

Pollinator Habitat Restoration on Working Lands

San Diego County, CA



Introduction

This guide is a tool for farmers and ranchers interested in incorporating more pollinator habitat on their working lands. Pollinator habitat is any area of permanent and/or temporary vegetation that provides shelter, nesting and food resources for pollinators like butterflies, bees, birds, bats, and more.

We provide information on the co-benefits of pollinator friendly farming and ranching, and resources to get started!

If you are a farmer or rancher in the San Diego region, you may be eligible for a free site visit to assess the quality of pollinator habitat on your working land. For more information, reach out to pollinators@rcdsandiego.org

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Authors:

Sam Padilla, Partners for Fish & Wildlife

Codi Hale, Resource Conservation District of
Greater San Diego County

Reviewers:

Jonathan Snapp-Cook, USFWS

Ann Baldrige, RCD of Greater San Diego County

Cooperators:

Christine Beck and Sarah Maisonneuve, Earth Discovery Institute

Tracey Rice, NRCS and Point Blue

Eric Porter, USFWS



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Institute

Why are pollinators important?



Pollinators play a keystone role in most ecosystems and are essential for almost a third of our food production. Despite their importance, pollinators are facing serious declines worldwide due to threats such as pesticides, climate change, habitat loss, invasive diseases, and pests. Bees, one of our most important pollinators, are among the many pollinators that are struggling. In the United States there are around 4,000 native bee species, at least 23% of which are in decline.

We can help pollinators by creating and restoring pollinator habitat areas. Ideally, a pollinator habitat is located in a pesticide-free area and near a water source, that includes shelter structures, nesting materials, host plants, and a mix of blooming and nectar plants that are available year-round.

The good news is most of these elements are already in your area!

Providing a diverse mix of native blooming plants, shrubs, trees and grasses is the best way to support our pollinators. Native plants are especially beneficial for pollinator habitats because they have evolved specifically to survive our California climate and better support our native pollinators.

Floral diversity also supports a variety of pollinator diets and extends the window of nectar and pollen availability.

A healthy abundance of pollinators not only supports the surrounding ecosystem but provides benefits for us as well. Globally, up to 75% of all flowering plant species and 35% of all food crops rely on a pollinator for reproduction.



Pollinator Habitat and Carbon Farming

Carbon Farming, also known as Climate Smart Agriculture, refers to the use of land management practices that help sequester (store) carbon in the soil. Soils are a major carbon reservoir containing more carbon than the atmosphere and terrestrial vegetation combined. Carbon is the primary component of soil organic matter and supports water-retention capacity, soil structure, and fertility. By capturing carbon in the soil, we are effectively removing it from the atmosphere and reducing the detrimental effects associated with excess carbon dioxide, such as drought and the increased frequency and severity of natural disasters. The process of trapping carbon in the soil is a simple, local solution to a complex global issue.

There is also positive overlap between practices that support pollinators and practices that support soil health. What's good for the soil is good for pollinators!

There are many benefits of carbon farming including:

- Greenhouse gas reduction
- Increased water infiltration
- Improved soil quality
- Higher carbon sequestration rates
- Reduced runoff and soil erosion



Benefits of Carbon Farming



GHG Reduction: Through the process of photosynthesis, plants absorb carbon dioxide from the atmosphere and convert it to fuel their own growth and produce food for microbes living in the soil. This process is also referred to as “draw down”, with the goal being to draw down more carbon through land management practices.

Improved Soil Health: The key to healthy plants is healthy soil! Soil with higher carbon content has more microbial activity, which breeds more resilient and productive plants. Carbon farming practices like low or no-till allow the soil (and it’s carbon) to remain undisturbed. When the soil is not tilled, or not tilled very often or deeply, it allows microbial life to flourish and increases a plant’s ability to uptake nutrients and protect itself against disease. By constantly building up the soil, instead of stripping it, we are able to reduce erosion and loss of topsoil which increases resilience and yield.

Increased Water Retention: Soil with higher carbon content is “stickier” and allows for the formation of soil aggregates, or large clusters of soil, which create stability against weathering and erosion, and increases the soil’s ability to hold the water and air that are essential for plants and microbes. Carbon farming practices like cover cropping support this concept by keeping the soil covered and full of living roots at all times, therefore creating more passageways for air, moisture and nutrients to be stored and distributed underground.

Co-Benefits for Pollinators



Pollinators benefit from all of the practices above.

