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Using Farm Bill Programs for Pollinator Conservation

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Cover photos:
Clockwise from top: Diverse native hedgerow in Yolo County, CA (photo by Katharina Ullmann, The Xerces Society for Invertebrate Conservation); *Selasphorus* hummingbird at *Lilium bolanderi* (Bolander's lily) (photo by Mark Skinner, NRCS); *Halictus* solitary bee on *Physocarpus capitatus* (Pacific ninebark) (photo by Mace Vaughan, The Xerces Society for Invertebrate Conservation); *Speyeria diana* (Diana) at *Asclepias tuberosa* (butterfly weed) (photo by Mark Skinner, NRCS)

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Using Farm Bill Programs for Pollinator Conservation

Introduction

More than 30 percent of our food relies on insect pollination, which is overwhelmingly provided by bees. The annual value of crops pollinated by wild, native bees in the United States is estimated at $3 billion. Native bees have declined due to habitat loss and the careless use of pesticides, among other factors. At the same time, managed colonies of European honey bees have suffered a 50 percent decline in recent decades and face immediate threats from invasive diseases, pests, and a mysterious ailment called Colony Collapse Disorder.

Recent research has shown that wild native bees, which number more than 4,000 species in North America, can contribute substantially to crop pollination on farms where their habitat needs are met (fig. 1). In some cases like squash production in New Jersey, native bees can provide 100 percent of necessary pollination. As hives of European honey bees become scarcer and more expensive, restoring native pollinators becomes ever more important. And while individual native bee species are susceptible to particular pests, a diverse community of many species has been shown to provide consistent pollination services since declines are buffered by other species that are flourishing.

The Food, Conservation, and Energy Act of 2008, otherwise known as the Farm Bill, authorizes the U.S. Department of Agriculture (USDA) to undertake a broad range of incentive-based conservation programs on agricultural land (table 1). Many of these programs rely on conservation practices that can be used to create or improve pollinator habitat. Previous USDA rulemaking established the promotion and conservation of pollinator habitat as a Conservation Security Program goal and a priority for the Conservation Reserve Program's State Acres for Wildlife (SAFE) practice. New language in the 2008 Farm Bill makes pollinators and their habitat a priority for every USDA land manager and conservationist. The new Farm Bill authorizes special consideration when determining payments for practices that promote pollinator habitat during Environmental Quality Incentive Program (EQIP) implementation. It requires that native and managed pollinators be considered during the review or development

Figure 1 Leaf-cutter and mason bees in the genus *Osmia* are among the most important native crop pollinators. (*Photo by Mace Vaughan, The Xerces Society for Invertebrate Conservation)*

of Farm Bill conservation practice standards. Most important of all, the new Farm Bill authorizes the Secretary of Agriculture to encourage "the development of habitat for native and managed pollinators; and the use of conservation practices that encourage native and managed pollinators" during administration of any conservation program. Congress has recognized that pollinators are a crucial part of the healthy landscape panorama, and USDA Natural Resources Conservation Service (NRCS) participation will be vital to this effort.

Fortunately, the NRCS already offers many opportunities to conserve and create habitat for pollinators using existing programs and practices. NRCS conservation practices that address habitat needs for native bees and other pollinators, such as butterflies, flies,

Table 1 Major Farm Bill conservation programs that can be used to promote pollinators on working lands. All programs are voluntary. Please see the NRCS Web site for more information (http://www.nrcs.usda.gov/programs/), and visit the USDA Service Center Locator to find USDA offices that administer these programs (http://offices.sc.egov.usda.gov/locator/app).

