TECHNICAL NOTE

USDA – Natural Resources Conservation Service
Boise, Idaho – Salt Lake City, Utah - Spokane, Washington

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REVISION

Plants for Pollinators in the Intermountain West

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The purpose of this Technical Note is to provide guidance for the design and implementation of conservation plantings to enhance habitat for pollinators including: bees, wasps, butterflies, moths and hummingbirds. Plant species included in this document are adapted to the Intermountain West; encompassing southern Idaho, eastern Oregon, northern Nevada and northern Utah. For species adapted to northern Idaho, central Oregon and eastern Washington refer to Idaho Plant Materials Technical Note 2B, "Plants for Pollinators in the Inland Northwest".

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INTRODUCTION

Many of the world's crop species benefit from insect pollination, which is mostly provided by bees. In North America, bees pollinate billions of dollars worth of crops annually. Nearly one quarter of our diet comes from crops whose production benefits from pollinating bees.

Pollinators include bees, moths, flies, beetles, wasps, desert bats, hummingbirds, and butterflies. Collectively, pollinators are critical to the function of terrestrial ecosystems because they enhance plant reproduction. Despite their importance, pollinators are threatened world-wide by habitat loss, habitat fragmentation, improper pesticide use, disease and parasites. This has serious economic implications for humans and for maintaining ecosystem diversity and stability.

Green sweatbee on hoary tansyaster. Derek Tilley, NRCS Aberdeen.

The Natural Resources Conservation Service can assist landowners with habitat enhancement for pollinators by encouraging the establishment of an array of attractive plants that flower throughout the growing season. Plant species, both herbaceous and woody, that provide a source of nectar, pollen and cover for adult and immature pollinators, will also provide habitat for a large array of other wildlife species.

Well-chosen forbs, legumes, shrubs and trees planted along farm and ranch borders and within fields attract wildlife, including pollinators and other beneficial insects. The correct mix of plant species that bloom throughout the growing season will provide a continuous source of nectar and pollen needed by pollinators and other beneficial insects. An ideal plant mix would be one that consists of up to nine species: three that bloom early in the season, three in mid-season and three in late season. In precipitation zones below 16 inches mean annual rainfall in the intermountain west, 9 adapted and commercially available species may not always be available. When seed of pollinator-friendly species are limited, at a minimum, try to have at least one blooming species available during the early, mid-, and late season.

Annual flowering plants can be useful tools in pollinator plantings because they produce tremendous amounts of flowers. However, annual plants only last one growing season and can be very competitive with perennial species that are slower establishing. Annual plants may also be "weedy". Consequently, annuals should only be considered for small, odd areas, and should not be mixed with perennials. A few annual plants that readily attract pollinators include buckwheat, canola, safflower, berseem clover, camelina, lentils and dry peas. Annuals can also be used as interim crops prior to planting perennials, to suppress weed growth and can help to reduce the weed seed bank in the soil.

HABITAT CONSIDERATIONS

Habitat needs for pollinators are similar to other animal species: food, shelter, nesting sites and water. Shelter and nesting sites may be a limiting factor in your project area and should be considered during planning.

Nectar and pollen from flowering plants provide food and water for pollinators. Additional needs for water, if necessary, can be met in riparian areas and wetlands, and with birdbaths, fountains, irrigation water, and moisture from plants. Moist salt licks help provide mineral requirements for butterflies and sweat bees. Shelter and nesting habitat needs differ by pollinator species and include bare or partially vegetated, well-drained soil; soil banks and cliffs, dead standing or fallen trees with beetle emergence holes, live trees, clumps of grass, live brush, tall grass, piles of leaves and sticks, wood piles, tree bark and rock crevices.

Most native bees are solitary, nesting underground, or less commonly, above ground using beetle holes in

dead-wood or dead pithy stems (e.g. elderberry, sumac or rose). Bumblebees are social with colonies of dozens to hundreds of workers. They typically nest in tree hollows or below-ground in old rodent burrows or in grass hummocks.

In pollinator plantings, use of pesticides should be avoided, especially insecticides. (Some applications, such as carbaryl bran baits for grasshoppers, are safe for bees.) If pesticides must be used, leave some areas untreated as refuge habitat for predatory and parasitic insects and pollinators that can re-colonize treated areas. Harm to beneficial insects can also be limited by spraying at dusk when pollinators are nesting and not actively foraging.

TABLE 1: HABITAT REQUIREMENTS FOR NATIVE POLLINATORS

Solitary bees	Nectar and pollen	Nest in bare and partially vegetated soils where water won't pond; or in beetle holes in deadwood, within pithy stems or twigs, or construct surface nests of mud or leaf pulp
Bumblebees	Nectar and pollen	Nest cavities underground, often in old rodent burrows, or in hollow trees or within clumps of grass
Butterflies and moths	Nectar, nutrients, minerals and salts from rotting fruit, tree sap, clay deposits and mud puddles	Leaves and stems of larval host plants; also small woodpiles used by species that winter as adults
Hummingbirds	Nectar, insects, caterpillars, tree sap and willow catkins	Trees, shrubs and vines

ECOLOGICAL BENEFITS OF POLLINATOR PLANTINGS

Pollinator-friendly plantings have the potential to provide multiple ecological benefits. They can:

Reduce pesticide use. Sequentially flowering plants provide forage and cover for predatory and parasitic insects that help control pest species. Established plant communities will resist weed invasion.

Stabilize soil and provide ground cover. Root systems and above ground vegetation hold soil in place, improve soil moisture infiltration, reduce the risk of erosion and serve as buffers which protect against surface water pollution. Legumes contribute nitrogen to the soil.

Serve as windbreaks and shelterbelts. Shrubs and trees protect farmsteads, feeding areas, crops and livestock from wind and dust damage. They also provide food, nesting and cover habitat for a great variety of wildlife, pollinators and other beneficial insects.

ESTABLISHING POLLINATOR PLANTINGS: GENERAL CONSIDERATIONS

- **Select an area that is at least 0.5 acres in size**. This will ensure adequate floral resources are available for pollinators.

- **Start right**. Most grasses and forbs, including legumes, can be started by direct seeding or in some cases by transplanting nursery seedlings. Flowering shrubs and trees are often best established by transplanting nursery seedlings.

- **Determine soil drainage and other soil limitation factors**. Most species will not do well in heavy, poorly drained or saline to sodic soils; select species that can perform well in the soils of the site.

- **Match plants with similar site preferences**. Choose plants that have similar soil and water requirements and that are adapted to the local climate.

- **Water wisely**. Shrub and tree plantings in the drier portions of the Intermountain West will require irrigation. For the best establishment biweekly watering the first 2 to 3 years is recommended. Once the plants are well established, watering less frequently, for a longer duration will drive the moisture deeper into the soil to ensure the plants develop their roots more fully, enhancing long-term survival.

- **Control weeds**. Most plants do not compete well with weeds during establishment. Start with a weed free area or create one using appropriate herbicides or tillage. Keep the area relatively weed free for the first 2 to 3 years of establishment. Mowing weeds during plant establishment will help suppress weed competition and encourage desired plants. However, some annual and biennial weeds are good nectar sources for pollinators and will die out naturally as the planting becomes established.

- **Protect planting from wildlife and livestock**. Fencing to protect the planting may be required in areas with abundant deer, antelope or elk, or with livestock such as sheep, cattle or horses. Monitor and control rodents and rabbits. This will ensure flowers are available to provide nectar, pollen and succulent foliage for pollinators.

- **Choose the right plant species**. Plantings should include a mixture of species that provide continual blooms throughout much of the growing season. Depending on the precipitation zone, at least one to three species are recommended for each bloom period: early, mid, and late. One or two grass species may also be included in the mix if ground cover is needed. Grasses should not comprise more than 25% of the mixture. To select plant species for your precipitation zone, use the Approved Pollinator Plant Lists (Tables 2 - 6).

