Time May - Jul

Growth rate: Moderate

Mature Height: 1-2'

Seeding Rate: 4lb/acre

Attracts: Bees

Annual Sunflower

Helianthus annuus

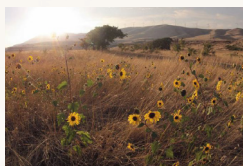


Figure 26

Bloom Time Jun - Sept

Growth rate: Rapid

Mature Height: 2-5'

Seeding rate 30lbs/acre:

Attracts: Butterflies, Bees

Snow Buckwheat

Erigonum niveum



Figure 27

Bloom Time:

Growth rate: Moderate

Mature Height: 1-2'

Spacing: 2'

Attracts: Bees, Butterflies, Wasps, Larval host of some Butterflies

Tall Buckwheat
Erigeron annuus



Figure 28

Bloom Time Jun - Aug
 Growth rate: Moderate
 Mature Height: 1-2'
 Spacing: 2'
 Attracts:

**Arrow-leaf Buckwheat,
 Northern Buckwheat**
Erigeron compositus



Figure 29

Bloom Time: May - Jul
 Growth rate: Moderate
 Mature Height: 1-2'
 Spacing: 2'
 Attracts: Native Bees, Butterfly Larvae, Beetles

Blanketflower
Gaillardia aristata

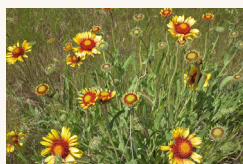


Figure 30

Bloom Time May - Sept
 Growth rate: Moderate
 Mature Height: 1-2'
 Spacing: 4'
 Attracts: Bees, Butterflies

Antelope Bitterbrush
Purshia tridentata



Figure 31

Bloom Time: Jun - Sept
 Growth rate: Moderate
 Mature Height: 1-2'
 Spacing: 4'
 Attracts: Bees, Butterflies, Wasps, Larval host of some Butterflies

Small Burnet
Sanguisorba minor



Onobrychis vicifolia
 Bloom Time June- August
 Growth rate: Rapid
 Seeding rate 44 lbs/acre:
 Attracts: Bees

Sainfoil
Onobrychis vicifolia



Bloom Time June- August
 Growth rate: Rapid
 Seeding rate 26 lbs /acre:
 Attracts: Bees



Figure 34



Figure 35

Useful guides to determine costs for your project include:

- [Xerces Society's Estimated Costs to Establish Pollinator Hedgerows](#)
- [Estimated Costs to Establish Wildflower Plantings Using Chemical Fallow](#)
- [Estimated Costs to Establish Wildflower Plantings Using Solarization](#)
- [Organic Site Preparation For Wildflower Establishment](#)

Contact nurseries at least 6 months before you plan on planting to ensure you get your order.

Site Prep

Proper site prep, especially adequate weed control will be the difference between a successful planting and a weedy mess. If starting from seed, the site needs to have all aggressive species removed or the native grasses and forbs will be outcompeted resulting in a failed stand. It may take up to 2 years to prepare a site for planting. Transplanting larger plants is a better choice if there are lots of aggressive species. The site will need to be regularly monitored and weeds controlled. Depending on site conditions, equipment and long term goals, site prep can be accomplished with herbicide treatment, repeated shallow tillage, solarization or sheet mulching. Correctly identifying major weedy species and proper timing of control measures are important for success. Site prep can be accomplished with or without chemicals. If soil assessments revealed high or low pH this is a good time for amendments.

[Xerces Organic Site Prep Methods Overview](#)



Figure 36



Moderate to High Weed Pressure

Solarization

Useful for smaller areas, with low risk of erosion, full sun, or in organic operations. Not as successful with rhizomatous or deep tap rooted plants.

Timing : 6+ months. Begin in spring.

Mow or till the site, removing plant debris. Smooth down site, irrigate and cover with UV stable plastic.

Edges will need to be buried to protect from wind and to maintain high temperatures.