Program	Purpose	Land eligibility	Type of assistance
Conservation Reserve Enhancement Program (CREP)	Land retirement program that helps agricultural producers protect environmentally sensitive land, decrease erosion, restore wildlife habitat, and safeguard ground and surface water. An offshoot of the Conservation Reserve Program, CREP emphasizes partnerships among State, Tribal, or local governments, private groups, and the USDA.	Lands that address an agriculture-related environmental issue of State or National significance such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish populations such as salmon. Enrollment in a State is limited to specific geographic areas and practices; about half the States have CREP programs.	Annual payment plus cost-share of up to 50% of the eligible costs to install the practice. CREP contracts require a 10- to 15-year commitment to keep lands out of agricultural production. CREP is administered by FSA; NRCS provides technical assistance. Contact NRCS or Farm Services Agency (FSA) State or local office. http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=cep
Conservation Reserve Program (CRP)	Land retirement program encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Addresses issues raised by State, regional, and National conservation initiatives.	Highly erodible land, wetland, streamside areas in pasture land, certain other lands. Eligible wetlands must have been cropped 3 of 10 previous years, highly erodible cropland 4 of 6 previous years. Pollinators are high priority wildlife under CRP practice CP38 Safe Acres for Wildlife Enhancement. http://www.fsa.usda.gov/Internet/FSA_File/safe08.pdf	50% cost-share for establishing permanent cover and conservation practices, and annual rental payments for land enrolled in 10- to 15-year contracts. Additional financial incentives are available for some practices. CRP is administered by FSA; NRCS provides technical land eligibility determinations, conservation planning, and practice implementation. Contact NRCS or FSA State or local office. http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp
Conservation Stewardship Program (CSP) (formerly Conservation Security Program)	Addresses resource concerns comprehensively by 1) undertaking additional conservation activities; and 2) improving, maintaining, and managing existing conservation activities. The CSP encourages farmers to broadly improve their conservation effort to protect water and air quality, improve soil quality, store carbon in soils, add wildlife habitat, conserve water, and save energy.	Private and Tribal agricultural land, and forested land incidental to agriculture. Land converted to cropland since 2008 is not eligible.	Annual payments based on expenses, foregone income, and environmental benefits; 5-year contracts renewable for another 5 years. Contact NRCS State or local office. http://www.nrcs.usda.gov/programs/csp
Environmental Quality Incentives Program (EQIP)	Promotes agricultural production and environmental quality as compatible National goals by helping eligible participants install or implement structural and management practices.	Land on which agricultural commodities, livestock, or forest-related products are produced.	Up to 75% cost-share for installed conservation practices or 100% of foregone income; contracts run 1 year past last practice installation, up to 10 years. Up to 3 years of incentive payments for certain management practices. Special payment consideration for practices that promote pollinator habitat. Contact NRCS State or local office. http://www.nrcs.usda.gov/programs/eqip

Table 1 Major Farm Bill conservation programs that can be used to promote pollinators on working lands. All programs are voluntary. Please see the NRCS Web site for more information (http://www.nrcs.usda.gov/programs/), and visit the USDA Service Center Locator to find USDA offices that administer these programs (http://offices.sc.egov.usda.gov/locator/app).

Program	Purpose	Land eligibility	Type of assistance
Grassland Reserve Program (GRP)	Help owners and operators protect grazing uses and related conservation values by restoring and conserving eligible land through rental contracts, easements, and restoration agreements.	Historical grassland used primarily for grazing that has high conservation, ecological, or archeological value.	50% cost-share for restoration; annual payment up to 75% of the grazing value of the land for 10-, 15-, or 20-year rental contracts, or easement payments no greater than fair market value less the encumbered grazing value for permanent easements or easements for the maximum duration allowed under State law. GRP is jointly administered by NRCS, FSA, and U.S. Forest Service. Contact NRCS or FSA State or local office. http://www.nrcs.usda.gov/programs/GRP
Wetland Reserve Program (WRP)	Land retirement program to restore, protect, or enhance wetlands on private or Tribal lands.	Farmed wetland or wetland converted to agriculture before 1985, together with functionally dependent adjacent land, or cropland or grassland that was used for agricultural production prior to natural flooding.	Private lands: 1) Permanent easement payment equal to forgone value plus 100% of restoration costs; or 2) 30-year easement payment (75% of forgone value) plus 75% of restoration costs; or 3) restoration cost-share agreement (usually 10 years) with payment of 75% of restoration costs. Tribal lands: restored through any combination of 2 and 3. Contact NRCS State or local office. http://www.nrcs.usda.gov/programs/wrp
Wildlife Habitat Incentive Program (WHIP)	Develop wildlife habitat on private and Tribal lands.	High-priority fish and wildlife habitats, especially habitat for declining species, otherwise unfunded beneficial practices, or locally determined fish and wildlife priority habitats.	Up to 75% cost-share for conservation practices under standard 5- to 10-year contracts, or higher cost-share for a limited number of 15-year contracts. Contact NRCS State or local office. http://www.nrcs.usda.gov/programs/whip

and hummingbirds, can have a great overall ecological benefit, and improve balance sheets for growers of adjacent insect-pollinated crops (fig. 2).