- **Maintain plantings**. Treatments such as haying or mowing may be required outside of the primary flowering period(s) to remove plant litter or weeds. Spot-spray herbicide treatments may also be needed to control invasive or noxious weeds.

PLANT SELECTION AND ESTABLISHMENT GUIDELINES FOR POLLINATOR HABITAT PLANTINGS

PLANT SELECTION

- Select plants from the Approved Plant List (found in appendix tables 2-6) that corresponds to your precipitation range.
- A mixture of 5 to 9 species including those that bloom in spring, summer and late summer (fall) are recommended.
- Select plants that will attract the target pollinator type(s).
- Consider pollination needs of nearby crops and select plants with different bloom periods than the crops to avoid attracting pollinators away from crop fields.
- Species with an asterisk (*) are known to establish easily and are commercially available in large quantities. It is strongly recommended several of these species be included in all mixes. The remaining species for each mix will depend on seed availability and the price the landowner is willing to pay.
- Species not included on these lists may be substituted only if approved by the State Plant Materials Specialist.

RECOMMENDED ESTABLISHMENT GUIDELINES

SITE PREPARATION

- Eliminate existing vegetation prior to seeding with tillage, herbicide, or a combination of techniques.
- Fallow the area to be seeded for at least one growing season. Delay seeding until after a flush of fall germinating weeds. These weed seedlings need to be controlled prior to any seeding.
- Create a firm, weed-free seed bed. Rule of thumb: a person's footprint will not be deeper than ½ inch into the seedbed.
- Some herbicides can have residual carryover and can negatively affect seedling establishment. Know the cropping history and past herbicide use of the site to be planted.

SEEDING

- Seed forbs and grasses at the same time during a late fall dormant planting (November or December).
- One of two seeding methods is recommended:
    - Drill seed into a firm weed-free seedbed. The best drill seedings have been accomplished by setting the drill to place the seed no deeper than ¼ inch. Drag chains or press wheels help to cover the seed with a thin soil layer.
    - Broadcast seed into a weed-free seedbed. The best broadcast seedings have been accomplished by pulling the tubes on the drill and running the packer wheels with enough down pressure to create good furrows and seed to soil contact.
- Rice hulls, cracked grain or granular clay may be used to assist seed flow.
- Omit grasses from the planting mix in areas heavily infested with cheatgrass or medusahead to allow for the option of using selective grass herbicides. This should only be done if the ground is not highly erodible.

SHRUB ESTABLISHMENT

- Plant shrub seedlings in early spring (late March through April) directly into soil where vegetation has been killed during the previous growing season with 1-2 applications of herbicides or by mechanical site preparation. Plant shrubs in areas that will not be mowed, or in rows to allow for mowing between the rows.
- Suppress weed growth around the shrubs with use of weed barrier fabric or herbicides.
- Install protective tubes or other barriers to reduce damage from rodents, rabbits and deer.

MANAGEMENT

- Manage weeds during the first year by mowing to prevent spread of weed seed.
- Manage weeds during following years by spot spraying, using pre-emergent herbicides or herbicides applied during phases of perennial dormancy.
- Do not apply fertilizer during the first year of establishment.

Establishment techniques different than those listed above may be used, but only with extreme caution. The above-mentioned guidelines have proven to have the highest rates of success.

THERE ARE MANY CHALLENGES ASSOCIATED WITH ESTABLISHING FORB PLOTS. Many forb seedings fail due to poor seed germination/emergence, weed competition, and neglect. Establishing, monitoring and maintaining forb plantings may be expensive and labor-intensive. The area may have to be re-seeded if an adequate stand is not achieved the first time.

An alternative establishment method to seeding is transplanting forb seedlings. Transplanting seedlings may initially be more expensive than seeding but may be less expensive in the long run, especially if a seeded stand fails, and has to be reseeded. The advantages of forb seedlings are: there are no seed dormancy/germination concerns, they already have a developed root system, and they can better compete with weeds. To establish forb plugs, use the same guidelines listed above for shrub establishment.

Species Descriptions

Additional information for many of these species can be found in NRCS Plant Guides and Fact Sheets, available by download from the PLANTS Database (http://plants.usda.gov). Seeding rates listed are pure live seeding rates, derived from a target rate of 25 PLS/ft² for species with <500,000 PLS/lb, and 50 PLS/ft² for species with >500,000 PLS/lb. **Rates should be adjusted appropriately when used as a part of a seed mixture.**

Forbs and Legumes

Western Yarrow. William S. Justice , @ PLANTS Database

Achillea millefolium, western yarrow
Origin: native forb
Mature Height: 0.5-1.5 ft
Growth Rate: rapid
Growth Habit: upright to prostrate
Wildlife Value: good forage
Attracts: butterflies, some bees
Flowers: white to yellow
Bloom: June-August
Seeding Rate: 0.5 lb/ac
In-row Spacing: N/A

Blue columbine. Al Schneider @ USDA-NRCS PLANTS Database

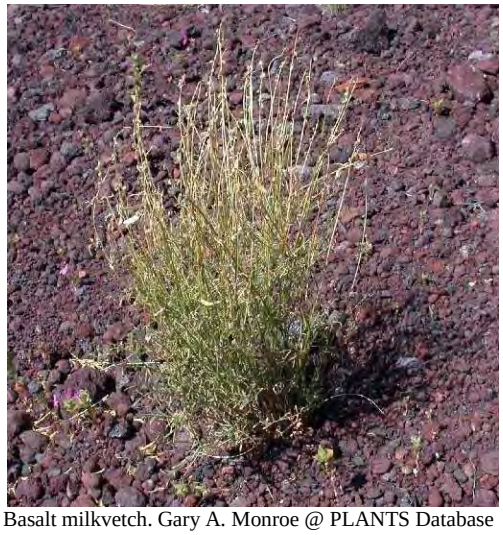
***Aquilegia* spp.**, columbine
Origin: native forb
Mature Height: 1-2 ft
Growth Rate: moderate to rapid
Growth Habit: upright
Wildlife Value: excellent food
Attracts: hummingbirds
Flowers: blue-white to yellow
Bloom: June-July
Seeding Rate: 5 lb/ac
In-row Spacing: 1-3 ft

Butterfly milkweed, J.S. Peterson @ PLANTS Database

Asclepias tuberosa, butterfly milkweed
Origin: native forb
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: toxic to livestock
Attracts: butterflies
Flowers: orange
Bloom: July-August
Seeding Rate: 15 lb/ac
In-row Spacing: N/A


Cicer milkvetch. Dan Ogle, NRCS Idaho

Astragalus cicer, cicer milkvetch
Origin: introduced legume
Mature Height: 1-3 ft
Growth Rate: moderate to rapid
Growth Habit: upright (lodges at maturity)
Wildlife Value: excellent forage
Attracts: bees
Flowers: cream
Bloom: May-July
Seeding Rate: 7 lb/ac
In-row Spacing: N/A


Basalt milkvetch. Gary A. Monroe @ PLANTS Database

Astragalus filipes, basalt milkvetch
Origin: native legume
Mature height: 1-3 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees
Flowers: white to cream
Bloom: May-July
Seeding Rate: 8 lb/ac
In-row Spacing: N/A


Arrowleaf balsamroot. Al Schneider @ Plants Database

Balsamorhiza sagittata, arrowleaf balsamroot
Origin: native forb
Mature Height: 1-2 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: excellent
Attracts: bees, butterflies
Flowers: yellow
Bloom: May-June
Seeding Rate: 18 lb/ac
In-row Spacing: 3-4 ft


Douglas' dustymaiden. Derek Tilley, NRCS Idaho

Chaenactis douglasii, Douglas' dustymaiden
Origin: introduced forb
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: excellent food

