

WEA BRIEFING P A P E R S



WILD FARM ALLIANCE

This Wild Farm Alliance Briefing Paper is part of a series that explores many of the issues that define and distinguish the concept of farming with the wild.

Each paper focuses on a particular issue set in the context of reconnecting food systems with ecosystems. We are striving to bridge the gap between stewardship farming and wildlands conservation. To obtain other papers in this series, or to learn more about our programs, contact the Wild Farm Alliance.

WILD FARM ALLIANCE

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Agricultural Cropping Patterns: Integrating Wild Margins

A farm under cultivation, whether irrigated or not, can provide varying degrees of opportunity for wildlife to co-exist in the landscape. In fact, “farming with the wild” can improve the living situation for many wildlife species and make farming interesting without harming economic productivity. In an effort to further understand and apply such practices, agriculturists and conservationists are forming partnerships to study, conserve, and reconnect living native landscapes for the prosperity and diversity of wildlife.

Farms Can Provide for Biodiversity

The essential needs of fish and wildlife are clean water and healthy abundant food near shelter and shade. A farm can provide safe places for mammals, fish, frogs, birds, and other wildlife to live and raise their young. In addition, a sustainable, productive agricultural landscape can offer space and contiguous habitat for wide-ranging species.

Biodiversity Can Also Provide for the Farm

In agricultural systems, biodiversity is essential to the production of food, fiber, and fuel. Naturally diverse, vegetated farm edges perform cleansing and climate regulation services. Vegetative buffers can assimilate and recycle nutrients and break down and detoxify many agricultural chemicals. Intact riparian zones help to regulate hydrology and local microclimates. A biodiverse system tends to naturally protect itself from invasive organisms, reducing the potential for on-farm pest outbreaks. Ultimately, biodiversity provides for those who live and work on the land and contributes to their economic viability.

Turning Point

Agriculture is practiced on two-thirds of the land area of the continental U.S. Unfortunately, trends in industrial agriculture continue to negatively impact our environment. Habitat degradation caused by agriculture affects 38% of endangered species. As wildlife habitats are converted to agricultural uses, hedgerows, windbreaks, and riverfront vegetation give way to expanded annual production fields. Today, more than 50% of the wetlands and riparian zones in the contiguous 48 states have been destroyed.

The widespread use of toxic agrichemicals and synthetic fertilizers contributes to the degradation of wildlife habitat and to the loss of diverse native species. Few pesticides are species specific, so their application affects many more populations than those intended—populations such as beneficial soil organisms, insects, and aquatic and terrestrial species. It is estimated that of the roughly 670 million birds

exposed to pesticides annually in the U.S., 10% are killed each year. Birds and other animals with damaged nervous systems may become disoriented and disperse to places where they cannot reproduce or survive. About 40% of pesticides, the majority still registered in the U.S., can kill birds even when used according to the directions on the label.



A mixture of plant species with different flowering periods and growth habits brings diversity and habitat for beneficial insects into areas of agricultural production.

No farm can be too wild. Rather, a key management question in the very near future will be whether a farm is wild enough. In other words, has the agricultural operation optimized the natural services of a healthy ecosystem that allow it to prosper?

—Daniel Imhoff,
Farming with the Wild

How do we reverse this trend and move toward a sustainable model? How do we understand, document, and influence positive trends in agricultural management?

Biodiversity-friendly farming incorporates habitat into the design and operation of the cultivated farm. Careful management of farmland and soil and water resources connected to uncultivated, wild areas creates habitat and encourages a healthy range of beneficial insects, birds, bats, and other wildlife. Whatever the crop, whatever the size of the operation, wildlife-friendly practices exist that can enhance and improve the farm.

Farm Plan Development

After assessing food, water, and wildlife cover resources, and understanding regional corridor connections, one can create a farm plan to help integrate both perennial and annual production practices. Perennial orchards and vineyards by themselves provide wildlife habitat and can function as buffers between intensively farmed annual cropland and undisturbed wild lands. Perennial crops undersown with ground cover benefit nearby natural drainage and sensitive habitats by reducing erosion and runoff potential. Permanent windbreaks modify climate, and native flowering hedgerows serve as insectaries for beneficial insects.