This technical note outlines opportunities within current Farm Bill programs to implement pollinator conservation actions on the ground, especially what the NRCS field conservationists can do at the local or field level (*Field-level opportunities*). The field-level advice primarily explores how current conservation practices (e.g., Practice 340—Cover Crop) can be used to benefit pollinators. Secondly, this technical note identifies opportunities for NRCS State, area, basin, and watershed offices to support conservation of crop-pollinating native bees and provide and enhance pollinator habitat during land or wildlife habitat improvement activities (*State-level opportunities*). At the State level, support for pollinators and their habitats includes developing biology technology notes with State-appropriate plant lists, conservation program enhancement job sheets, and other guidance documents for field office conservationists.

We specifically promote native bees because of their economic importance for agriculture and their keystone role in the healthy and complex food webs that support diverse wildlife. However, conservation practices implemented for native bees will also greatly benefit an array of other pollinators and beneficial insects, including managed and feral European honey bees, butterflies, moths, flies, beetles, wasps, and the predators and parasites of crop pests. It is these insects that feed wildlife either directly or by producing many of the plant fruits that sustain birds and mammals and, thereby, help hold natural systems together.

Figure 2 Creation of hedgerows at Butler Farm in Winters, CA, will provide pollinator nest sites, refuge, and forage. (*Photo by Mace Vaughan, The Xerces Society for Invertebrate Conservation*)

Field-level opportunities

Incorporating pollinators into current conservation practices

Tables 2 and 3 provide details on how current conservation practices can be used to benefit pollinators, particularly crop-pollinating native bees. Native pollinator conservation practices provide natural or seasonal habitat to: 1) increase the abundance of pollen and nectar while ensuring that plants are in flower from early in the spring (e.g., willow) through late fall (e.g., goldenrod); 2) add or protect potential nest sites; and 3) provide a refuge from pesticides. Whenever possible, conservationists should use native plants since native pollinators and other wildlife are adapted to them for food and shelter. Most of the conservation practices outlined in table 2 allow field office planners to include diverse flowering plants that provide sequential bloom throughout the growing season. Some practices allow for creation or protection of nest sites, such as snags or stable untilled ground for solitary bees, or small cavities (usually created by rodents) for bumble bees. Any practice that increases areas of natural habitat that are not sprayed with pesticides or implements buffers to reduce pesticide drift will minimize harm to native pollinators. (See the Xerces Society publication *Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms* for more information.*)*

Table 2 lists conservation practices alphabetically and describes the potential for each practice to supply or improve habitat for pollinators. The pollinator notes column describes pollinator habitat components that can be provided by each practice and offers recommendations for management practices that require careful timing of management activities (e.g., mowing or fire) to benefit or reduce harm to pollinators. Table 3 presents the general habitat requirements of pollinators and lists the conservation practices that can be used to supply these requirements.

Table 2 Conservation practices that can be used to create or enhance pollinator habitat