Attracts: bees
Flowers: white to pinkish
Bloom: June-July
Seeding Rate: 3 lb/ac
In-row Spacing: N/A


Yellow beeflower. Idaho Dept. of Transportation

Cleome lutea, Yellow beeflower
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good pollinator
Attracts: bees
Flowers: yellow
Bloom: May-June
Seeding Rate: 10 lb/ac
In-row Spacing: N/A


Crownvetch. Purdue University

Coronilla varia, crownvetch
Origin: introduced legume
Mature Height: 1-2 ft
Growth Rate: rapid
Growth Habit: spreading to upright
Wildlife Value: good forage
Attracts: bees
Flowers: white-pink
Bloom: May-June
Seeding Rate: 8 lb/ac
In-row Spacing: N/A


Searl's prairie clover. Gary A. Monroe @ PLANTS Database

***Dalea* spp.**, prairie clover
Origin: native forb
Mature Height: 1-2.5 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees
Flowers: purple
Bloom: June-August
Seeding Rate: 7 lb/ac
In-row Spacing: 1-3 ft

***Echinacea* spp.**, coneflower, purple
Origin: native forb
Mature Height: 1.5-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: butterflies, bees
Flowers: white to purple
Bloom: July-September
Seeding Rate: 7 lb/ac
In-row Spacing: 1-2 ft


Blanketflower. Utah.gov

Gaillardia aristata, blanketflower
Origin: native forb
Mature Height: 1-1.5 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: excellent food and cover
Attracts: bees
Flowers: orange, yellow
Bloom: July-September
Seeding Rate: 6 lb/ac
In-row Spacing: 1-2 ft


Sticky geranium. S. Hagwood @ PLANTS Database

Geranium viscosissimum, sticky geranium
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value:
Attracts: bees, butterflies
Flowers: purple
Bloom: May-June
Seeding Rate: 20 lb/ac
In-row Spacing: 2-3 ft


Northern or Utah sweetvetch. USDA-ARS

Hedysarum boreale, northern or Utah sweetvetch
Origin: native legume
Mature Height: 1-2 ft
Growth Rate: upright to spreading
Growth Habit: spreading to upright
Wildlife Value: good forage
Attracts: bees, butterflies
Flowers: red to purple
Bloom: May-June
Seeding Rate: 24 lb/ac
In-row Spacing: 3-4 ft


Sunflower. A. Schneider @ PLANTS Database

Helianthus species, sunflower
Origin: native forb
Mature Height: 2-5 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good winter food
Attracts: butterflies, bees and ants
Flowers: yellow to orange
Bloom: July-September

Seeding Rate: 4 lb/ac
In-row Spacing: 2-4 ft


Prairie blazingstar, R.A. Shadow, USDA-NRCS

Liatris pycnostachya, prairie blazingstar
Origin: native forb
Mature Height: 2-4 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: good forage
Attracts: bees, butterflies
Flowers: pink to purple
Bloom: June-July
Seeding Rate: 8 lb/ac
In-row Spacing: 2-3 ft


Lewis flax. Derek Tilley, NRCS Idaho

Linum lewisii, Lewis flax
Origin: native forb
Mature height: 1-2 ft
Growth Rate: moderate to rapid
Growth Habit: upright
Wildlife value: excellent pollinator
Attracts: bees
Flowers: light blue
Bloom: May-July
Seeding Rate: 5 lb/ac
In-row Spacing: 1-2 ft


Blue flax. Derek Tilley, NRCS Idaho

Linum perenne, blue flax
Origin: introduced forb
Mature height: 1-2 ft
Growth Rate: moderate to rapid
Growth Habit: upright
Wildlife value: excellent pollinator
Attracts: bees
Flowers: light blue
Bloom: May-July
Seeding Rate: 4 lb/ac
In-row Spacing: 1-2 ft

Lomatium dissectum, fernleaf biscuitroot
Origin: native forb
Mature Height: 0.5-2 ft
Growth Rate: slow
Growth Habit: erect
Wildlife Value: good insect habitat
Attracts: bees
Flowers: yellow green
Bloom: June-July
Seeding Rate: 20 lb/ac
In-row Spacing: 2-5 ft


Gray's biscuitroot. A. Schneider @ PLANTS Database

Lomatium grayi, Gray's biscuitroot
Origin: native forb
Mature Height: 0.5-1 ft
Growth Rate: slow
Growth Habit: erect
Wildlife Value: good insect habitat
Attracts: bees
Flowers: white
Bloom: April-June
Seeding Rate: 20 lb/ac
In-row Spacing: 2-3 ft


Nineleaf biscuitroot. A. Schneider @ PLANTS Database

Lomatium triternatum, nineleaf biscuitroot
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: slow
Growth Habit: erect
Wildlife Value: good insect habitat
Attracts: bees
Flowers: yellow green
Bloom: May-June
Seeding Rate: 20 lb/ac
In-row Spacing: 2-5 ft


Birdsfoot trefoil. R. Mohlenbrock @ PLANTS Database

Lotus corniculatus, birdsfoot trefoil
Origin: introduced legume
Mature Height: 1.5-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good winter food
Attracts: bees
Flowers: yellow
Bloom: June-August
Seeding Rate: 3 lb/ac
In-row Spacing: N/A


Hoary tansyaster. Derek Tilley, NRCS Idaho

Machaeranthera canescens, hoary tansyaster
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: erect

Wildlife Value: forage
Attracts: bees, butterflies
Flowers: blue to purple
Bloom: August-October
Seeding Rate: 1 lb/ac
In-row Spacing: N/A

Medicago sativa, alfalfa
Origin: introduced legume
Mature Height: 2-3 ft
Growth Rate: fast
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees
Flowers: purple
Bloom: May-July (delay by cutting)
Seeding Rate: 5 lb/ac
In-row Spacing: N/A

***Medicago sativa* ssp. falcata**, yellow blossom alfalfa
Origin: introduced legume
Mature Height: 2-3 ft
Growth Rate: fast
Growth Habit: upright, spreading
Wildlife Value: excellent forage
Attracts: bees
Flowers: yellow
Bloom: May – July (delay by cutting)
Seeding Rate: 5 lb/ac
In-row Spacing: N/A

Yellow sweetclover. J.S. Peterson @ PLANTS Database

Melilotus alba* and *M. officinalis, white and yellow sweetclover
Origin: introduced legume
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good forage
Attracts: many bees
Flowers: white or yellow
Bloom: June-July
Seeding Rate: <u>do not exceed</u> 1 lb/ac
In-row Spacing: N/A


Sainfoin. Image from glaucus.org.uk

Onobrychis viciifolia, sainfoin
Origin: introduced legume
Mature Height: 2-5 ft
Growth rate: rapid
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: larger bees
Flowers: pink
Bloom: May-July (delay by cutting)
Seeding Rate: 34 lb/ac
In-row Spacing: N/A


Firecracker penstemon. Derek Tilley, NRCS Idaho

Penstemon eatonii, firecracker penstemon
Origin: native forb
Mature Height: 1-2.5 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees, wasps, hummingbirds
Flowers: red
Bloom: April-June
Seeding Rate: 3 lb/ac
In-row Spacing: 2-3 ft


Palmer's penstemon. Wikipedia

Penstemon palmeri, Palmer's penstemon
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid
Growth Habit: erect
Wildlife Value: fair forage
Attracts: larger bees
Flowers: pink
Bloom: May-July
Seeding Rate: 2 lb/ac
In-row Spacing: 2-3 ft


Rocky Mountain penstemon. A. Schneider @ PLANTS Database

Penstemon strictus, Rocky Mountain penstemon
Origin: native forb
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: fair forage
Attracts: bees
Flowers: purple
Bloom: May-July
Seeding Rate: 2 lb/ac
In-row Spacing: 2-3 ft