For annual production, use of cover crops and strip tillage can provide seasonal habitat and alternative food sources for wildlife, while increasing soil fertility, organic matter, and water retention, and reducing weeds and soil erosion. Machine harvesting and other activities that disrupt on-farm wildlife habitat can be timed to minimize impacts, especially during critical breeding and nesting periods.

Planning farming practices to support natural systems reduces negative impacts to surrounding ecosystems and watersheds. One of the easiest ways to ensure this reduction is to avoid converting sensitive habitats to agricultural uses. Another is to use sustainable agriculture and organic farming practices that offer many ways to benefit wildlife, from planting appropriate crops and diversifying and rotating crops on a whole farm scale to reducing inputs of harmful chemicals. Farm managers who use organic methods, integrated pest management, and reduced or less-toxic pesticide applications can maintain non-pest insect populations as forage for birds and beneficial insects, and decrease mortality of other wildlife in general.

Native Plant Communities

Since indigenous wildlife species have co-evolved with native plants, they rely heavily on these resources for food and shelter. Structurally diverse native shrubs, trees, and perennial grasses that mimic natural plant communities provide the most resources to the majority of wildlife. Native plants are well adapted to local climate conditions and growing regions, often require no additional irrigation once established, and are usually naturally resistant to pest pressures.

Restoring habitat using native vegetation that historically occupied a site can prevent the introduction and spread of invasive, non-native species. Moreover, some natives can be relatively inexpensive and easy to propagate if collected from local seed and plant material sources. In short, native plants are climate hardy and often low-cost and low-maintenance options that increase regional biodiversity along field margins.

Conservation Buffers

With vegetative conservation buffers, a farm can be managed to significantly improve soil and water quality. Conservation buffers include everything from field borders, grassed waterways, and contour and filter strips, to windbreaks, hedgerows, and vegetated riparian zones. Over time, these buffers become valuable for stabilizing the soil, trapping sediments, controlling dust and wind erosion, reducing weed competition, increasing water retention, and filtering pollutants.

Leaving margins uncultivated or planting grassed and filter strips on a farm can save time and money while supporting wildlife. Many native perennial grasses have deep roots and can tolerate drought and/or flooding, enabling them to reduce erosion and soil loss while taking up excess nutrients in runoff and leachate. Grassed conservation buffers limit the need for on-farm spraying and ditch cleaning, and most maintenance can be accomplished with mowing, burning, and rotational grazing.

On-farm flowering hedgerows and other native plants support pollinators and other beneficial insects. In all, more than 100 crops grown in the U.S. are insect-pollinated; up to 30% of the average American's diet is made up of insect-pollinated foods. Apples, cucumbers, sunflowers, and strawberries are just a few of the many agricultural crops that rely on insects for complete pollination to produce high yields and the best quality fruits.

Besides providing pollination services, diverse, native insects can benefit a farm by preying on pest populations. Beneficial insects, such as lady beetles, syrphid flies, spiders, and parasitic and predatory wasps, are attracted to flowering plants for pollen, nectar, and shelter. Hedgerows, windbreaks, and naturally occurring native plants provide habitat for beneficial insects that help to control a variety of pest insects including aphids, caterpillars, and mites. In some instances, pests can be attracted to native plantings, but in general, having diverse vegetation with well-established populations of beneficial insects will challenge pressure from migratory pest populations. By preserving and installing native plants along roads, boundaries, fence lines, levees, irrigation ditches, and non-cropped areas, farmers can attract beneficial insects and provide habitat for birds and other wildlife. Entomologists recommend planting and maintaining sequentially blooming flowering plants known to attract pollinators and beneficial predatory insects.

On-Farm Bird and Bat Habitat

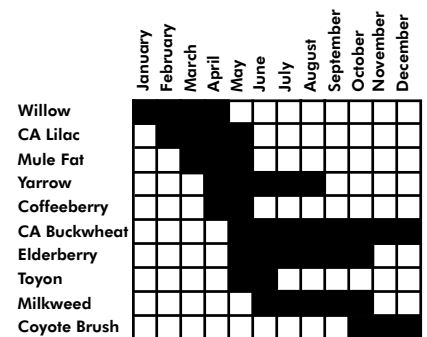
Many birds rely on insects as their primary source of food, while others eat rodents or seeds. Insectivorous birds in Central California coastal apple orchards consume more than three-quarters of the overwintering codling moth pests. Adult barn owls have been estimated to feed their maturing young the equivalent of a dozen mice each per night, if prey is available. Sparrows predominately eat seeds, except when rearing nestlings.