Conservation practice (unit)	Code	Pollinator notes
Alley Cropping (acre)	311	Can include native trees, shrubs and vines (e.g., black locust (*Robinia pseudoacacia*), *Rubus* spp., etc.) or row covers (e.g., various legumes) that provide nectar or pollen. **Note**: Black locust should be used with care because it is invasive in certain habitats outside of its natural range.
Channel Bank Vegetation (acre)	322	Can include diverse flowering trees, shrubs, vines, and forbs. Channel banks provide a unique opportunity to supply early-flowering willow and, in dry areas, late flowering native forbs (e.g., goldenrod (*Solidago* spp.)). These stable areas of habitat also may support solitary bee ground-nests where the soil surface is accessible, or bumble bees where vegetation becomes dense or duff layers accumulate.
Conservation Cover (acre)	327	Can include diverse forbs (e.g., various legumes) to increase plant diversity and ensure flowers are in bloom for as long as possible, providing nectar and pollen throughout the season.
Conservation Crop Rotation (acre)	328	Cover crops used during conservation crop rotations can include forbs (e.g., various legumes, buckwheat (*Eriogonum* spp.), phacelia (*Phacelia* spp.), etc.) that provide abundant forage for pollinators. Insecticides should not be applied to these conservation covers. Moving insect-pollinated crops no more than 800 feet during the rotation may help maintain local populations of native bees that have become established because of a specific crop or conservation cover.
Constructed Wetland (acre)	656	Can include stable soil as nesting substrate in more upland areas, as well as plants that provide pollen and nectar for native bees and other pollinators. Possible plant genera with obligate or facultative wetland species include: *Asclepias*, *Bidens*, *Cephalanthus*, *Cornus*, *Crataegus*, *Epilobium*, *Eupatorium*, *Hibiscus*, *Hypericum*, *Iris*, *Juncus*, *Ledum*, *Lobelia*, *Ludwigia*, *Lysimachia*, *Mimulus*, *Ranunculus*, *Rhexia*, *Rhododendron*, *Ribes*, *Rosa*, *Rubus*, *Salix*, *Solidago*, *Spiraea*, *and Vaccinium*. Look for appropriate wetland plants for the region from these and other genera.
Contour Buffer Strips (acre)	332	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. In addition, mowing only every 2 or 3 years to benefit wildlife also will benefit nesting bumble bees. To protect bumble bee nests, mowing should occur in the late fall when colonies have died for the year and queens are overwintering.
Cover Crop (acre)	340	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. Look for a diverse mix of cover crop plant species that come into bloom at different times and provide a sequence of bloom throughout the year. Some examples include clover (*Trifolium* spp.), phacelia (*Phacelia* spp.), and buckwheat (*Eriogonum* spp.). Many "beneficial insect" cover crop blends include plant species that will also provide forage for pollinators.
Critical Area Planting (acre)	342	Can include flowering plant species that provide abundant pollen and nectar for native bees and other pollinators. Planted areas may support stable soil for ground-nesting solitary bees, or dense vegetation under which bumble bee queens may hibernate or build nests.
Early Successional Habitat Development/Management (acre)	647	This management practice is important for maintaining open and sunny habitat for pollinators. **Note**: To minimize damage to pollinator populations, disturbance practices should be implemented only every 2 to 3 years in rotation and, ideally, on only 30% or less of the overall site. This allows for habitat heterogeneity and opportunities for recolonization of non-treated habitat. For example, managers could mow or burn a small portion of the habitat (less than 1/3 of the site each year or two) on a 3- to 6-year cycle. Alternatively, they could treat a fifth of the site each year, on a 5-year cycle. In addition, when possible, disturbance practices should be implemented when most pollinators are inactive, such as from late fall to early spring. For details, see the Xerces Society publication *Pollinators in Natural Areas: A Primer on Habitat Management.*
Field Border (foot)	386	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. Strive for a mix of forbs, vines, and shrubs that come into bloom at different times throughout the year. Site management (for example, mowing) should occur in the late fall to minimize impacts on pollen and nectar sources used by pollinators. Alternatively, allowing field borders to become overgrown may provide nesting habitat for bumble bees, as well as abundant forage. Stable (untilled) field borders may provide opportunities for solitary bees to nest in the soil.

Table 2 Conservation practices that can be used to create or enhance pollinator habitat—Continued

Conservation practice (unit)	Code	Pollinator notes
Filter Strip (acre)	393	Can include legumes or other forbs that provide pollen and nectar for native bees. Look for a diverse mix of cover crop plant species that come into bloom at different times and provide a sequence of bloom throughout the year. Site management (for example, mowing or burning) should occur in late fall to early spring to minimize impacts on pollinators.
Grassed Waterway (acre)	412	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. In dry regions, these sites may be able to support flowering forbs with higher water requirements and thus provide bloom later in the summer.
Hedgerow Planting (foot)	422	Can include forbs, vines, and shrubs that provide pollen and nectar for native bees. Look for a diverse mix of plant species that come into bloom at different times and provide a sequence of bloom throughout the year. Bee nesting sites also may be incorporated, including semi-bare ground or wooden block nests. Including strips of unmowed grasses and forbs along the edge of the hedgerow may provide nesting opportunities for bumble bees. This practice also can help reduce the drift of pesticides into areas of pollinator habitat.
Herbaceous Wind Barriers (foot)	603	Can include diverse forbs and shrubs that provide pollen and nectar for native bees. Look for a diverse mix of plant species that come into bloom at different times and provide a sequence of bloom throughout the year.
Multi-Story Cropping (acre)	379	Can include woody plants carefully chosen to supply pollen and nectar for pollinators. Look for mixes of plants that flower at different times throughout the growing season and can support populations of pollinators over time.
Pasture and Hay Planting (acre)	512	Can include diverse legumes (e.g., alfalfa) or other forbs that, when in bloom, provide pollen and nectar for native bees.
Pest Management (acre)	595	In general, implementing Integrated Pest Management (IPM) for a crop reduces the use and impact of pest control chemicals on pollinators. In addition, plant species commonly used in IPM to support the beneficial insects that help manage pests also can support bees. Examples of these plants include: phacelia (*Phacelia* spp.), sunflowers (*Helianthus* spp.), buckwheat (*Eriogonum* spp.), and yarrow (*Achillea* spp.). Pest management practices also can include replacement of invasive or exotic plant species with flowering native trees, shrubs, vines, legumes, or other forbs that provide pollen and nectar for native bees. Look for a diverse mix of plant species that come into bloom at different times and provide a sequence of bloom throughout the year.
Prescribed Burning (acre)	338	Can greatly benefit pollinators by maintaining a diverse mix of open, early successional habitat in various stages of habitat maturity. **Note**: It is best if: 1) only 30% or less of a site is burned at any one time to allow for recolonization by pollinators from adjacent habitat; 2) burning occurs only every 3 to 6 years; and 3) burning occurs when pollinators are least active, such as when most plants have senesced or in the fall.
Prescribed Forestry (acre)	409	Can help maintain open understory and forest gaps that support diverse forbs and shrubs that provide pollen and nectar for pollinators. Standing dead trees may be kept or drilled with smooth 3- to 6-inch deep holes to provide nesting sites for bees.
Prescribed Grazing (acre)	528	Can help maintain early successional habitat and its associated flowering plants. Ensure that grazing objectives include a diverse plant community that incorporates legumes, forbs, and appropriate flowering woody species to create floral and structural diversity.
Range Planting (acre)	550	Can include diverse legumes, other forbs and shrubs that provide pollen and nectar for native bees.
Residue and Tillage Management, No-Till/Strip Till/Direct Seed (acre)	329	Can protect bees that are nesting in the ground at the base of the plants they pollinate. Soil tillage digs up these nests (located 0.5 to 3 feet underground) or blocks emergence of new adult bees bred the proceeding year.
Restoration and Management of Rare and Declining Habitats (acre)	643	Can be used to provide diverse locally grown native forage (forbs, shrubs, vines, and trees) and nesting resources for pollinators. Many specialist pollinators that are closely tied to rare plants or habitats may significantly benefit from efforts to protect rare habitat. In addition, certain rare plants require pollinators to reproduce. **Note**: Pollinator plants should only be planted if they were part of the rare ecosystem you are trying to restore.