Venus penstemon. Derek Tilley, NRCS Idaho

Penstemon venustus, Venus penstemon
Origin: native forb
Mature Height: 2-3 ft
Growth Rate: rapid

Growth Habit: erect
Wildlife Value: fair forage
Attracts: bees
Flowers: blue-purple
Bloom: July-August
Seeding Rate: 1 lb/ac
In-row Spacing: 2-3 ft


Silverleaf phacelia. Clint Shock @ OSU

Phacelia hastata, silverleaf phacelia
Origin: native forb
Mature Height: 1-2 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good insect habitat
Attracts: bees
Flowers: blue-purple
Bloom: June-August
Seeding Rate: 7 lb/ac
In-row Spacing: N/A


Prairie coneflower. C.A. Rechenthin @ PLANTS Database

Ratbida columnifera, prairie coneflower
Origin: native forb
Mature Height: 1-1.5 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good forage
Attracts: bees
Flowers: yellow/orange
Bloom: June-August
Seeding Rate: 2 lb/ac
In-row Spacing: N/A


Small burnet. J. Duft @ PLANTS Database

Sanguisorba minor, small burnet
Origin: introduced forb
Mature Height: 1-2.5 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees
Flowers: green-red
Bloom: June-August
Seeding Rate: 20 lb/ac
In-row Spacing: 2-3 ft


Globemallow. Vince Tepedino, ARS Bee Research Lab.

***Sphaeralcea* spp.**, globemallow
Origin: native forb
Mature Height: 1.5-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: excellent forage
Attracts: bees
Flowers: orange to red
Bloom: April-June
Seeding Rate: 2 lb/ac
In-row Spacing: 2-4 ft


Aster. G.A. Cooper @ PLANTS Database

***Symphiotrichum* spp.**, Aster
Origin: native forb
Mature Height: 0.5-3 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: excellent food and cover
Attracts: bees
Flowers: creamy white to purple
Bloom: June-September
Seeding Rate: 2 lb/ac
In-row Spacing: 1-2 ft

***Trifolium* spp.**, clover
Origin: introduced legumes
Mature Height: 0.5-1 ft
Growth Rate: rapid
Growth Habit: spreading
Wildlife Value: excellent forage
Attracts: bees
Flowers: white, red, pink
Bloom: May-July (delay by cutting)
Seeding Rate: 4 lb/ac
In-row Spacing: N/A

***Vicia americana*,** American vetch
Origin: native legume
Mature Height: 0.5-1 ft
Growth Rate: rapid
Growth Habit: spreading
Wildlife Value: excellent forage
Attracts: bees
Flowers: purple
Bloom: May-June
Seeding Rate: 34 lb/ac
In-row Spacing: N/A

Shrubs and Half-Shrubs


Serviceberry. J. McMillian @ PLANTS Database

Amelanchier alnifolia, serviceberry
Origin: native shrub
Mature Height: 6-15 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: good cover and food
Attracts: butterflies, bees
Flowers: white
Bloom: May-June
Planting – establish with plants
In-row Spacing: 5-10 ft


Siberian peashrub. R.A. Howard @ PLANTS Database

Caragana arborescens, Siberian peashrub
Origin: introduced legume shrub
Mature Height: 6-20 ft
Growth Rate: rapid
Growth Habit: erect oval shrub
Wildlife Value: nesting
Attracts: large bees (especially bumblebees)
Flowers: small showy yellow
Bloom: April-June
Planting – establish with plants
In-row Spacing: 5-10 ft


Clematis. Tim Dring, NRCS Washington

Clematis ligusticifolia, clematis
Origin: native shrub or vine
Mature Height: 1 ft
Growth Rate: moderate
Growth Habit: spreading and climbing vine
Wildlife Value: cover
Attracts: moths, bees
Flowers: white
Bloom: May-July
Planting – establish with plants
In-row Spacing: 2-6 ft


Cotoneaster. E.E. Herman @ PLANTS Database

Cotoneaster integerrimus, cotoneaster
Origin: introduced shrub
Mature Height: 4-6 ft
Growth Rate: moderate
Growth Habit: multi-branched erect shrub
Wildlife Value: fruit, cover
Attracts: bees
Flowers: white
Bloom: May – June
Planting – establish with plants
In-row Spacing: 4 – 6 ft


Black hawthorn. Tim Dring, NRCS Washington

Crataegus douglasii, black hawthorn
Origin: native shrub
Mature Height: 12-30 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: food and cover
Attracts: moths, bees, butterflies
Flowers: white
Blooms: May-June
Planting – establish with plants
In-row Spacing: 5-10 ft


Shrubby cinquefoil, D. Barton @ mt.gov

Dasiphora fruticosa, shrubby cinquefoil
Origin: native shrub
Mature Height: 2-4 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: food and cover
Attracts: moths, bees, butterflies
Flowers: yellow
Blooms: May-June
Planting – establish with plants
In-row Spacing: 4-6 ft


Rubber rabbitbrush. USDI-BLM

***Ericameria* and *Chrysothamnus* spp.**, rabbitbrush
Origin: native shrub
Mature Height: 2-6 ft
Growth Rate: moderate
Growth Habit: open spreading
Wildlife Value: loafing, food and browse
Attracts: butterflies, small bees
Flowers: yellow
Bloom: August-October
Seeding rate – 0.5 lb/ac
Planting – commonly establish with plants
In-row Spacing: 3-6 ft


Whorled buckwheat. Derek Tilley, NRCS Idaho

Eriogonum heracleoides, whorled buckwheat
Origin: native sub-shrub
Mature Height: 1-3 ft
Growth Rate: moderate
Growth Habit: spreading, open sub-shrub
Wildlife Value: cover, fall forage
Attracts: moths, butterflies, bees
Flowers: white, cream
Bloom: July-September

Seeding rate – 4 lb/ac
Planting – establish with plants
In-row Spacing: 1-3 ft


Sulphurflower buckwheat. Derek Tilley, NRCS Idaho

Eriogonum umbellatum, sulphurflower buckwheat
Origin: native sub-shrub
Mature Height: 0.5-2 ft
Growth Rate: moderate
Growth Habit: spreading, open sub-shrub
Wildlife Value: cover, fall forage
Attracts: moths, butterflies, bees
Flowers: yellow
Bloom: July-September
Seeding rate – 4 lb/ac
Planting – establish with plants
In-row Spacing: 1-3 ft


Russian sage, G. Monroe @ PLANTS Databse

Perovskia atriplicifolia, Russian sage
Origin: introduced half shrub
Mature Height: 1-3 ft
Growth Rate: rapid
Growth Habit: upright
Wildlife Value: good cover
Attracts: many bees
Flowers: purple
Bloom: June-July
Planting – establish with plants
In-row Spacing: 3-5 ft

American plum. W. Cook @ Duke University

Prunus americana, American plum
Origin: native shrub
Mature Height: 8-10 ft
Growth Rate: moderate
Growth Habit: rounded crown, suckers
Wildlife Value: nesting, loafing, food, browse
Attracts: butterflies, bees
Flowers: white
Bloom: April-May
Planting – establish with plants
In-row Spacing: 6-10 ft

Prunus pumila, western sandcherry
Origin: native shrub
Mature Height: 3-6 ft
Growth Rate: moderate
Growth Habit: open and spreading
Wildlife Value: loafing, food, brose
Attracts: butterflies, bees
Flowers: white
Bloom: April-May
Planting – establish with plants
In-row Spacing: 3-6 ft


Chokecherry. Nevada Native Plant Society @ PLANTS Database

Prunus virginiana, chokecherry
Origin: native shrub
Mature Height: 6-25 ft
Growth Rate: moderate
Growth Habit: oval to round; suckering
Wildlife Value: excellent food and cover
Attracts: bees, butterflies
Flowers: white
Bloom: April-May
Planting – establish with plants
In-row Spacing: 8-12 ft


