



Habitat Conservation: Habitat & Farmlands

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I. INTRODUCTION

With nearly two-thirds of the lower 48 states' land base engaged in some form of farming and ranching activities, agriculture is a dominant force on the U.S. landscape. The importance of vital agricultural production systems for the country and for the world as a whole cannot be over-emphasized. Most obvious are agriculture's immense contributions to both global and regional economies and food and fiber systems. Another often under-estimated value of agricultural lands is the essential habitat linkages well-managed farms and ranches can provide in maintaining healthy ecosystems.

It wasn't by accident that the most biologically diverse and productive lands were settled for agriculture. Choosing places with the best soils, access to water, and beneficial climatic conditions, U.S. agriculture spread from fertile river valleys to converted grasslands and woodlands and

finally to more marginal lands and wetlands. By the mid-twentieth century, agriculture became increasingly mechanized and industrialized. Farms that previously combined row crops and livestock within a matrix of non-cropped areas gave way to



Photo by Gary Randorff.

specialized, monocrop operations that required ever larger areas to operate. Fencerow-to-fencerow conversion of hedgerows, shelterbelts, wetlands, and wildways greatly increased the separation between agriculture and the native

landscape. The ever-expanding production of commodity crops led to decades of low prices. In an effort to survive in an increasingly globalizing economy, landowners resorted to overgrazing, overplanting, overplowing, chemical intensive monocultures, and other forms of land misuse.

Among the many devastating consequences of modern agriculture are

habitat destruction and fragmentation, the displacement of native species and the introduction of exotic species, pollution of terrestrial and aquatic ecosystems, soil erosion, the persecution of predators, the release of genetically modified organisms, and the overexploitation of nonrenewable resources for food production and distribution. According to the US Department of Agriculture's own 1996 statistics, farming activities contributed to 46 percent of species listed as threatened or endangered, and ranching to 26 percent (USDA, *America's Private Lands: A Geography of Hope*, 1999).

Agriculture has also had disproportionate impacts on certain habitats over others. Floodplains-essential to all healthy river systems-have always been attractive to agriculturalists and have been usurped and re-engineered for farming in areas throughout the country. Tens of millions of acres of grasslands have been converted for the

production of grains, while oak woodlands throughout the west coast were cleared first for fruit tree crops and more recently for vineyards. At the same time, those wildlands that we have managed to protect

are not proportionally represented throughout our ecoregions. Instead, protected wildlands have primarily been relegated to high elevation coniferous forests and alpine regions rather than complete sweeps of the landscape.

Today, just under five percent of the land in the continental United States has been protected as roadless wilderness. Many of those protected areas have become too



Photos by Dan Imhoff.

isolated and fragmented to support the diversity of native and migratory species that depend upon them for survival. With so much of the land now in farming and ranching activities, agriculture can and must provide vital linkages between fragmented wildlands and between aquatic and terrestrial habitats.

With the proper incentives, assistance, and resources, farmers and ranchers could be supported to manage their lands more sustainably, and profitably, while protecting conservation values. The integration of native habitats and wildlife on farms and ranches can bring a number of agricultural, economic, and conservation benefits, such as:

- **Yield enhancement** (pollination and biological pest control);

- **Reduction of yield losses** (wind protection, erosion control);

- **Water quality improvements** (sediment filtration, streambank stabilization, water table recharge);



Photo by Robert Payne.

- **Biodiversity protection** (seed dispersal, breeding opportunities, aquatic and terrestrial habitat linkages for native and migratory species);
- **Restoration of previously damaged landscapes** and the protection of remnant intact habitat types;

- **Restoration of ecosystem processes** such as flooding, lightning-ignited fire, nutrient cycling, and predation;