- Methods like no-till allow for burrowing pollinators, like many bumblebees and solitary bees, to maintain habitat in undisturbed soil. In fact, 70% of the 20,000 bee species in the world nest underground.
- Incorporating native and blooming plants as cover crops and conservation cover ensures that pollinators have a consistent source of food throughout the seasons, and in turn increases their pollination effort in your fields.
- Planting hedgerows, field borders, and windbreaks with native plants provides a permanent source of food, shelter and protection for birds, bees, butterflies, natural enemies of pests, and more!
- On rangeland, prescribed grazing and range planting ensure that there is a healthy diversity of grasses and blooming plants available throughout the year for pollinators to use as host plants, shelter or sources of nectar.

There are a number of common practices outlined by the NRCS that are known to support soil health and pollinator habitat.

Carbon Farming for Pollinators

At the Carbon Sink Farms demonstration site at Solidarity Farm in Pauma Valley, they designed and planted hedgerows and windbreaks along the farm's perimeter to improve pollinator habitat, and selected hedgerow plants according to traditional ecological knowledge.

Hedgerows assist with 12-month forage for pollinators, slow erosion from wind, and even improve microclimates on portions of the farm that are prone to extreme heat and frost.

As of December 2021, the 5,417 linear foot hedgerow planting goal has been completed, and based on the COMET planner data, the practice provides a total carbon sequestration capacity of 14 tons a year.

How Does Pollinator Habitat Benefit My Working Land?



- Hedgerows and other non-cropped habitats support greater numbers of beneficial arthropods than simple landscapes. Restored native pollinator habitat areas also support natural enemies of pest species. Studies show that these habitat areas can aid pest population suppression and reduce crop damage.
- Permanent plant cover also ensures that living roots are maintained in the soil, leading to increased soil water holding capacity and soil organic matter.
- Hedgerows and native wildflower field borders can protect water quality by reducing surface water run-off into drainage ditches and streams, as well as filtering any potential pesticide or fertilizer residue.
- Buffer strips consisting of permanent non-cropped vegetation can remove up to 97% of soil sediment before it enters adjacent streams, and can reduce the concentration of nitrogen transported from the soil between 40 and 94% before it enters adjacent surface water.

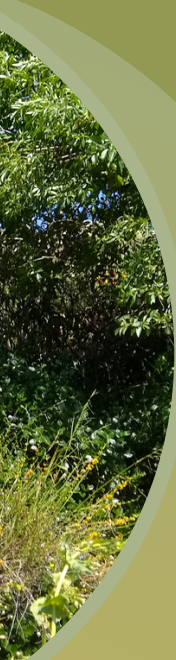


How Pollinator Habitat Restoration Supports Farmers



Agricultural lands are a particularly good fit for pollinator restoration because these lands have the most to benefit from a healthy pollinator community! Many crops that flower already support pollinators since they provide nectar, pollen, shelter and nesting resources. Often, all an agricultural land needs is to provide an extra mix of other blooming plants to provide nectar and pollen during the off-season to maintain the pollinator population until the next crop bloom.

- The maintenance of a pollinator-friendly cover crop may also help to reduce the competitiveness of annual weed species and the level of disturbance associated with weed management.
- Crop yields can also be higher in areas located closer to natural or semi-natural habitats.
- Permanent vegetation cover helps limit soil erosion and absorbs excess soil nitrogen that might otherwise be leached below the root zone of plants in the soil profile.
- Many pollinator-friendly leguminous cover crops (like beans) fix atmospheric nitrogen into their biomass, with positive effects on soil fertility, reducing the need for synthetic fertilizers because nitrogen is progressively released back into the soil.
- Grasses inter-planted with leguminous plants absorb a portion of nitrogen, storing it for later release when the grass' biomass is reduced.



How Pollinator Habitat Restoration Can Benefit Ranchers



Ranches and grazing land are productive and biodiverse working lands. Allowing pollinator-friendly perennial plants to bloom on these working lands in between grazing rotations increases both plant and insect biodiversity, and reciprocally, grazing can benefit pollinators by preventing conversion of flower fields to shrublands or forests.

Grazing also helps reduce competition from the annual and exotic grasses that livestock generally feed on, which alleviates pressure on native pollinator plants and other native species. Native perennial grasses, which provide nutritious forage to cattle during dry years, also provide overwintering habitat to pollinators.