Table 2 Conservation practices that can be used to create or enhance pollinator habitat—Continued

Conservation practice (unit)	Code	Pollinator notes
Riparian Forest Buffer (acre)	391	Can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. The stable habitat may supply nest sites to solitary ground and wood-tunnel nesting bees, as well as bumble bees. This practice also can help reduce drift of pesticides onto areas of pollinator habitat.
Riparian Herbaceous Cover (acre)	390	Can include diverse forbs that provide pollen and nectar for native bees. In drier parts of the U.S., many of these forbs flower in the late summer and fall, when pollinator forage is needed most.
Silvopasture Establishment (acre)	381	If grazing intensity is low enough to allow for plants to flower, this practice can include legumes and other forbs that provide pollen and nectar for bees. Trees and shrubs that provide pollen and nectar also can be planted.
Stream Habitat Improvement and Management (acre)	395	Plants chosen for adjoining riparian areas can include trees, shrubs, and forbs that provide pollen and nectar for pollinators. Maximizing plant diversity along riparian corridors will result in more pollinators and other terrestrial insects to feed fish in the streams.
Streambank and Shoreline Protection (foot)	580	If vegetation is used for streambank protection, plants can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Good candidates include willow (*Salix* spp.), dogwood (*Cornus* spp.), and goldenrod (*Solidago* spp.).
Stripcropping (acre)	585	Can include diverse legumes or other forbs that provide pollen and nectar for native bees. If insect pollinated crops are grown, plants used in adjacent strips of vegetative cover may be carefully chosen to provide a complementary bloom period to the crop, such that the flowers available in the field are extended over a longer period of time.
Tree/Shrub Establishment (acre)	612	Can include trees, shrubs, and vines especially chosen to provide pollen and nectar for pollinators. Woody plants with pithy stems (e.g., elderberry (*Sambucus* spp.), boxelder (*Acer negundo*), and raspberries (*Rubus* spp.) also may be chosen to provide potential nest sites for solitary bees that nest in wood stems.
Upland Wildlife Habitat Management (acre)	645	Can include managing for pollinator forage or pollinator nest sites, such as including nest blocks or snags for solitary bees that nest in tunnels in wood, access to bare soil for ground-nesting solitary bees, and small mammal burrows or overgrown grass cover for bumble bees. **Note**: Please see Early Successional Habitat Development/Management (647) and Prescribed Burning (338) for management techniques that minimize the disruption of pollinator communities.
Vegetative Barriers (foot)	601	Can include plants that provide pollen and nectar for pollinators.
Wetland Enhancement (acre)	659	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected.
Wetland Restoration (acre)	657	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected.
Wetland Wildlife Habitat Management (acre)	644	Wetland and adjacent upland can include trees, shrubs, and forbs especially chosen to provide pollen and nectar for pollinators. Snags can be protected or nest blocks for bees erected. **Note**: Please see Early Successional Habitat Development/Management (647) and Prescribed Burning (338) for management techniques that minimize the disruption of pollinator communities.
Windbreak/Shelterbelt Establishment (foot)	380	Can include trees, shrubs, vines, and forbs especially chosen to provide pollen and nectar for pollinators. Windbreaks and shelter belts are a good place to put nesting structures for native bees, and they can help reduce drift of insecticides onto a site.
Windbreak/Shelterbelt Renovation (foot)	650	Can include trees, shrubs, vines, and forbs especially chosen to provide pollen and nectar for pollinators. If appropriate, dead trees and snags may be kept or drilled with holes to provide nesting sites for bees.