Nanking cherry. D.E. Herman @ PLANTS Database

Prunus tomentosa, Nanking cherry
Origin: introduced shrub
Mature Height: 6-10 ft
Growth Rate: moderate
Growth Habit: upright, semi-spreading
Wildlife Value: browse, fruit for song birds
Attracts: butterflies, bees
Flowers: small pink
Bloom: April-May
Planting – establish with plants
In-row Spacing: 6-8 ft


Antelope bitterbrush. G. Monroe @ PLANTS Database

Purshia tridentata, antelope bitterbrush
Origin: native shrub
Mature Height: 2-6 ft
Growth Rate: moderate
Growth Habit: upright shrub
Wildlife Value: cover, fall forage
Attracts: butterflies, bees
Flowers: yellow
Bloom: April-June
Seeding Rate: 2 lb/ac
Planting – commonly establish with plants
In-row Spacing: 3-5 ft


Skunkbush sumac. D.E. Herman @ PLANTS Database

Rhus trilobata, skunkbush sumac
Origin: native shrub
Mature Height: 6-8 ft
Growth Rate: slow to moderate
Growth Habit: ascending to spreading
Wildlife Value: browse, nesting, bird food
Attracts: early bees
Flowers: light yellow
Bloom: May-June
Planting – establish with plants
In-row Spacing: 4-6 ft


Golden currant. Cartina Kuvatoimisto

Ribes aueum, golden currant
Origin: native shrub
Mature Height: 5-8 ft
Growth Rate: moderate
Growth Habit: spreading and upright
Wildlife Value: roosting, loafing, nesting, fruit
Attracts: early spring bees, bumblebees
Flowers: fragrant golden yellow
Bloom: April-May
Planting – establish with plants
In-row Spacing: 4-6 ft


Wood's rose. Clint Shock @ OSU

Rosa woodsii, Wood's rose
Origin: native shrub
Mature Height: 3-6 ft
Growth Rate: moderate
Growth Habit: upright to semi-weeping shrub
Wildlife Value: nesting, cover, excellent food
Attracts: bees
Flowers: pink
Bloom: June-July
Seeding Rate: 1 lb/ac
Planting – normally established with plants
In-row Spacing: 3-5 ft


Elderberry. T. Bodner

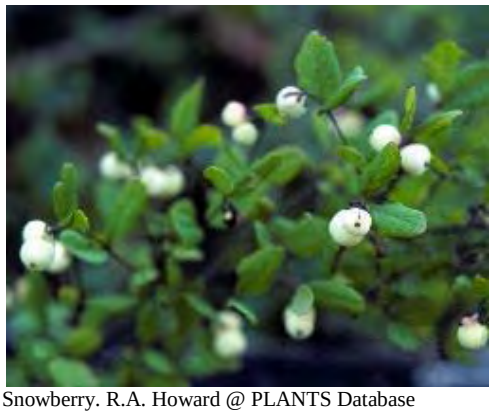
Sambucus cerulea, elderberry
Origin: native shrub
Mature Height: 6-15 ft
Growth Rate: moderate
Growth Habit: upright
Wildlife Value: nesting, food
Attracts: butterflies, nesting bees
Flowers: white to cream
Bloom: June-July
Planting – establish with plants
In-row Spacing: 4-6 ft


Buffaloberry. R.A. Howard @ PLANTS Database

Shepherdia argentea, buffaloberry
Origin: native shrub
Mature Height: 6-20 ft
Growth Rate: moderate
Growth Habit: upright to spreading tall shrub
Wildlife Value: browse, fruit
Attracts: butterflies, bees
Flowers: male=yellow; female=inconspicuous
Bloom: May-July
Planting – establish with plants
In-row Spacing: 8-10 ft


Douglas spiraea, L. Koepke @ PLANTS Database

Spiarea douglasii, Douglas spiraea
Origin: native shrub
Mature Height: 4-6 ft
Growth Rate: rapid
Growth Habit: thicket forming to upright
Wildlife Value: cover
Attracts: butterflies, bees
Flowers: rose to pink
Bloom: June
Planting – establish with plants
In-row Spacing: 2-4 ft


Snowberry. R.A. Howard @ PLANTS Database

***Symphoricarpos* spp.**, snowberry
Origin: native shrub
Mature Height: 2-4 ft
Growth Rate: moderate
Growth Habit: open and spreading
Wildlife Value: loafing, food, browse
Attracts: butterflies, bees, hummingbirds
Flowers: pink
Bloom: June-August
Planting – establish with plants
In-row Spacing: 3-4 ft

Syringa vulgaris, common lilac
Origin: introduced shrub
Mature Height: 6-12 ft
Growth Rate: slow
Growth Habit: upright, leggy, suckering
Wildlife Value: nesting
Attracts: early spring bees
Flowers: white to purple
Bloom: April-May
Planting – establish with plants
In-row Spacing: 5-10 ft


Yucca. OPSU

***Yucca* spp.**, yucca or soapweed
Origin: native shrub – Great Plains
Mature Height: 2-4 ft
Growth Rate: slow
Growth Habit: upright
Wildlife Value: cover
Attracts: moths
Flowers: creamy white
Blooms: June-July
Planting – establish with plants
In-row Spacing: 3 ft

POLLINATOR PLANT LISTS

The following tables 2 – 6 are lists of plants that have known value for pollinators and are adapted to various precipitation ranges in the Intermountain West. The lists are separated into 7–9”, 9– 12”, 12– 15”, 15– 18” and 18– 25” mean annual precipitation zones. Care was taken to list species that are commercially available. Additional species may be available or become available that were not considered for this technical note during publication. Consult your State Plant Materials Specialist prior to making any species substitutions.

This section also lists grasses and shrubs, which, although they do not provide pollen or nectar, are important elements of pollinator and wildlife habitat, and should be included in pollinator or wildlife friendly plantings.

TABLE 2: POLLINATOR PLANT LIST 7 – 9 INCH PRECIPITATION													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Forbs												
*	*Achillea millefolium*	Western yarrow				N	0 - 1/8	2,500,000	0.5	N/A		X	X
*	*Chaenactis douglasii*	Douglas' dustymaiden				N	0 - 1/8	350,000	3	N/A		X	X
	Cleome lutea	Yellow beeflower				N	0 – 1/4	100,000	10	N/A	X	X	
*	*Gaillardia aristata*	Blanketflower				N	1 /4 - 1/2	200,000	6	N/A		X	X
	Helianthus species	Sunflower				N	1/4 - 1/2	45,000	4	N/A	X	X	X
	Machaeranthera canescens	Hoary tansyaster				N	0 - 1/8	1,300,000	1	N/A		X	X
*^	*Melilotus alba*	White sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X
*^	*M. officinalis*	Yellow sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X
	Sphaeralcea spp.	Globemallow				N	1/4 - 1/2	500,000	2	N/A		X	X
	GRASSES												
	Achnatherum hymenoides	Indian ricegrass				N	1/2 - 3	235,000	6	N/A		X	X
	Elymus elymoides	Bottlebrush squirreltail				N	1/4 – 1/2	220,000	6	N/A		X	X
	E. lanceolatus	Thickspike wheatgrass				N	1/4 – 1/2	135,000	6	N/A	X	X	
	E. wawawaiensis	Snake River wheatgrass				N	1/4 - 3/4	139,000	8	N/A		X	X
	Leymus cinereus	Basin wildrye				N	1/4 – 3/4	130,000	8	N/A		X	X
	Poa secunda	Sandberg bluegrass				N	0 – 1/4	1,000,000	2	N/A	X	X	X
	Sporobolus cryptandrus	Sand dropseed				N	0 – 1/4	5,298,000	1	N/A			X

TABLE 2 continued: POLLINATOR PLANT LIST 7 – 9 INCH PRECIPITATION													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Shrubs												
	Artemisia tridentata ssp. Wyomingensis	Wyoming big sagebrush				N	0 – 1/8	1,700,000	0.5	6	X	X	X
	Atriplex canescens	Fourwing saltbush				N	1/4 - 3/4	52,000	2	6		X	X
	Chrysothamnus viscidiflorus	Green rabbitbrush				N	0 - 1/8 or seedlings	782,000	0.5	4		X	X
	Ericameria nauseosa	Rubber rabbitbrush				N	0 - 1/8 or seedlings	693,000	0.5	4		X	X
	Eriogonum umbellatum	Sulphur buckwheat				N	0 - 1/4 or seedlings	209,000	4	4		X	X
	Krascheninikovia lanata	Winterfat				N	0 - 1/8	123,000	2	6		X	X
	Yucca spp.	Yucca				N	1/4 – 1/2 or seedlings	25,000	plants	6		X	X
*	Species that germinate and establish well. Several of these species should be included in every mix.												
^	Can become weedy or invasive under proper conditions.												