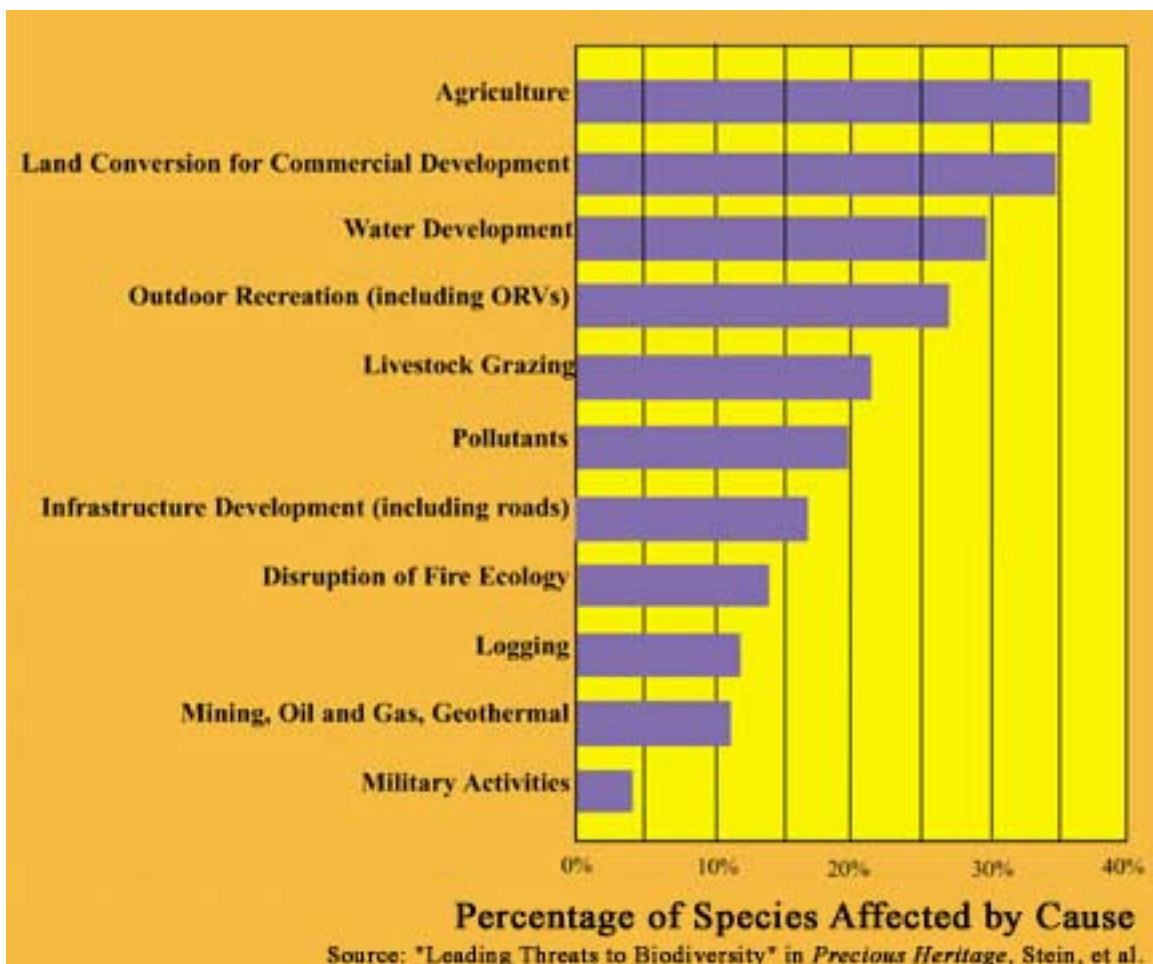
- **Agrotourism opportunities** (bird and breakfasts, fishing and hunting opportunities, farm visits).

II. ISSUES

FARMING THREATENS HABITAT

Agricultural expansion in the lower 48 states has been the leading cause of habitat loss and fragmentation, which in turn remains the primary threat to imperiled and

federally listed species (Stein, Kutner, and Adams, 2000). This ranks farming and ranching as an even greater threat to biodiversity loss than commercial development, pollution from manufacturing, logging, energy exploration, and other



Importance of various forms of habitat degradation.

activities (Bruce A. Stein, et. al., *Precious Heritage: The Status of Biodiversity in the United States*, Oxford University Press, 2000). As a result, there is a direct correlation between our grocery lists and the endangered species list.

Agriculture's most significant impacts concern water and aquatic systems. Water is the life force of all living organisms on the planet, yet nearly 70 percent of the world's fresh water is consumed by agriculture. The natural flow of rivers and streams is being interrupted or depleted and leaves many habitats high and dry. Lakes are shrinking due to diversions, wetlands are drained, tilled, and replumbed, and aquifers are pumped exponentially faster than they can be replenished by annual rainfall.

Consider some of the following statistics:

- While U.S. farmers rely on groundwater for 40 to 45 percent of the irrigation requirements, irrigation techniques are only 50 percent efficient.
- 60 percent of the rivers in the United States have been impaired due to agricultural runoff.