Jack Kelly Clark, University of Calif.

Beneficial syrphid fly adults feed on nectar and pollen from flowering plants as well as honeydew produced by aphids; their voracious offspring will directly attack these soft-bodied pests.

Perennial Insectary Plants with Flowering Periods Designated by Shaded Areas



Sequentially flowering native plants offer pollinators and other beneficial insects nectar and pollen throughout the year, which helps them survive and reproduce (after Bugg et al., 1998).

Although some birds are seen as pests, a 1993 study estimated that only 10 out of 215 migratory species significantly damaged U.S. agricultural crops. By taking over so much of their native habitat, agriculture and other human uses may have unintentionally created these pest species, according to another study.

Bats too attack farm pests; for instance, just 150 brown bats can eat enough each summer to protect farmers from 33 million cucumber beetle rootworm larvae, pests that can cost farmers billions of dollars annually. Loss of natural roosts are some of the most significant threats to birds and bats. Farmers can provide alternative homes by building roosting perches and boxes for birds and narrow slatted-houses for bats.

Timing farm practices can minimize nest disturbance during the breeding season. By delaying machine harvesting, spraying, and plowing until ground-nesting birds have fledged, usually after July 1, we can ensure better breeding success. And saving fields closest to water for the last harvest, where the highest nest densities exist, again allows needed time for nestlings to mature.

Farmers who plant corn, sorghum, and other cereal grains may choose to delay the harvest in order to provide food for birds during the fall and winter. Growers in California's Sacramento Valley allow harvested rice fields to flood in the winter, providing habitat for waterbirds, shorebirds, ducks, and wading birds. Further, this inundation helps to break down the rice stubble, alleviating the need to burn the straw and saving the skies from pollution.

Aquatic Resources

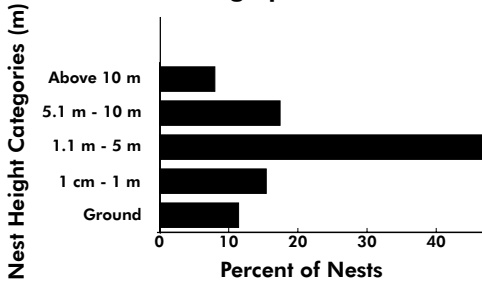
Central to any landscape is water and its attendant vegetation. Riparian areas support more wildlife species than any other type of area because of their complex vegetation structure and proximity to water. These farm areas usually yield the most for wildlife when conserved and enhanced.

Vegetation surrounding rivers, creeks, farm ditches, off-stream ponds, and wetlands can offer wildlife breeding habitat, food, and refuge from the elements. Riparian zones likewise provide natural wildlife movement corridors that follow the meander of streams and enable wildlife to travel without encountering barriers such as roads and developments. Trees in riparian areas play a key role in improving water quality, retaining soil moisture, reducing soil erosion, slowing flood waters, and harboring beneficial insects that help control pests.

Off-stream ponds, when appropriate to the local ecosystem, are some of the most reliable and economical sources of water. Besides providing for wildlife, ponds can contribute to groundwater recharge, capture runoff water and eroding sediments, and provide water for fire fighting, fishing, swimming, picnicking, watering livestock, and irrigating fields. Migratory waterfowl often use farm ponds and wetlands as resting places in their flights to and from the north. Shorebirds, wading birds, certain ducks, and many amphibians also use these seasonal or year-round water bodies as breeding places, particularly where sufficient food supply and emergent vegetation exists, while upland game birds and wide-ranging wildlife use them as watering holes.

Continued on page 6

Where Do Birds Nest? Everywhere! Nesting Habitat Requirements Vary Among Species



More than 25% of birds nest at or below 1 m (~3 ft) (after Pitkin, 2002).



Bats primarily consume beetles, moths, leafhoppers, and other flying insects that cost farmers billions of dollars every year.

Hedgerows & Barn Owls at the Foster Ranch

Curious to discover whether hedgerows could increase biological diversity and augment production on his home ranch, Phil Foster decided to plant two mixed native hedges on opposite sides of his organically managed vegetable fields in the mid 1990s. He made this decision after hearing about Robert Bugg's work in documenting various beneficial insects associated with native shrubs. After observing predatory insects on the newly planted natives, and no destructive impacts to his nearby crops, Foster installed more hedgerows in the following years, for a total of 3,000 feet. Near his house, he planted a windbreak to moderate the strong winds that blow through the San Juan Bautista, California, countryside. Besides attracting beneficial insects, Foster has enticed barn owls to move in by placing nest boxes high above the now 15 foot-tall sequentially flowering hedgerows. During nesting season, many regurgitated pellets replete with gopher and mice bones can be found at the base of the barn owl boxes.