TABLE 3: POLLINATOR PLANT LIST 9 - 12 INCH PRECIPITATION													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Forbs												
*	*Achillea millefolium*	Western yarrow				N	0 - 1/8	2,500,000	0.5	N/A		X	X
	Astragalus filipes	Basalt milkvetch				N	1/4 - 1/2	100,000	8	N/A		X	X
	Balsamorhiza sagittata	Arrowleaf balsamroot				N	0 - 1/4	55,000	18	N/A		X	X
*	*Chaenactis douglasii*	Douglas' dustymaiden				N	0 - 1/8	350,000	3	N/A		X	X
	Cleome lutea	Yellow beeplant				N	1/8 – 1/4	100,000	10	N/A	X	X	
*	*Gaillardia aristata*	Blanketflower				N	1 /4 - 1/2	200,000	6	N/A		X	X
	Hedysarum boreale	Northern/(Utah)sweetvetch				N	1/4 - 1/2	46,000	24	N/A	X	X	X
	Helianthus species	Sunflower				N	1/4 - 1/2	45,000	4	N/A	X	X	X
*	*Machaeranthera canescens*	Hoary tansyaster				N	0 - 1/8	1,300,000	1	N/A		X	X
*	*Medicago sativa* ssp. *falcata*	Yellow blossom alfalfa				I	1/8 - 1/2	211,000	5	N/A	X	X	
*^	*Melilotus alba*	White sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X
*^	*M. officinalis*	Yellow sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X
	Penstemon eatonii	Firecracker penstemon				N	0 - 1/8	315,000	3	N/A		X	X
	Penstemon palmeri	Palmer's penstemon				N	0 - 1/8	294,000	2	N/A		X	X
	Phacelia hastata	Silverleaf phacelia				N	1/8 – 1/4	150,000	7	N/A		X	X
	Sphaeralcea spp.	Globemallow				N	1/4 - 1/2	500,000	2	N/A		X	X
^	*Vicia Americana*	American vetch				N	1 - 2	33,000	34	N/A		X	X

TABLE 3 continued: POLLINATOR PLANT LIST 9 - 12 INCH PRECIPITATION													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Grasses												
	Achnatherum hymenoides	Indian ricegrass				N	1/2 - 3	235,000	6	N/A		X	X
	Elymus elymoides	Bottlebrush squirreltail				N	1/4 – 1/2	220,000	6	N/A		X	X
	E. lanceolatus	Thickspike wheatgrass				N	1/4 – 1/2	135,000	6	N/A	X	X	
	E. trachycaulus	Slender wheatgrass				N	1/2 - 3/4	135,000	6	N/A	X	X	
	E. wawawaiensis	Snake River wheatgrass				N	1/4 – 1/2	139,000	8	N/A		X	X
	Leymus cinereus	Basin wildrye				N	1/4 - 3/4	130,000	8	N/A		X	X
	Poa ampla	Big bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	P. nevadensis	Nevada bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	P. secunda	Sandberg's bluegrass				N	0 - 1/4	1,000,000	2	N/A	X	X	X
	Pseudoroegneria spicata	Bluebunch wheatgrass				N	1/4 – 1/2	139,000	8	N/A	X	X	
	Sporobolus cryptandrus	Sand dropseed				N	0 - 1/4	5,298,000	1	N/A			X
	Stipa thurberiana	Thurber's needlegrass				N	1/4 – 1/2	180,000	6	N/A	X	X	

TABLE 3continued: POLLINATOR PLANT LIST 9 - 12 INCH PRECIPITATION													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Shrubs												
	Artemisia tridentata ssp. tridentata	Basin big sagebrush				N	0 – 1/8	1,700,000	0.5	6		X	X
	A. tridentata ssp. wyomingensis	Wyoming big sagebrush				N	0 – 1/8	1,700,000	0.5	6	X	X	X
	Atriplex canescens	Fourwing saltbush				N	1/4 - 3/4	52,000	2	6		X	X
	Chrysothamnus viscidiflorus	Green rabbitbrush				N	0 - 1/8 or seedlings	782,000	0.5	4		X	X
	Ericameria nauseosa	Rubber rabbitbrush				N	0 - 1/8 or seedlings	693,000	0.5	4		X	X
	Eriogonum heracleoides	Whorled buckwheat					0 - 1/4 or seedlings	135,700	4	4		X	X
	E. umbellatum	Sulphur buckwheat				N	0 - 1/4 or seedlings	209,000	4	4		X	X
	Krascheninikovia lanata	Winterfat				N	0 – 1/8	123,000	2	6			
	Purshia tridentata	Antelope bitterbrush				N	1/4-1.0	15,400	2 or plants	6		X	X
	Rhus trilobata	Skunkbush sumac					seedlings	N/A	plants	8			X
	Yucca spp.	Yucca				N	seedlings	N/A	plants	6		X	X
*	Species that germinate and establish well. Several of these species should be included in every mix.												
^	Can become weedy or invasive under proper conditions.												

TABLE 4: POLLINATOR PLANT LIST 12 - 15 INCH PRECIPITATION.

			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Forbs												
*	*Achillea millefolium*	Western yarrow				N	0 - 1/8	2,500,000	0.5	N/A		X	X
	Balsamorhiza sagittata	Arrowleaf balsamroot				N	0 - 1/4	55,000	18	N/A		X	X
*	*Chaenactis douglasii*	Douglas dustymaiden				N	0 - 1/8	350,000	3	N/A		X	X
	Cleome lutea	Yellow beeplant				N	1/8 – 1/4	100,000	10	N/A	X	X	
	Dalea spp.	Prairie clover				N	1 /4 - 1/2	148,000	7	N/A		X	X
	Echinacea spp.	Prairie coneflower				N	1/8 - 1/2	115,000	2	N/A			
*	*Gaillardia aristata*	Blanket flower				N	1 /4 - 1/2	200,000	6	N/A		X	X
	Hedysarum boreale	Northern(Utah)/sweetvetch				N	1/4 - 1/2	46,000	24	N/A	X	X	X
	Helianthus species	Sunflower				N	1/4 - 1/2	45,000	4	N/A	X	X	X
*	*Linum lewisii*	Lewis flax				N	0 - 1/8	260,000	5	N/A		X	X
*	*L. perenne*	Blue flax				I	0 - 1/8	278,000	4	N/A		X	X
	Lomatium dissectum	Fernleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	L. grayi	Gray's biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	L. triternatum	Nineleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
*	Machaeranthera canescens	Hoary tansyaster				N	0 - 1/8	1,300,000	1	N/A		X	X
*	*Medicago sativa*	Alfalfa				I	1/8 - 1/2	200,000	5	N/A	X	X	
	Medicago sativa ssp. *falcata*	Yellow blossom alfalfa				I	1/8 - 1/2	211,000	5	N/A	X	X	
*^	*Melilotus alba*	White sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X
*^	*M. officinalis*	Yellow sweetclover				I	1/8 - 1/2	260,000	1	N/A	X	X	X