Remove in fall before transplanting or seeding.

Spring

- Obtain Plastic (Greenhouse plastic 4mil or 6 mil, new or used, black plastic)
- Mow or cultivate site. Create a smooth, level seed bed.=
- Lay plastic, bury edges, repair and holes with greenhouse tape.

Summer

- Regularly check plastic for holes and repair. Assess weed growth.

Fall

- If weed pressure is low, remove plastic and prepare for seeding.
- Remove all vegetation and weeds from seedbed.
- If weed pressure is still significant, continue to solarize for a second summer.
- Seed grass and forb mix with native seed drill, broadcast seeding or install transplants.

<https://xerces.org/publications/guidelines/organic-site-preparation-for-wildflower-establishment>

Low to Moderate Weed Pressure

Herbicide Application

Organic herbicides or Chemical fallow, 6-12+ months

Spring

- Choose herbicide based on the most problematic species and your site needs.
- Do not use neo-nicotinoids or other broad spectrum herbicides that are bee-toxic.
- Shallow till, level and smooth site.
- Begin herbicide application, following label directions.
- (Herbicides are most effective when weed seedlings are 4-6" tall)
- Repeat herbicide applications as needed to prevent newly germinated weeds from going to seed.

Summer

- Repeat herbicide applications as needed.

Fall

- If weed pressure is low; Lightly cultivate area to be seeded or planted. **Do not Till.**
- Seed or plant in October-December.

Low to Moderate Weed Pressure

Sheet Mulching

Good for small sites inaccessible by equipment
 Best for transplanting larger plants into hedgerows or field edges.

Spring

- As soon as field is workable, mow existing vegetation close to the ground.
- Aerate compacted soils, and deeply water site.
- Layer sheet mulch, watering each layer.
- Mix of N and C (Cardboard, manure, compost, straw, grass clippings, wood bark, sawdust, shavings, hay, leaves, newspaper or recycled paper.
- Check on weed pressure, water as needed.

Summer

- Monitor weed pressure, water as needed

Fall/ Early Winter

- Transplant shrubs, trees and forbs into sheet mulch in November or December.
- Continue to monitor weed pressure and water as needed.

<https://xerces.org/publications/guidelines/organic-site-preparation-for-wildflower-establishment>

Low to Moderate Weed Pressure

Repeated Shallow Cultivation

Good for large areas with low weed pressure (previous crop ground).
 Timing: 6–12 months, disking or cultivation, repeated 6 times spring through fall.

Spring

- As soon as field is workable, mow existing vegetation close to the ground, then deep cultivation before winter/spring annuals go to seed.
- Shallow cultivation (2") using a disk/tine harrow or sweep cultivator.
- Repeat shallow cultivation as needed, about every month. (6x)

Summer

- Repeat shallow cultivation as needed.

Fall

- Repeat shallow cultivation as needed.
- Seed grass and forb mix if weed pressure is low.

<https://xerces.org/publications/guidelines/organic-site-preparation-for-wildflower-establishment>

A person in a dark shirt and pants is bent over, planting a small green seedling into the soil. The background is a light, textured surface.