- Manure from animal confinement facilities exceeds the volume of human sewage waste by 130 times, and much of this waste reaches waterways and groundwater untreated.
- The flow of nitrogen and phosphorous fertilizers, pesticides, and other agricultural runoff from the midwestern corn belt into the Mississippi River has created an 8,500 square-mile hypoxic "dead zone" in the Gulf of Mexico, causing fish kills, degradation of coral reefs, and the near collapse of the fishery. This is just one of a number of dead zones that have been identified around the continent.

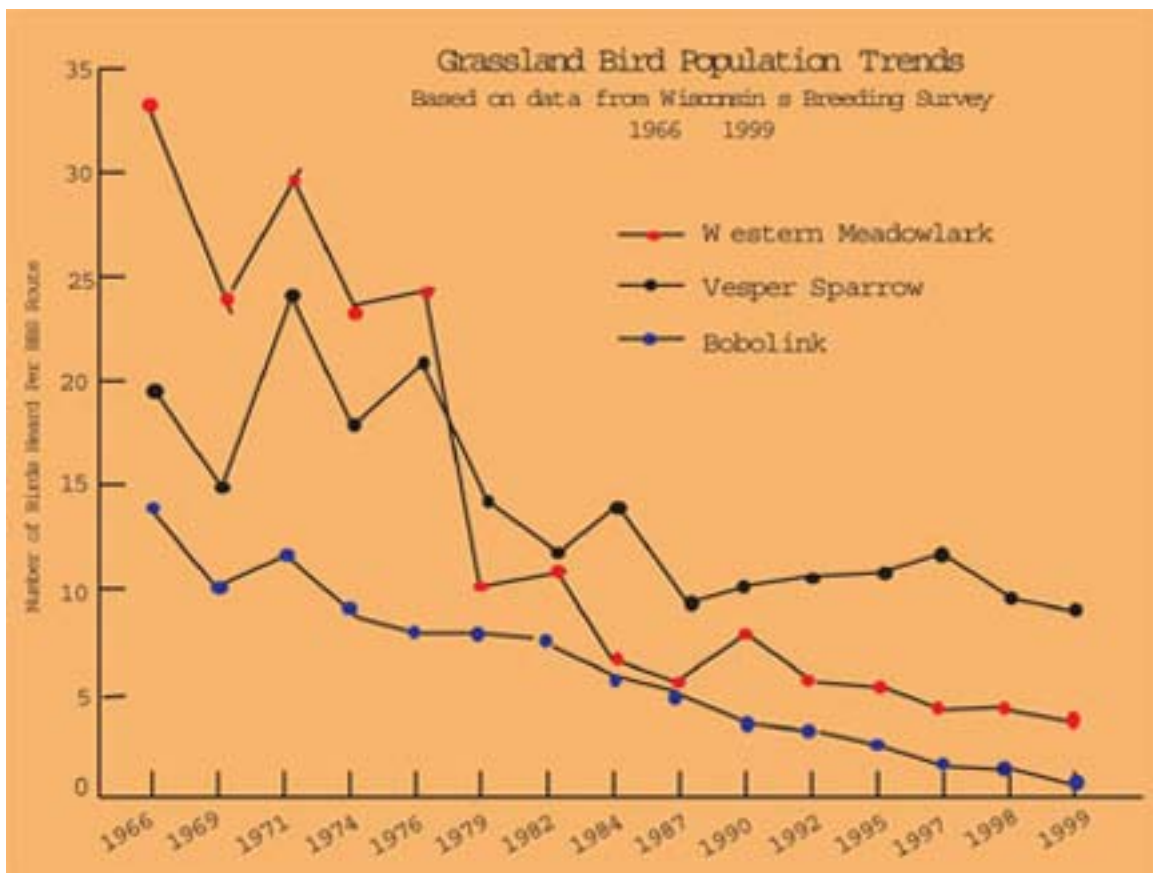
As far back as the late 1930s, Aldo Leopold identified the ideal type of agriculture as "biotic farming." "A good farm," wrote Leopold, "must be one where the wild flora and fauna has lost acreage without losing its existence." (Aldo Leopold, "A Biotic View of the Land," from *The River of the Mother of God and Other Essays*, The University of Wisconsin Press, 1991.) Following Leopold's land ethic, agriculture would take place within a matrix of different habitat types in any given ecoregion. This would require conducting ecological

assessments within a given area to determine what habitat types have been disproportionately affected. Optimal goals would be set to provide at least 30 percent of undisturbed habitat type throughout the ecoregion by preventing the conversion of any intact habitat for production and restoring already disturbed areas.