TABLE 4 continued: POLLINATOR PLANT LIST 12 - 15 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Onobrychis viciifolia	Sainfoin				I	1/4 - 3/4	18,500	34	N/A		X	X
	Penstemon eatonii	Firecracker penstemon				N	0 - 1/8	315,000	3	N/A		X	X
	P. palmeri	Palmer's penstemon				N	0 - 1/8	294,000	2	N/A		X	X
	Phacelia hastata	Silverleaf phacelia				N	1/8 – 1/4	150,000	7	N/A		X	X
	Sphaeralcea spp.	Globemallow				N	1/4 - 1/2	500,000	2	N/A		X	X
^	*Vicia Americana*	American vetch				N	1 - 2	33,000	34	N/A		X	X
	Grasses												
	Achnatherum hymenoides	Indian ricegrass				N	1/2 - 3	235,000	6	N/A		X	X
	Elymus elymoides	Bottlebrush squirreltail				N	1/4 – 1/2	220,000	6	N/A		X	X
	E. lancelatus	Thickspike wheatgrass				N	1/4 – 1/2	135,000	6	N/A	X	X	
	E. multisetus	Big squirreltail				N	1/4 – 1/2	192,000	6	N/A	X	X	
	E. trachycaulus	Slender wheatgrass				N	1/2 - 3/4	135,000	6	N/A	X	X	
	E. wawawaiensis	Snake River wheatgrass				N	1/4 – 1/2	139,000	8	N/A		X	X
	Leymus cinereus	Basin wildrye				N	1/4 - 3/4	130,000	8	N/A		X	X
	Poa ampla	Big bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	Poa nevadensis	Nevada bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	Pseudoroegneria spicata	Bluebunch wheatgrass				N	1/4 – 1/2	139,000	8	N/A	X	X	
	Stipa thurberiana	Thurber's needlegrass				N	1/4 – 1/2	180,000	6	N/A	X	X	

TABLE 4 continued: POLLINATOR PLANT LIST 12 - 15 INCH PRECIPITATION.

			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Shrubs												
	Artemisia tridentata ssp. tridentata	Basin big sagebrush				N	0 – 1/8	1,700,000	0.5	6		X	X
	A. tridentata ssp. wyomingensis	Wyoming big sagebrush				N	0 – 1/8	1,700,000	0.5	6	X	X	X
	Amelanchier alnifolia	Serviceberry				N	Seedlings	N/A	plants	10		X	
	Caragana arborescens	Siberian peashrub				I	Seedlings	N/A	plants	10	X	X	X
	Chrysothamnus viscidiflorus	Green rabbitbrush				N	0 - 1/8 or seedlings	782,000	0.5	4		X	X
	Clematis ligusticifolia	Clematis				N	Seedlings	N/A	plants	6	X	X	X
	Crataegus douglasii	Black hawthorn				N	Seedlings	N/A	plants	10	X	X	
	Ericameria nauseosa	Rubber rabbitbrush				N	0 - 1/8 or seedlings	693,000	0.5	4		X	X
	Eriogonum heracleoides	Whorled buckwheat				N	0 - 1/4 or seedlings	135,700	4	4		X	X
	E. umbellatum	Sulphur buckwheat				N	0 - 1/4 or seedlings	209,000	4	4		X	X
	Prunus americana	American plum				N	Seedlings	N/A	plants	10		X	
	Purshia tridentata	Antelope bitterbrush				N	1/4-1.0	15,400	2 or plants	6		X	X
	Rhus trilobata	Skunkbush sumac				N	Seedlings	N/A	plants	8			X
	Ribes aureum	Golden currant				N	Seedlings	N/A	plants	6		X	
	Rosa woodsii	Wood's rose				N	1/2-3/4	50,000	1 or plants	5		X	
	Symphoricarpos spp.	Snowberry				N	Seedlings	N/A	plants	4		X	
*	Species that germinate and establish well. Several of these species should be included in every mix.												
^	Can become weedy or invasive under proper conditions.												

TABLE 5: POLLINATOR PLANT LIST 15 - 18 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Forbs												
*	*Achillea millefolium*	Western yarrow				N	0 - 1/8	2,500,000	0.5	N/A		X	X
	Astragalus cicer	Cicer milkvetch				I	1 /4 - 1/2	130,000	7	N/A	X	X	
	Dalea spp.	Prairie clover				N	1 /4 - 1/2	148,000	7	N/A		X	X
*	*Gaillardia aristata*	Blanket flower				N	1 /4 - 1/2	200,000	6	N/A		X	X
	Geranium viscosissimum	Sticky geranium				N	1 /4 - 1/2	55,000	20	N/A		X	
	Hedysarum boreale	Northern(Utah)/sweetvetch				N	1/4 - 1/2	46,000	24	N/A	X	X	X
*	*Linum lewisii*	Lewis flax				N	0 - 1/8	260,000	5	N/A		X	X
*	*L. perenne*	Blue flax				I	0 - 1/8	278,000	4	N/A		X	X
	Lomatium dissectum	Fernleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	L. grayi	Gray's biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	L. triternatum	Nineleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
*	*Medicago sativa*	Alfalfa				I	1/8 - 1/2	200,000	5	N/A	X	X	
*	*M. sativa ssp. falcata*	Yellow blossom alfalfa				I	1/8 - 1/2	211,000	5	N/A	X	X	
	Onobrychis viciifolia	Sainfoin				I	1/4 - 3/4	18,500	34	N/A		X	X
	Penstemon eatonii	Firecracker penstemon				N	0 - 1/8	315,000	3	N/A		X	X
	P. strictus	Rocky Mountain penstemon				N	0 - 1/8	286,000	2	N/A	X	X	
	Ratibida columnifera	Prairie coneflower				N	1 /4 - 1/2	740,000	2	N/A	X	X	X
	Sanguisorba minor	Small burnet				I	1/4 - 1/2	42,000	20	N/A	X	X	
	Symphyotrichum spp.	Aster spp.				N	0 - 1/2	1,290,000	2	N/A			
^	*Vicia Americana*	American vetch				N	1 - 2	33,000	34	N/A		X	X

TABLE 5 continued: POLLINATOR PLANT LIST 15 - 18 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Grasses												
	Bromus marginatus	Mountain brome				N	1/4 – 1/2	80,000	10	N/A	X	X	X
	Elymus glaucus	Blue wildrye				N	1/4 – 1/2	145,000	8	N/A	X	X	
	E. multisetus	Big squirreltail				N	1/4 – 1/2	192,000	6	N/A	X	X	
	E. trachycaulus	Slender wheatgrass				N	1/2 – 3/4	135,000	6	N/A	X	X	
	Festuca idahoensis	Idaho fescue				N	1/4 – 1/2	450,000	4	N/A	X	X	
	Koeleria macrantha	Prairie junegrass				N	1/4 – 1/2	2,135,000	1	N/A		X	X
	Leymus cinereus	Basin wildrye				N	1/4 - 3/4	130,000	8	N/A		X	X
	Poa ampla	Big bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	Poa nevadensis	Nevada bluegrass				N	0 - 1/4	925,000	2	N/A	X	X	
	Pseudoroegneria spicata	Bluebunch wheatgrass				N	1/4 – 1/2	139,000	8	N/A	X	X	