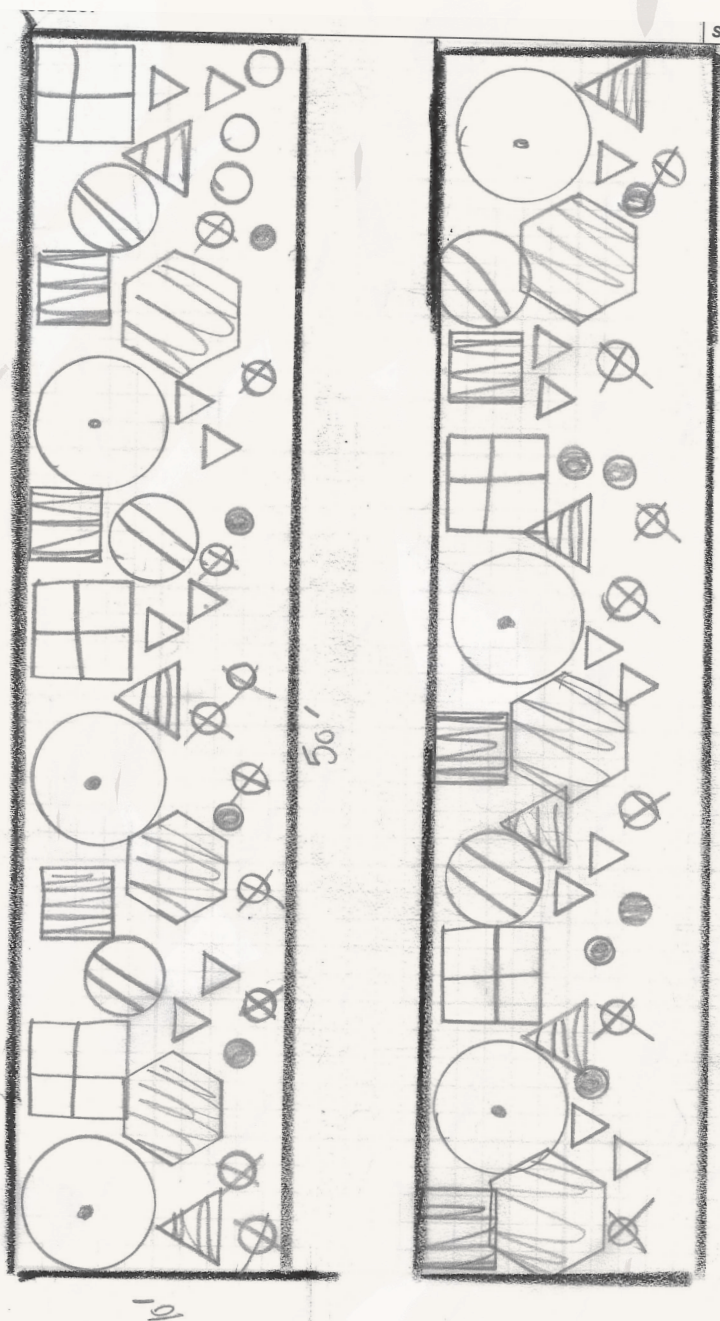
Planting

Planting in the Inland Northwest is best done in fall to allow plants to settle in while dormant, taking advantage of winter moisture. Transplanting can be done with shovels and planting bars. Larger sites may benefit from a plug trans-planter.

Shrubs and trees can generally be planted on 4-6' center. Herbaceous forbs can be closer spaced, 2' on center. Drawing out the planting site and plant placement can be helpful if working with a crew. Using plastic mulch is not recommended. Plastic barriers prevent ground nesting pollinators and beetles from accessing the soil. Cardboard mulching along with other natural materials is an inexpensive and effective mulch, providing weed control and moisture retention. Drip irrigation is the recommended for the first 2 years of growth. Old vineyard drip line can be retrofitted for hedgerows. If the vineyard is not fenced, protective cages will be needed on transplants to protect from wildlife for the first few years.



Seeding wildflowers and native grass is best done in late fall to take advantage of winter moisture. Site must be close to weed free or it will be difficult to control weeds once flowers are germinating.



MOCKORANGE ○

HAWTHORN 田

OCEAN SPRAY ●

ROSE ○

PACIFIC NINEBARK ▲

NATIVE BUCKWHEAT ☒

OREGON SUNSHINE + FAB BS ●

SAGE 田

~~RUBBER~~ RABBIT BRUSH ▲

} 2' SPACING

} 6' SPACING

Maintenance

A successful planting should provide functional habitat while not interfering with grape production. Plantings should be monitored and managed on a regular basis. Ideally there should be multiple species with different bloom structure and bloom times, without any species dominating the site or surrounding areas. Adequate site prep and careful plant selection will limit the amount of on- going maintenance necessary. Weed control and irrigation will be important during the first 2 to 3 years to allow slow growing native plants to get established. Tree guards may be needed to protect transplants from herbivores but should be removed after the first year or two.