Note: Many FSA-sponsored CRP and CREP conservation practices are similar in name and intent, so the recommendations in this table can often be applied to them.

Table 3 Pollinator requirements and the conservation practices that can be used to provide them in the field

Pollinator resource	Code and conservation practice (unit)
Forage (diverse sources of pollen and nectar that support pollinators from early in the spring to late in the fall)	311—Alley Cropping (acre) 322—Channel Bank Vegetation (acre) 327—Conservation Cover (acre) 328—Conservation Crop Rotation (acre) 656—Constructed Wetland (acre) 332—Contour Buffer Strips (acre) 340—Cover Crop (acre) 342—Critical Area Planting (acre) 386—Field Border (foot) 393—Filter Strip (acre) 412—Grassed Waterway (acre) 422—Hedgerow Planting (foot) 603—Herbaceous Wind Barriers (foot) 379—Multi-Story Cropping (acre) 512—Pasture and Hay Planting (acre) 595—Pest Management (acre) 409—Prescribed Forestry (acre) 528—Prescribed Grazing (acre) 550—Range Planting (acre) 643—Restoration and Management of Rare and Declining Habitats (acre) 391—Riparian Forest Buffer (acre) 390—Riparian Herbaceous Cover (acre) 381—Silvopasture Establishment (acre) 395—Stream Habitat Improvement and Management (acre) 580—Streambank and Shoreline Protection (foot) 585—Stripcropping (acre) 612—Tree/Shrub Establishment (acre) 645—Upland Wildlife Habitat Management (acre) 601—Vegetative Barriers (foot) 659—Wetland Enhancement (acre) 657—Wetland Restoration (acre) 644—Wetland Wildlife Habitat Management (acre) 380—Windbreak/Shelterbelt Establishment (foot) 650—Windbreak/Shelterbelt Renovation (foot)
Nest sites (stable ground, holes in wood, cavities for bumble bees, or overwintering sites for bumble bee queens)	322—Channel Bank Vegetation (acre) 656—Constructed Wetland (acre) 332—Contour Buffer Strips (acre) 342—Critical Area Planting (acre) 386—Field Border (foot) 422—Hedgerow Planting (foot) 409—Prescribed Forestry (acre) 329—Residue and Tillage Management, No-Till/Strip Till/Direct Seed (acre) 643—Restoration and Management of Rare and Declining Habitats (acre) 391—Riparian Forest Buffer (acre) 612—Tree/Shrub Establishment (acre) 645—Upland Wildlife Habitat Management (acre) 659—Wetland Enhancement (acre) 657—Wetland Restoration (acre) 644—Wetland Wildlife Habitat Management (acre) 380—Windbreak/Shelterbelt Establishment (foot) 650—Windbreak/Shelterbelt Renovation (foot)

Table 3 Pollinator requirements and the conservation practices that can be used to provide them in the field—Continued

Pollinator resource	Code and conservation practice (unit)
Pesticide protection (refuge from spray, buffers to drift, etc.)	322—Channel Bank Vegetation (acre) 656—Constructed Wetland (acre) 342—Critical Area Planting (acre) 422—Hedgerow Planting (foot) 391—Riparian Forest Buffer (acre) 657—Wetland Restoration (acre) 380—Windbreak/Shelterbelt Establishment (foot)
Site management for pollinators	647—Early Successional Habitat Development or Management (acre) 595—Pest Management (acre) 338—Prescribed Burning (acre) 409—Prescribed Forestry (acre) 528—Prescribed Grazing (acre) 643—Restoration and Management of Rare and Declining Habitats (acre) 645—Upland Wildlife Habitat Management (acre) 644—Wetland Wildlife Habitat Management (acre)