TABLE 5 continued: POLLINATOR PLANT LIST 15 - 18 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Shrubs												
	Amelanchier alnifolia	Serviceberry				N	Seedlings	N/A	plants	10		X	
	Artemisia tridentata ssp. *vasaseyana*	Mountain big sagebrush				N	0 – 1/8	1,700,000	0.5	6		X	X
	Caragana arborescens	Siberian peashrub				I	Seedlings	N/A	plants	10	X	X	X
	Clematis ligusticifolia	Clematis				N	Seedlings	N/A	plants	6	X	X	X
	Crataegus douglasii	Black hawthorn				N	Seedlings	N/A	plants	10	X	X	
	Ericameria nauseosa	Rubber rabbitbrush				N	0 - 1/8 or seedlings	693,000	0.5	4		X	X
	Eriogonum heracleoides	Whorled buckwheat				N	0 - 1/8 or seedlings	693,000	4 or plants	4		X	X
	Eriogonum umbellatum	Sulphur buckwheat				N	0 - 1/4 or seedlings	135,700	4 or plants	4		X	X
	Perovskia atriplicifolia	Russian sage				I	Seedlings	N/A	plants	6		X	
	Prunus americana	American plum				N	Seedlings	N/A	plants	10		X	
	Prunus virginiana	Chokecherry				N	Seedlings	N/A	plants	12		X	
	Rhus trilobata	Skunkbush sumac				N	Seedlings	N/A	plants	8			X
	Ribes aureum	Golden currant				N	Seedlings	N/A	plants	6		X	
	Rosa woodsii	Wood's rose				N	1/2-1.0	50,000	1 or plants	5		X	
	Sambucus cerulea	Elderberry				N	Seedlings	N/A	plants	6			X
	Shepherdia argentea	Buffaloberry				N	Seedlings	N/A	plants	10		X	
	Symphoricarpos spp.	Snowberry				N	Seedlings	N/A	plants	4		X	
	Prunus tomentosa	Nanking cherry				I	Seedlings	N/A	plants	8		X	
*	Species that germinate and establish well. Several of these species should be included in every mix.												
^	Can become weedy or invasive under proper conditions.												

TABLE 6: POLLINATOR PLANT LIST 18 - 25 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Forbs												
*	*Achillea millefolium*	Western yarrow				N	0 - 1/8	2,500,000	0.5	N/A		X	X
	Aquilegia spp.	Columbine				I	0 - 1/8	180,000	3	N/A		X	
	Asclepias tuberosa	Butterfly milkweed				N	1/8 - 1/2	70,000	15	N/A		X	X
	Astragalus cicer	Cicer milkvetch				I	1 /4 - 1/2	130,000	7	N/A	X	X	
^	*Coronilla varia*	Crownvetch				I	1 /4 - 1/2	140,000	8	N/A		X	X
*	*Gaillardia aristata*	Blanket flower				N	1 /4 - 1/2	200,000	6	N/A		X	X
	Geranium viscosissimum	Sticky geranium				N	1 /4 - 1/2	55,000	20	N/A		X	
	Liatris pycnostachya	Prairie blazingstar				N	0 - 1/8	120,000	8	N/A	X	X	X
*	*Linum lewisii*	Lewis flax				N	0 - 1/8	260,000	5	N/A		X	X
*	*L. perenne*	Blue flax				I	0 - 1/8	278,000	4	N/A		X	X
	Lomatium dissectum	Fernleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	L. triternatum	Nineleaf biscuitroot				N	1/8 - 1/2	45,000	20	N/A		X	
	Lotus corniculatus	Birdsfoot trefoil				I	1/4 – 1/2	375,000	3	N/A	X	X	X
*	*Medicago sativa*	Alfalfa				I	1/8 - 1/2	200,000	5	N/A	X	X	
*	*M. sativa ssp. falcata*	Yellow blossom alfalfa				I	1/8 - 1/2	211,000	5	N/A	X	X	
	Onobrychis viciifolia	Sainfoin				I	1/4 - 3/4	18,500	34	N/A		X	X
	P. strictus	Rocky Mountain penstemon				N	0 - 1/8	286,000	2	N/A	X	X	
	P. venustus	Venus penstemon				N	0 - 1/8	1,090,000	1	N/A	X	X	
	Ratibida columnifera	Prairie coneflower				N	1 /4 - 1/2	740,000	2	N/A	X	X	X
*	*Sanguisorba minor*	Small burnet				I	¼ - 1/2	42,000	20	N/A	X	X	
	Symphyotrichum spp.	Aster spp.				N	0 – 1/2	1,290,000	2	N/A		X	X
*^	*Trifolium* spp.	Clover spp.				I	1/8 – 1/4	300,000	4	N/A	X	X	X
^	*Vicia Americana*	American vetch				N	1 - 2	33,000	34	N/A		X	X

TABLE 6 continued: POLLINATOR PLANT LIST 18 - 25 INCH PRECIPITATION.

			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Grasses												
	Bromus marginatus	Mountain brome				N	1/4 – 1/2	80,000	10	N/A	X	X	X
	Elymus glaucus	Blue wildrye				N	1/4 – 1/2	145,000	8	N/A	X	X	
	E. multisetus	Big squirreltail				N	1/4 – 1/2	192,000	6	N/A	X	X	
	Festuca idahoensis	Idaho fescue				N	1/4 – 1/2	450,000	4	N/A	X	X	
	Koeleria macrantha	Prairie junegrass				N	1/4 – 1/2	2,135,000	1	N/A		X	X
	Pseudoroegneria spicata	Bluebunch wheatgrass				N	1/4 – 1/2	139,000	8	N/A	X	X	
	Shrubs												
	Amelanchier alnifolia	Serviceberry				N	Seedlings	N/A	plants	10		X	
	Artemisia tridentata ssp. *vasaseyana*	Mountain big sagebrush				N	0 – 1/8	1,700,000	0.5	6		X	X
	Caragana arborescens	Siberian peashrub				I	Seedlings	N/A	plants	10	X	X	X
	Clematis ligusticifolia	Clematis				N	Seedlings	N/A	plants	6	X	X	X
	Cotoneaster integerrimus	Cotoneaster				I	Seedlings	N/A	plants	6		X	
	Crataegus douglasii	Black hawthorn				N	Seedlings	N/A	plants	10	X	X	
	Dasiphor fruticosa	Shrubby cinquefoil				N	Seedlings	N/A	plants	6		X	
	Eriogonum heracleoides	Whorled buckwheat				N	0 - 1/8 or seedlings	693,000	4 or plants	4		X	X
	Eriogonum umbellatum	Sulphur buckwheat				N	0 - 1/4 or seedlings	135,700	4 or plants	4		X	X
	Prunus americana	American plum				N	Seedlings	N/A	plants	10		X	
	Prunus tomentosa	Nanking cherry				I	Seedlings	N/A	plants	8		X	

TABLE 6 continued: POLLINATOR PLANT LIST 18 - 25 INCH PRECIPITATION.													
			Bloom Color and Time								Soils		
	Scientific Name	Common Name	spring	summer	late summer	Origin N = native, I = introduced	Seeding Depth (in)	Seeds/lb	Seeding Rate (PLS lbs/ac)	Plant Spacing (ft)	fine	med	coarse
	Prunus virginiana	Chokecherry				N	Seedlings	N/A	plants	12		X	
	Rosa woodsii	Wood's rose				N	1/2-1.0	50,000	1 or plants	5		X	
	Salix spp.	Willow				N	Cuttings	N/A	cuttings	8		X	X
	Sambucus cerulea	Elderberry				N	Seedlings	N/A	plants	6			X
	Spirea douglasii	Douglas spirea				N	Seedlings	N/A	plants	4		X	
	Symphoricarpos spp.	Snowberry				N	Seedlings	N/A	plants	4		X	
	Syringa vulgaris	Lilac				I	Seedlings	N/A	plants	10		X	
*	Species that germinate and establish well. Several of these species should be included in every mix.												
^	Can become weedy or invasive under proper conditions.												

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