For information, please visit www.pinacleorganic.com or write Phil and Katherine Foster Ranches, P.O. Box 249, San Juan Bautista, CA 95045.



Riparian Conservation Buffer on the Hain Farm

Tres Pinos Creek flows alongside Paul Hain's third-generation family farm in Central California. A well-established, organic cover-cropped walnut orchard, blocks of specialty vegetables, and flowering hedgerows transition to native cottonwoods and willows near the creek's floodplain. Sounds of water, wind rustling through trees, and bird songs fill the air, as chickens scour for insects inside their chicken tractor house.

Hain's knowledge of the landscape helped him respond when the storm of 1998 hit with the force of a 100-year event. After days of torrential rains, the Tres Pinos Creek overflowed its banks and flooded across the land. When the flood waters receded, the Hains saw that the river had completely scoured out 2 acres of their walnut orchard and smothered 7 more acres with roughly a foot of silt.

Knowing that it is best to give the creek room to run its natural course, Paul designed a riverbank stabilization and habitat restoration project that incorporated deposited silt from the orchard and recovered logs and woody debris that had been ripped from the banks. Now anchored, buried, and cabled into the side of the existing bank, the woody debris traps newly deposited sediment and restores complex fish habitat. Moreover, many of the trees are resprouting to shade and stabilize the riverbank, recolonize the floodplain, and provide connectivity of wildlife linkages. Paul and his son have since planted additional cuttings of native plants taken from their farm to fill in the restoration and to provide a live buffer for the farm.

For information write Paul and Leticia Hain, P.O. Box 549, Tres Pinos, CA 95075.



Walnuts



Restored River Bank

Connecting Wildlife Movement Corridors

With less than 5% of U.S. lands in the lower 48 states preserved as wilderness, populations of wildlife species are becoming fragmented. Even though agriculture has displaced much wildlife with its expansive footprint, its very vastness can render connections for species that could not otherwise survive in isolated, disjointed conservation areas. Farmers can work with adjoining neighbors in their watersheds to create and conserve wildlife movement corridors along farm borders or in naturally occurring riparian zones. For further information on wildlife linkages, see the WFA Briefing Paper titled “Making Connections for Nature.”

Reaping the Benefits

- ❖ **Land Values** increase with the presence of aesthetically pleasing riparian habitat on the farm.
- ❖ **Products from Conservation Buffers**, such as edible nuts and berries, firewood, building materials, nursery stock, and medicinal plants are valued in billions of dollars annually.
- ❖ **Windbreaks** can lower home energy consumption by 10–25%.
- ❖ **Hedgerows and Vegetated Buffers**, often placed in prominent locations along roadways and field margins, divide land uses, designate property boundaries, and add privacy.
- ❖ **Conservation Easements** placed on all or part of farmlands can help preserve and diversify regional wildlife habitat and can provide financial benefits to the landowner.
- ❖ **Grants, Cost-Share Programs, and Technical Assistance** available from several government agencies and conservation groups encourage the creation of riparian and wildlife habitat projects on private lands (see the WFA Briefing Paper titled “Linking Conservation with the Bottom Line” for more information).

Supporting Biodiverse Farms

- ❖ **Buy Directly** from biodiversity-friendly farms at farmer’s markets, roadside stands, or by joining Community Supported Agriculture efforts that provide just-picked seasonal produce in weekly boxes.
- ❖ **Patronize Businesses**, such as grocery stores, restaurants, and Internet websites, that promote biodiversity-friendly farm products.
- ❖ **Encourage Your Friends**, co-workers, school system, and local government to promote an environmentally friendly agricultural ethic.
- ❖ **Support Tourism Efforts** that educate visitors about the need for, and benefits of, “farming with the wild.”
- ❖ **Promote Wildlife-Friendly Farms** in community newsletters and on bulletin boards.
- ❖ **Try to Eat One Thing** each day from a farm that chooses to farm as if nature mattered. You can make a difference.

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