State-level opportunities

Pollinator conservation biology technical notes

Each State can develop pollinator conservation biology technical notes to help field conservationists promote pollinators in their conservation planning and implementation. Ideally, the notes will:

- Emphasize the importance of leaving as much land as possible in relatively natural condition since many pollinators require this for successful completion of their life cycles.
- Provide details on the native and nonnative plants used by native bees (or other pollinators such as butterflies) that could be included in various conservation practices throughout the State. Important information to include for each plant is flowering period and suitable habitat conditions for planting, as well as information on seeding rates.
- Stress the importance of having many plant species in bloom throughout the growing season. In practice, this means providing at least three blooming pollinator plants during spring, summer, and fall.
- Highlight the importance of nest sites for crop pollinating native bees. These nest sites include:
  - partially bare, well-drained ground for solitary ground-nesting bees
  - narrow tunnels in standing dead wood or plants with pithy stems for solitary tunnel-nesting bees
  - small cavities, such as abandoned rodent burrows or areas of overgrown, fallen grass for bumble bees

Oregon, New Jersey, and Montana NRCS State Offices have produced pollinator conservation biology technical notes, and others are in the making. The Xerces Society drew from these sources and other technical materials to create a template of a State technical note. These documents and others referenced in *State-level opportunities* are listed with Web locations in table 4, as are complementary Fish and Wildlife Habitat Management Leaflets produced by the Agricultural Wildlife Conservation Center. These documents are also available at the PLANTS Database (http://plants.usda.gov/pollinators/NRCSdocuments.html).

Table 4 NRCS documents for pollinator conservation and enhancement

Description or title	Document type	Scope	Web location (if available)
Bats (PDF; 935 KB)	Fish and Wildlife Habitat Management Leaflet	U.S.	http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18509.wba
Butterflies (PDF; 2312 KB)	Fish and Wildlife Habitat Management Leaflet	U.S.	http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18479.wba
Conservation Cover: Wildflower Meadow for Wildlife and Pollinators 327a (PDF; 95 KB)	Conservation Practice Job Sheet	Virginia	http://efotg.nrcs.usda.gov/references/public/VA/327a_Cover_Crop_Wildflower_js_Final.pdf
County Irrigated Land Information MT 2008 (DOC; 79 KB)	Conservation Project Ranking Criteria	Montana	http://www.mt.nrcs.usda.gov/programs/eqip/eqip2008/irrigatedland2008.html
CSP Wildlife Enhancement Activity - Pollinator Areas (PDF; 74 KB)	Conservation Security Program, Enhancement Activity Job Sheet	Alabama	ftp://ftp-fc.sc.egov.usda.gov/AL/tech/csp08/al_pollinator_areas.pdf
EQIP Ranking Instructions SD FY08 (DOC; 389 KB)	Conservation Project Ranking Criteria	South Dakota	
EQIP Ranking Summary Sheet–NRCS MT Madison County 2005 (PDF; 73 KB)	Conservation Project Ranking Criteria	Montana	
Factors Affecting Butterfly Use of Filter Strips in Southwest Minnesota (PDF; 1639 KB)	Pollinator Conservation Biology Technical Leaflet	Minnesota	ftp://ftp-fc.sc.egov.usda.gov/WHMI/WEB/pdf/TechnicalLeaflets/Butterfly.pdf
Habitat Development for Pollinator Insects MT-20 (PDF; 47 KB)	Pollinator Conservation Biology Technical Note	Montana	ftp://ftp-fc.sc.egov.usda.gov/MT/www/technical/biology/Biology_Tech_Note_MT20_Rev3.pdf
Habitat Development for Pollinators NJ (PDF; 102 KB)	Pollinator Conservation Biology Technical Note	New Jersey	http://www.nj.nrcs.usda.gov/programs/whip/documents/NJ_BIO_TECH_NOTE-Pollinators.pdf
Montana Native Plants for Pollinator-Friendly Plantings (PDF; 1982 KB)	Pollinator Conservation Biology Technical Note	Montana	ftp://ftp-fc.sc.egov.usda.gov/MT/www/technical/plants/pollinator.pdf
Native Pollinators (PDF; 4730 KB)	Fish and Wildlife Habitat Management Leaflet	U.S.	http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=18497.wba
NRCS Pollinator Tech Note TEMPLATE–Xerces (DOC; 649 KB)	Pollinator Conservation Biology Technical Note	U.S.	
Plant Management for Native, Culturally Significant Plants EPL40 (PDF; 67 KB)	Conservation Security Program, Enhancement Activity Job Sheet	U.S.	http://www.pa.nrcs.usda.gov/technical/Jobsheets/EPL40_Native_Culturally_Significant_Plants.pdf