Weed management strategies may include spot spraying, mowing or hand-weeding.

Mowing can be an effective way to manage a wild flower meadow or larger field edge plantings. Mow $1/3$ to $1/2$ of area at a time, in November or December to reduce thatch and spread seed. This will be timed after bloom period is over to reduce harm to insects and ground nesting birds. Mowing can also be used to control aggressive



Figure 34



Cardboard and bark mulch can help with weed control and water retention in the soil.

annual species if mowing is timed before they go to seed. Flail mow with blade height of 6" or higher to not harm plant crowns. Hand weeding, weed-eating or spot spraying with selective herbicides can be used in hedgerows or to manage smaller areas in wildflower meadows.

Crop management practices may affect the plantings or wildlife that use the habitat areas. Be aware of potential for pesticide drift, farm crew traffic and weedy areas near habitat planting.

Periodic scouting for insects in the habitat area and adjacent crops will give you a better idea of the beneficial and pest species throughout the vineyard, alerting you to potential pest outbreaks before damage occurs. This can be done with sticky traps, or [foliage scouting](#).

Determine and have a plan of action for reaching thresholds for making treatment decisions.

Beneficial Insects

Insectary plantings should be part of whole farm planning. There are many factors which will influence whether beneficial insects will inhabit your plantings. Surrounding landscape and resources will influence the populations. These beneficial insects are found around the Walla Walla Valley and prey on vineyard pests. Other common insects that provide pest control include Praying Mantis, Predatory beetles, Earwigs, Ants, Centipedes. They all assist with the control of Aphids, Leafhoppers, Mealy Bugs, Scale Insects, Thrips, Nematodes, Cutworms, as adults, larvae and eggs.

Big-Eyed Bugs

Adult size 2-5mm



Figure 40

Generalist predators of eggs, nymphs, larvae or adults. (True bugs, beetles, caterpillars, flies, thrips, mites, cutworm larve)
Over-wintering in leaf litter or low growing plants

Predatory Wasps

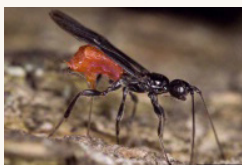
Adult size 10-30mm



Adults collect prey to bring back to the nests (Caterpillars, beetles, flies, true bugs, grasshoppers, aphids)
Overwintering in soil, cavities and in wood

Parasitoid Wasps

Adult size 0.1-40mm



Often host specific (Aphids, whiteflies, mealybugs, Generalist predators of caterpillars, flies, beetles, leafhoppers, others.
Overwintering in host species, found in flowering plants

Tachinid Flies

Adult size 5-20 mm



Figure 43

Attack larval stage of their hosts inserting eggs into host's body (Larval stages of caterpillars, beetles, true bugs, grasshoppers)
Overwintering in leaf litter
Need flowering resources (milkweed)

Damsel Bugs

Adult sized 3-13mm



Figure 44

Generalist predators (caterpillars, aphids, leafhoppers, thrips, spider mites, eggs)
Over-wintering in mulch, brush piles. Pastures and grasses areas.

Hoverflies/Syrphid Flies

Adult size 8-20mm



Figure 45

Generalist Predators preferring aphids. Good at control early in season. Also consume nectar and pollen. (Aphids, mealybug, spider mites, thrips)
Overwintering in leaf litter and in soil as larvae, pupae or adults.

Green & Brown Lacewings

Adult size 15-25 mm



Figure 46, 50

Generalist predators that can travel up to 100' in search of prey. (Aphids, small caterpillars, beetles, thrips, mites, whiteflies, mealybugs. Overwintering in forest edges, orchards. Pollen & nectar resources needed for egg laying adults.