Integrating large blocks of riparian and associated upland habitats can help facilitate the movement of many species, particularly top predators that play a key role in

regulating an ecosystem's predator and prey population dynamics. Similarly, the transcontinental journeys of migratory birds, insect pollinators, and other species can be aided by the presence of on-farm wetlands and other blocks of habitat that function as critical "stepping stones."

Grassland-dependent birds are among other victims of habitat conversion to massive-scale, industrial agriculture and development. The western meadowlark, for example, was one of Wisconsin's more



Grassland bird population trends.

common birds in the 1960s. Since then, its numbers have declined by over 90 percent (Wisconsin Breeding Bird Survey, 1966-1999). This fate has befallen many of Wisconsin's — and the nation's — grassland-dependent species, such as the vesper sparrow (70 percent decline) and the bobolink (50 percent decline). Other grassland flora and fauna, from plants and insects to reptiles and amphibians, have also experienced significant losses.

FARMING CAN SERVE AS A VITAL LINK FOR HABITAT PROTECTION

Protecting, restoring, and expanding habitats and buffering water bodies within and between farm and ranch boundaries should become a top priority for land owners, conservationists, government agencies, land trusts, and others. Wildlife corridors, protected waterways, and other natural linkages on wildlife-friendly farms and ranches can provide vital conservation benefits, such as clean air and water, clean and stable soils, and varied habitat for native species. However, larger blocks of habitat are needed in addition to buffers and linear features.

Conservation-based agriculture is a landscape approach to farming and ranching that attempts to place an optimum value on food and fiber production as well as the many noncrop services and contributions to healthy rural landscapes. The primary objective of conservation-based agriculture is the creation of economically viable farming and ranching operations that are compatible with wild nature. The expansion of protected and restored natural habitats, in response to careful study of ecosystem health, must become a priority in agricultural regions throughout the country.

Practices such as pasture-based meat production, diversified land use (supplementing field crops with livestock, perennial crops, and woodlots), establishing habitat buffers along river systems, and protecting critical natural areas on and adjacent to farms and ranches help to establish a sense of fluidity or permeability on the agricultural landscape.

A number of different strategies can contribute to a conservation-based farm or ranch plan:

- **Mapping the landscape.** Maps compile the unique characteristics of a given property as well as the lands outside its

borders in the context of the broader watershed or ecoregion. These maps can detail diverse layers of data, such as species surveys, historical land uses, soil types and climatic influences, floodplain patterns, upland and lowland linkages, wildlife movements, and other essential planning information. Landowners can obtain information from state wildlife agencies, Natural Heritage programs, and other sources.

- **Using complementary practices.**

Agricultural practices themselves can directly reflect a conservation ethic. Pasturing, mowing, and planting can be carefully timed to protect breeding habitat. Perennial intensive pasturing systems essentially mimic grassland conditions. Baseline standards for organic farming have been shown to significantly reduce impacts on birds and amphibians. Cultivation practices can also be developed that respect natural processes such as flooding or fire in certain areas.

- **Fish, wildlife and habitat monitoring.**

Monitoring the movements of fish and wildlife on farms as well as within broader rural areas can help set priorities

for conservation efforts. This can be done working with conservation groups and by participating in annual bird surveys, and soliciting biological inventories. An excellent resource is *Monitoring on Your Farm: A Guide to Tracking and Understanding the Resources and Wildlife on Your Land*, available from Yolo County, California. Larger scale habitat monitoring is also important.

- **Providing connectivity.** An individual farm or ranch must be seen as both a stable environment, as well as an integral part of the broader flows of water, fish and wildlife movements, and natural cycles and processes. Connectivity within a farm can be achieved through intentional plantings around and between fields. Tailwater ponds can filter irrigation water as well as providing important habitat. Efforts should be made to link restored and protected habitats to larger patches whenever possible within the broader ecoregion.

- **Preserving and restoring native habitat.** Linkages can be provided by protecting large blocks of intact, undisturbed habitat, by eliminating
-

non-native invasive species, and by encouraging the re-establishment of native vegetation. The North American Native Plant Society is a good resource to get started.

- **Enrolling in conservation incentive programs.** Cost-share programs can be used to help defray the costs of creating wide buffers around cultivation areas or in wetland, grassland, or woodland areas. Long-term or permanent easements can help protect priority habitat from unwanted subdivision or development. Conservation programs can also be initiated to return marginally productive lands to valuable habitat or to protect sensitive or threatened species in an area. [Click here for more information about state and federal incentives programs.](#)
- **Adaptive management.** Conservation-based agriculture is more approach than prescription. Adaptive management embraces this ongoing process with a balance between action and observation, encouraging landowners to "try, monitor, adjust, and try again."