Table 4 NRCS documents for pollinator conservation and enhancement

Description or title	Document type	Scope	Web location (if available)
Plant Management for Nectar Corridors EPL41 (PDF; 788 KB)	Conservation Security Program, Enhancement Activity Job Sheet	U.S.	http://www.pa.nrcs.usda.gov/technical/Jobsheets/EPL41_Nectar_Corridors.pdf
Plants for Pollinators in Oregon PM 13 (PDF; 402 KB)	Pollinator Conservation Biology Technical Note	Oregon	ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Plant%20Materials/PMC13.pdf
Plants for Pollinators in the Intermountain West PM 2 (PDF; 1405 KB)	Pollinator Conservation Biology Technical Note	Intermountain West	http://www.plant-materials.nrcs.usda.gov/pubs/idpmstn7641.pdf
Pollinator Ranking Form Final SD (XLS; 103 KB)	Conservation Project Ranking Criteria	South Dakota	
Pollinators South Dakota Fact Sheet SD–FS–55 (PDF; 72 KB)	Pollinator Conservation Biology Fact Sheet	South Dakota	
Ruby-throated hummingbird (PDF; 416 KB)	Fish and Wildlife Habitat Management Leaflet	U.S.	ftp://ftp-fc.sc.egov.usda.gov/WHMI/WEB/pdf/RUBYthroated1.pdf
WHIP Ranking Template Questions SD 2008 (PDF; 150 KB)	Conservation Project Ranking Criteria	South Dakota	ftp://ftp-fc.sc.egov.usda.gov/SD/win/Intranet/Bulletins/FY08_Bulletins/WHIP%20Instructions.pdf

Pollinator conservation job sheets

States can also develop pollinator conservation job sheets. For example, Virginia has produced a Conservation Cover job sheet on establishing and maintaining wildflower meadows for wildlife and pollinators (fig. 3). This job sheet provides general criteria and specifications, details on site maintenance, lists of appropriate plants, and tools for site planning.

Conservation project ranking criteria

States can include a line item that provides additional points during scoring if proposed conservation projects address the flowering or nesting needs of pollinators. In Montana, an EQIP or WHIP line item awards 20 additional points for projects that include sequentially blooming pollinator-friendly plants. South Dakota and California have also developed project ranking criteria that support pollinators.

Conservation Security Program, pollinator enhancements

The Conservation Security Program (CSP) includes enhancements that may be pulled into State programs to conserve pollinators. Nectar Corridors (CSP Enhancement Activity Job Sheet for Plant Management EPL41) and Native, Culturally Significant Plants (EPL40) both provide additional incentives for incorporation of pollinator habitat into CSP contracts. In addition, an enhancement specifically for pollinator habitat is available for the 2008 Conservation Security Program sign-up. The Conservation Security Program was replaced by the Conservation Stewardship Program in May 2008, but, these enhancements will continue in similar form.

Other State opportunities

NRCS State programs can add pollinator habitat criteria to their existing Wildlife Habitat Evaluation Guides, or develop specific documents that assess pollinator habitat. They can also incorporate information on pollinators into their State vegetation guides.

Plant Materials Center assistance

Regional NRCS Plant Materials Centers (PMC) and plant material specialists can develop field trials to test individual plants or combinations of plant materials with a native pollinator focus. The Corvallis PMC (Corvallis, OR), Rose Lake PMC (East Lansing, MI), Lockeford PMC (Lockeford, CA), and the National PMC (Beltsville, MD) are currently developing demonstration insectary plantings and recommendations for pollinator seeding mixes. PMC staff can work with States to produce regional pollinator conservation biology technical notes and other documents.

Figure 3 Fire can be used in meadows, prairies, and savannahs to encourage forbs that feed and shelter pollinators. *(Photo by Jeff Vanaga, NRCS)*

State office assistance

The NRCS Agricultural Wildlife Conservation Center and several private foundations funded the Xerces Society to provide NRCS State Offices with technical support to help implement pollinator conservation measures. Please contact Mace Vaughan (mace@xerces.org) if you are interested in this service.

For more information about pollinator conservation measures, please see the NRCS Ecological Sciences Division publications (http://www.nrcs.usda.gov/technical/ECS/database/technotes.html), or visit the Xerces Society (http://www.xerces.org/pollinator-conservation-agriculture/) or the Pollinator Partnership (http://www.pollinator.org/).