Minute Pirate Bugs

Adult size 2-5mm



Figure 47

Generalist predators, eating up to 30 insects or eggs a day. (Thrips, mites, mealybugs, aphids, plant lice, small caterpillars) Overwintering in leaf litter, herbaceous vegetation.

Lady Beetles

Adult size 1-8 mm



Figure 48

Semi-specialist predators (Aphids or scale) Overwintering habitat leaf litter, rocks Need flowers plants with nectar and pollen for adult and larvae

Mirids (Plant bugs)

Adult size 1/4"



Figure 49

An omnivorous predator feeding on plants and insects. They prefer mites, thrips, leafhoppers, small caterpillars and insect eggs. Overwintering habitat: under bark, leaf litter

Ground Beetles

Adult size 1- 60 mm



An generalist predator that can eat their bodyweight in prey each day. Adults hunt on the soil surface and larve hunt for root worms and caterpillars under the soil surface. Can be effective at controlling cutworms. Overwintering habitat: bunch grasses, under debris, bark, and leaf litter

Resources & Links

Native Plant Nurseries

The following list provides contact information to regional native plant nurseries. This list is not exhaustive or intended to endorse particular businesses.

CTUIR Tribal Plant Nursery

73820 OR-331, Pendleton, OR 97801
(541) 278- 8525

Plants of the Wild

Large selection of native species from the NW.

123 Stateline Rd., Tekoa, WA 99033
(509) 284-2848
carrie@plantsofthewild.com

Tapteal Native Plants

Drought tolerant trees, shrubs, forbs and grasses.

info@taptealnativeplants.com
(509) 578-6446

Grain Growers Northwest

Native grass and forb seed mixes.

305 W Reese St, Walla Walla, WA 99362
(509) 525-6510

Funding and Technical Resources

Natural Resources Conservation Service (NRCS)

USDA'S Natural Resources Conservation Service (NRCS) provides financial and technical assistance through conservation programs that protect pollinators and other wildlife on farms through EQIP and CSP programs.

Pollinator Protectors

Pollinator Protectors is an Endangered Species Coalition (ESC) campaign focused on conservation of native pollinators and native plants, with the particular goal of increasing habitat for threatened, endangered, and declining species. ESC collaborates partners including

farms, schools, National Wildlife Refuges, churches, nature centers, and other kinds of organizations, providing funding for native plantings beneficial for native pollinator conservation. Contact for Endangered Species Coalition Pollinator Protectors Campaign:

Jeanne Dodds, Creative Engagement Director, Endangered Species Coalition

jdodds@endangered.org

Walla Walla County Conservation District

WWCCD is dedicated to the conservation and restoration of the natural resources of Walla Walla County, facilitated by working on a voluntary basis with landowners to identify opportunities and create solutions, while consistently providing education, information, and assistance whenever possible.

Xerces Society for Invertebrate Conservation

The Xerces Society for Invertebrate Conservation is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat.



Resources

Habitat Planning for Beneficial Insects

Xerces Society

<https://www.xerces.org/publications/guidelines/habitat-planning-for-beneficial-insects>

Beneficial Insects: Farms and Agricultural Landscapes

Beneficial Insect Habitat Assessment Guide
Xerces Society

<https://www.xerces.org/publications/hags/beneficial-insects-farms-and-agricultural-landscapes>

Farming for Pest Management

Habitat for Predators and Parasites
Xerces Society

<https://www.xerces.org/publications/brochures/farming-for-pest-management>

Beneficial Insects for Natural Pest Control: Foliage Scouting

Xerces Society

<https://www.xerces.org/publications/scouting-guides/>

[beneficial-insects-for-natural-pest-control-foilage-scouting](#)

Bee Better Certified: A Farmer's Guide

Xerces Society

<https://www.xerces.org/publications/brochures/bee-better-certified-farmers-guide>

Beyond the Birds and the Bees

Effects of Neonicotinoid Insecticides on Agriculturally Important Beneficial Insects