CONSERVATION-BASED AGRICULTURE MUST TAKE PLACE ON A LANDSCAPE SCALE

Optimizing conservation values on individual properties is essential. These individual efforts become multiplied, however, when practices are integrated on a regional or watershed basis. Such community bridge-building may start with farmers, ranchers, conservationists, agency staff, and consumers visiting farms and discussing the important attributes of any given area, forming management teams, and learning from one another. From there, communities of willing landowners, scientific experts, and concerned citizens can begin to identify the models, goals, and benchmarks that lead to regional action.

In the best of all worlds, agriculture would take place within a matrix of different habitat types in any given ecoregion. This will require conducting ecological assessments to determine what habitat types have been disproportionately affected. Ideally, goals will be set to provide at least 30 percent of undisturbed habitat type throughout the ecoregion by:

1. Preventing the conversion of any intact habitat for production; and
2. Restoring already disturbed areas.

Habitat conservation programs may also be initiated by resource agencies and nonprofit organizations working together to develop watershed, ecoregional, or state-level conservation strategies. For example, The Nature Conservancy has developed ecoregional plans for most areas in the United States. All state fish and wildlife agencies must complete comprehensive wildlife conservation strategies by October 2005.

Incorporating farmland restoration into broader strategic planning efforts has a number of important advantages. We have already mentioned that nearly two-thirds of the land is in some form of grazing, haying, or row-cropping. In many areas, agricultural land values remain very low, and many lands are in a somewhat restorable condition.

Farmers, ranchers and conservationists all have a common interest in preventing or controlling the spread of weeds and other non-native invasive species, which are widely recognized as one of the biggest threats to native biodiversity. Farmers and ranchers are on the front line of defense in many areas and the good ones can and do play a critical role in keeping these invaders out of native habitats. In addition, working with farmers and ranchers will be necessary to achieve the scale required to reap the ecological benefits of suitable natural area protection.

A redirection of annual Farm Bill subsidy payments could help make such goals economically possible, and help to achieve the landscape scale necessary to reap the ecological benefits of habitat protection. As a result, emphasizing the conservation incentive programs and eventual appropriations of the next Farm Bill should be a top priority of conservation-minded citizens.

CORE BIODIVERSITY PRINCIPLES

by Jo Ann Baumgartner, director of the Wild Farm Alliance.

Baumgartner is currently working with organic certifying organizations to adopt criteria that define biodiversity protection on organic farms and ranches.

- Consider farmland within a watershed or ecosystem context.
 - Avoid conversion of sensitive habitats to agricultural production or development.
 - Protect threatened and endangered species, species of special concern, and keystone species.
 - Conserve and restore native plants and animals of the production operation, including in and around water bodies.
 - Maintain and restore linkages and connectivity, including large blocks of habitat to strengthen regional networks of conservation areas.
 - Prevent introduction and spread of non-native, invasive species.
 - Take advantage of nature's ecosystem services, such as pollination, pest control, beneficial predation and fire, flood and erosion control, nutrient cycling, and improved water quality and quantity.
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III. EXAMPLES

The nature of conservation-based agriculture has yet to become fully developed, though efforts have been underway in isolated parts of the United States for more than a decade. A number of those inspiring stories and replicable models follow:

- **Malpais Borderlands Group** — large natural areas within farmlands (restored).
- **Threemile Canyon Farms** — large natural areas within farmlands (restored).
- **Hedgerow Farms** — strips and patches of natural habitat between fields.
- **Yolo County Landowner Stewardship Program** — strips and patches of natural habitat between fields.
- **Enchanted Acres** — lands used simulatenously for crops, livestock and wildlife.
- **Methow Valley Conservancy** — linking both aquatic and terrestrial needs.

GRASSBANKING AND FIRE MANAGEMENT

Malpais Borderlands Group

Identified as one of the pioneering organizations in the conservation ranching movement, the Malpai Borderlands Group consists of approximately two dozen landowners whose ranches span nearly a million acres in southwestern New Mexico, southeastern Arizona, and northern Mexico. The group was formed in the early 1990s by ranchers concerned about the long-term effects of state and federal fire suppression and overgrazing that lead to critical invasions of brush and woody species into what had formerly been luxuriant grasslands. At a time when anti-grazing activism had reached a flash point, the Malpai Borderlands Group founders forged an alliance based on the common appreciation for the open space buffers that unfragmented ranchlands provide over ever-encroaching "wildcat" subdivisions. Another unifying concern was that their own activism should be guided by sound science.