- The presence of a healthy pollinator community can be a natural form of pest control in grazed fields by attracting natural enemies of insect pests that disturb livestock.
- Livestock can also benefit from the diversity of plants in pollinator habitat mixes. Studies show that livestock are healthier, show greater growth, and have higher rates of reproduction when provided a diverse mix of plant forage versus just grazing on one species of grass.
- Increasing forage diversity with pollinator plants can improve livestock mineral balance and can reduce the risk of mineral deficiencies or toxicities. Healthier livestock can also improve the quality of animal products, like meat and milk.





Habitat Restoration at Sky Mountain Permaculture



At Sky Mountain Permaculture they have created an agriculture/restoration system that not only provides food, fiber, timber and medicine for people, but also provides resources and support for birds, insects, microorganisms and other wildlife. After a 2014 fire, rainwater harvesting earthworks were implemented to reduce and sometimes eliminate the need for supplemental irrigation. Fruit trees have been planted with native plants to form a food forest that saves water and sequesters carbon. They have used native plants, which are known to grow best in our climate and provide the most benefit for wildlife and microbiology. Key features at Sky Mountain Permaculture are a native plant guild for fruit trees and implementation of terracing to stabilize a slope below a swale. Sky Mountain Permaculture has also utilized native plants for their different ecological functions. They've used deer weed and yarrow as dynamic accumulators which store nutrients in the soil, deerweed, catclaw acacia, and yankee point ceanothus as nitrogen fixers, elderberry, monkey flower, baccharis, and yankee point ceanothus to attract and support pollinators, and yankee point ceanothus as a ground cover to suppresses weeds and shade the roots of the fruit trees.

Getting Started



The Natural Resources Conservation Service (NRCS) provides financial and technical assistance to America's farmers, ranchers, and forest landowners interested in conserving the nation's soil, water, air, and other natural resources. They were established in 1935 as a response to the Dust Bowl, when the country realized how closely tied the proper management and protection of our natural resources was to the well-being of our people.

NRCS Programs

NRCS supports this work through government funded programs that support land managers with the implementation and management of carbon farming and pollinator friendly practices.



Conservation Technical Assistance Program (CTA)

provides agricultural and forest land managers with a detailed conservation plan for their land.

Participants work closely with an NRCS certified Conservation Planner to ensure they have the knowledge and tools to conserve, maintain and restore the natural resources on their lands and continue to improve their land in the future.



The Environmental Quality Incentives Program (EQIP)

provides financial and technical assistance to agricultural producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, increased soil health and reduced soil erosion and sedimentation, improved or created wildlife habitat, and mitigation against increasing weather volatility.



The Conservation Stewardship Program (CSP)

helps agricultural producers maintain and improve their existing conservation systems and adopt additional conservation activities to address priority resources concerns. Participants earn CSP payments for conservation performance—the higher the performance, the higher the payment.

Stay Connected!

Carbon Farming Info

- [RCD San Diego](#)
 - [Sign up for Carbon Farming Newsletter](#)
- [NRCS Soil Health Resources](#)
- [Carbon Cycle Institute](#)

Pollinator Info

- [Xerces Pollinator Resources for CA](#)
- [NRCS Pollinator Resources](#)
- [San Diego Pollinator Alliance](#)
 - [Sign up for SDPA Newsletter](#)

Carbon Farming Funding

- [NRCS - EQIP](#)
- [CDFA - Healthy Soils Program](#)
- [Zero Food Print - Restore CA](#)
- [Zero Food Print - Compost Connector](#)
- [RCD of Greater San Diego - Request a Carbon Farm Plan](#)

Pollinator Resources

- [Xerces - Habitat Kits](#)
- [Monarch Joint Venture - Free Seed Program](#)
- [Project Apis m. - Seeds for Bees](#)
- [Pheasants Forever](#)
- [Bee Friendly Farming Certification](#)

Carbon Farming Practices for Pollinators

- [Conservation Cover](#)
- [Cover Cropping](#)
- [Field Border](#)
- [Hedgerows](#)
- [Prescribed Grazing](#)
- [Range Planting](#)
- [Reduced Tillage and/or No Tillage](#)
- [Riparian Forest Buffer](#)
- [Riparian Herbaceous Cover](#)
- [Tree and Shrub Establishment](#)
- [Windbreak Establishment](#)

Pollinator Plant Lists

- [Bloom Calendar](#)
- [Xerces Pollinator Seed Mixes](#)
- [Xerces SoCal Plant List](#)
- [NRCS Plant List](#)
- [San Diego Plant List](#)





Our Information was Collected from the Following Sources:

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