<https://www.xerces.org/publications/higs/idaho-organic-farms>

Xerces Society

<https://www.xerces.org/publications/guidelines/beyond-birds-and-bees>

Estimated Costs to Establishing Pollinator Hedgerow

<https://www.xerces.org/publications/fact-sheets/estimated-costs-to-establish-pollinator-hedgerows>

Maintaining Diverse Stands of Wildflowers Planted for Pollinators

Ongoing Management of Pollinator Habitat
Xerces Society

<https://xerces.org/publications/guidelines/maintaining-diverse-stands-of-wildflowers-planted-pollinators>

Organic Site Preparation for Wildflower Establishment

Xerces Society

<https://xerces.org/publications/guidelines/organic-site-preparation-for-wildflower-establishment>

Plants for Pollinators in the Inland Northwest

Biological Technical Note No. 24

United States Department of Agriculture NRCS

https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/wapmctn11733.pdf

Beneficial Insects, Spiders, and Other Mini-Creatures in Your Garden

Who They Are and How to Get Them to Stay
 Washington State University Extension, EM067E
 Dr. David James

<https://pubs.extension.wsu.edu/beneficial-insects-spiders-and-mites-in-your-garden-who-they-are-and-how-to-get-them-to-stay-home-garden-series>

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Hedgerow benefits align with food production and sustainability

goals

Adoption of hedgerows on California farms shows benefits and a return on investment in 7 to 16 years.

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Miguel A. Altieri, Clara I. Nicholls, Houston Wilson, Albie Miles. 2010

Habitat Management in Vineyards

A growers' manual for enhancing natural enemies of pests.

Laboratory of Agroecology

<http://agroecology.berkeley.edu>

College of Natural Resources, University of California

L. A. Morandin, R. F. Long, C. Kremen, 2016

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General Photos

1. Victor Paul [flickr.com/photos/victor_paul/11698879263/in/gallery-195655195@N02-72157720699407564/] Vineyard with understory
34. CountryMouse13 [flickr.com/photos/20456595@N04/8074237981/in/gallery-195655195@N02-72157720699407564/] Pickup Truck of Natives
35. Washington State Department of Transportation [flickr.com/photos/wsdot/50543836523/in/gallery-195655195@N02-72157720699407564/] Nursery Plants
36. Larry McCombs [flickr.com/photos/folkbird/2189109624/in/gallery-195655195@N02-72157720699407564/] Vineyard with understory
37. Curt Mills [flickr.com/photos/millsjpg/24144953899/in/gallery-195655195@N02-72157720699407564/] Bee on Goldenrod
38. NRCS Oregon, Minto Island Growers Organic Farm [flickr.com/photos/nrcs_oregon/28809757551/in/gallery-195655195@N02-72157720699407564/] Bee on Blanket Flower

Insect Photos

45. Joseph Berger [Bugwood.org], syrphid flies, *Syrphus spp.*
43. Joseph Berger [Bugwood.org], Tachinid fly, *Siphona spp.*
47. Bradley Higbee, Paramount Farming [Bugwood.org], minute pirate bug, *Anthocoris tomentosus*
40. Bradley Higbee, Paramount Farming [Bugwood.org], bigeyed bugs, *Geocoris spp.*
46. Bradley Higbee, Paramount Farming [Bugwood.org], green lacewings, *Chrysopa spp.*
48. Bradley Higbee, Paramount Farming [Bugwood.org], transverse ladybeetle, *Coccinella transversoguttata*



Figure 37

44. Bradley Higbee, Paramount Farming, [Bugwood.org], Damsel Bugs *Nabis spp.*
49. Bradley Higbee, Paramount Farming [Bugwood.org] Deraeocoris brevis *Deraeocoris brevis*
50. Whitney Cranshaw, Colorado State University [Bugwood.org] Green lacewings *Chrysolerla sp.*

Plant Photos

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