The Bootheel Fire Management Plan

Among the group's initial concrete efforts was the establishment of the Bootheel Fire Management Plan. Based on five years of scientific research and lobbying as well as consultation with agencies and private landowners, the plan identified landowners within the region who were willing to allow (or consider allowing) lightning-ignited and prescribed wildfires to burn within their properties as a means to reduce shrub encroachment and rejuvenate grasslands. A simple, color-coded "fire map" compiled owner names, boundary lines, and contact numbers. The color coding explained whether fires should be left to burn, be put out, or if the landowner would like the opportunity to decide. Today, as a result of this initiative, tens of thousands of acres of grasslands now benefit from the natural pulses of summer fires.



Over 137,000 acres of grassland on the Gray Ranch have benefitted from the reintroduction of natural or prescribed fires. Photo by Pam Porter.



Animas Valley. Photo by Dan Imhoff.

Grassbanking

Another important community initiative developed by the Malpai Borderlands Group is the "grassbank." With neighboring ranchers experiencing a number of consecutive years

of serious drought conditions, Malpai Borderlands Group co-founder Drum Hadley offered grazing allotments on the Gray Ranch as a regional safety valve.

These short-term conservation easements permitted neighboring ranchers to move their cattle to the abundant grasslands of the Gray Ranch, while restoring their own pastures from the ill effects of overgrazing. In return for the grazing privileges, grassbank participants enrolled selected lands in

permanent conservation easements to protect against subdivision. With an emphasis on protecting unfragmented habitats, the group's grassbank program has allowed tens of thousands of grasslands to be reseeded and

rejuvenated by fire, and registered 42,000 acres in conservation easements. It is a model that has been replicated as a regional conservation tool in various communities, but should be carefully studied to optimize grassland restoration rather than to maximize grazing in arid regions.

LARGE NATURAL AREAS WITHIN FARMLANDS

Threemile Canyon Farms, Columbia Basin, Oregon

For years a battle was brewing in a remote corner of northeastern Oregon between conservationists and agricultural and development interests. At stake were water rights to the Columbia River and a large area of undisturbed shrub-steppe habitat critical to a number of imperiled species, including ferruginous hawks, loggerhead shrikes, sage sparrow, Washington ground squirrel, and several threatened species of salmon.

Decades earlier, the Boeing Corporation had leased the land from the state in hopes of

establishing a high-tech aerospace industrial park. Instead, they ended up subleasing the land to farmers, who converted much of the shrub-steppe into circle-pivot irrigated farmlands. In the mid-1990s, expansion plans proposed what conservationists considered excessive water withdrawals from the Columbia River. After years of legal wrangling, a large North Dakota-based agribusiness arrived that was interested in

purchasing the 93,000-acre property for an intricate mix of complimentary uses but was also open to protecting its extremely important native habitat values.



Washington ground squirrel.
Photo by Geoff Pampush.

The R.D. Offutt Company, a large potato producer based in Fargo, North Dakota, saw the opportunity to expand its operations. As a complement to the vagaries of food commodity markets, however, they planned to diversify potato production by teaming up with a large Bakersfield, California-based dairy operation, Bos Family Oregon Farms. Under their plan, the operation would milk up to 15,000 dairy cows, grow enough potatoes to feed seven

million people, and raise the necessary alfalfa and corn for the dairy animals.

In order to do its part to protect one of the most threatened areas in Oregon, the newly named Threemile Canyon Farm also agreed to two critical conservation efforts. First, under a negotiated settlement with conservationists, they set aside 23,000 acres of undisturbed of juniper and sage habitat—one-fourth of the property's 145 square miles—in permanent protection under the The Nature Conservancy's management. That land was contiguous with already protected habitat on a property managed by the U.S. Navy as a bombing range. Second, they consented to using only half of the Columbia River water originally requested. This would keep 120,000 acre-feet of water annually in the river, the rough equivalent of enough water to serve 120,000 households in a year.



Native habitat on the Boardman Grassland Preserve. Photo by Bruce Taylor.



Crops and native habitat on the Threemile Canyon Farm. Photo by Bruce Taylor.

The farming and business plan rolled out by Threemile Canyon Farm also seemed far-sighted in its attempt to recycle and optimize on-farm resources. At the center of the plan was a strategy to mitigate the

hazards of compounding so much manure from such a large number of confined animals. With a \$15 million bond initiative, the farm created a plant to convert solid and liquid waste into methane gas which in turn generates electricity to supply the operation and sell excess power to the consumers in the surrounding region.

The remaining manure is applied to the potato and forage operations as fertilizer. In addition, any skins or crop residues from the potato operation become feed

for the dairy cows.

As luck would have it, just as Threemile Canyon Farm was devising a marketing strategy for its dairy operation, the western

Oregon-based cheese maker Tillamook was facing a milk shortage. While demand for its cheese was expanding among supermarket consumers, its cooperative of producers in Tillamook County on the Oregon coast were nearing capacity. From the milk produced on Threemile Canyon farm, Tillamook expects to produce an additional 58 million pounds of cheese each year, almost as much as it now makes in Tillamook County.

To their credit, the farm's managers have not overlooked the vulnerability and value of the essential habitat they have set aside. According to Defenders of Wildlife Oregon Biodiversity Program Director Bruce Taylor, the shrub-steppe is extremely susceptible to fire. "Once the natural habitat is burned in this very arid ecosystem, invasive species now almost immediately take over," says Taylor. As a result, Threemile Canyon managers have been diligent about reseeding the borders of crop circles with native plant species and implementing aggressive fire protection measures. The farm also provides funding and in-kind assistance for

The Nature Conservancy's management of the 23,000-acre conservation area.

In 2003, the farm entered into a multi-species candidate conservation agreement with the U.S. Department of the Interior that formalizes many of its conservation commitments.

STRIPS AND PATCHES OF NATURAL HABITATS BETWEEN FIELDS



Hedgerow farms, Winters, California.

Photo by Roberto Carra.

***John Anderson,
Hedgerow Farms, Winters,
California. Audubon
California's Yolo County
Landowner Stewardship
Program***

In an industrial agricultural region of California's Central Valley, a county-wide movement is under way to reverse decades of "clean" farming practices. Yolo County's conservation-based agriculture movement began like many initiatives around the country, with the efforts of a few brave individuals. Twenty years ago, unsatisfied with a landscape devoid of native habitat along ditch banks, between fields, and along roads, John and Marsha Anderson began

bringing the edges of their 500-acre Hedgerow Farms back to life.

"A weed-free farmscape doesn't have to mean vegetation-free," explains Anderson, a long-time outdoorsman and now retired veterinarian.

Anderson devoted himself to studying California's original oak savanna ecosystems. In low-lying areas along the slough that runs through the property he established seasonal wetlands. He built tailwater ponds at the bottom of furrow-irrigated fields to filter water and runoff. Eventually, some 50 species of native perennial grasses, forbs, rushes, shrubs, and trees were planted around field borders, roadsides, riparian areas, and other unused strips of the farm. Two decades later, beavers, predators, dozens of bird species including three types of owls, and up to ten threatened or endangered species find haven at Hedgerow Farms.



Photo by Roberto Carra.



Photo by John Anderson.

Hedgerows planted between fields provide a succession of nectar and pollen sources for beneficial insects and pollinators. Research scientists from the University of California found that the native hedgerows

contributed positively to the farm's output. The Yolo County Resource Conservation District also took notice of the important habitat restoration underway and began developing both expertise and cost-share funds to support regional landowners. Eventually the Willow Slough Watershed Integrated Resources Management Plan was generated to identify measures to prevent biodiversity loss and the degradation of

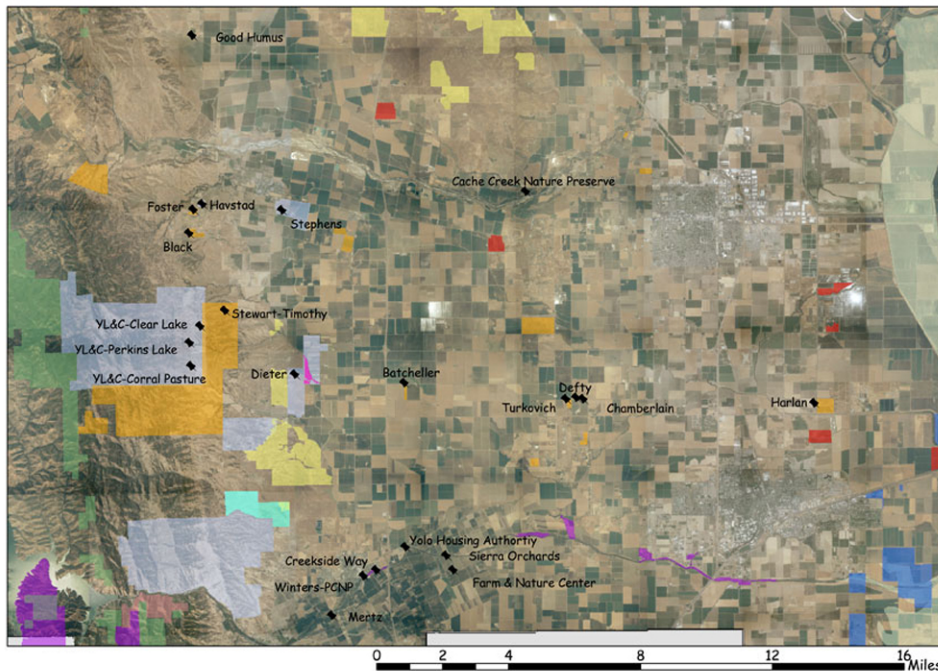
water quality in the Putah-Cache Creek bioregion.

Inspired by the efforts at Hedgerow Farms, more of the county's farmers and ranchers initiated restoration projects on their properties. With grants from CALFED (the state and federally financed watershed

enhancement program), Audubon California, and the Yolo County Resource Conservation District, over 20 projects are completed or are underway. Partnering with land owners, local agencies, and other groups, the county now has an ambitious plan to create habitat linkages on both public and private lands throughout this largely rural area on the boundaries of urban expansion. These efforts will protect riparian areas and link critical upper rangeland habitats as well.

Throughout the county, many cost-share programs use restoration projects as opportunities for hands-on learning as well as field visits for students with limited access to rural areas. Plantings of perennial grasses, prescribed burns for weed and vegetation control, installation of riparian corridors, tailwater ponds and stock ponds, and revegetation of irrigation canals and waterways are becoming standard practices throughout the region. The Student and

SLEWS Sites and Conservation Lands of Yolo County



- Legend**
- ◆ SLEWS Sites
 - Bureau of Land Management
 - Davis Open Space
 - Department of Fish and Game Land
 - LCD Management Areas
 - Conservation Reserve Program
 - Wetland Reserve Program
 - Environmental Quality Incentives Program
 - Wildlife Habitat Incentives Program
 - Other Conservation Participants
 - Conservation Reserve Enhancement Program
 - Yolo Bypass

Data Sources:
 Mr. STD Orthophoto Imagery:
 National Cartography and Geospatial Center,
 U.S. Department of Agriculture,
 Natural Resources Conservation Service,
 Fort Worth, TX.
 DfS, BLM, and UC Natural Reserve System Data
 Provided by the Office of Resource Management
 and Planning, University of California, Davis.
 Map produced by Woodland Service Center, CA.



Landowner
 Educational
 Watershed
 Stewardship
 (SLEWS) project
 brings students
 from local schools
 to participate in
 habitat plantings
 and monitoring
 efforts up to 50
 days per year. These
 are hosted by the
 Audubon California
 Landowner
 Stewardship
 Program.

LANDS USED SIMULTANEOUSLY FOR CROPS OR LIVESTOCK AND WILDLIFE

***Art Thicke, Enchanted Acres,
grass-pastured dairy, southeastern Minnesota
(in collaboration with U.S. Fish and Wildlife on
grassland bird protection)***

In the blufflands of southeastern Minnesota, a few miles from the Mississippi River, lives a farming family that cares almost as much about resident prairie birds as they do about their modest herd of carefully bred Ayrshire dairy cows. Owners Art and Jean Thicke prefer the Ayrshires because they are hardier, lighter in weight, and longer-lived than conventional Holsteins. By frequently rotating the herd between pastures, they can also maintain critical breeding habitat for many at-risk songbird species, such as meadowlarks, bobolinks, dickcissels, and savanna and vesper sparrows.

Unlike the Thicques' rotational pasture management approach, the meat and dairy livestock industry is dominated by confined,

grain-fed systems. Awareness has been increasing about the value of more traditional pasture-based systems, for a variety of reasons: (1) sickness of animals from industrial confinement conditions; (2) pollution of waterways from untreated manure ponds; (3) health hazards to consumers and communities; (4) a dependence on antibiotics, growth

hormones, and genetically engineered crops to maximize quantity over quality.

Grain-fed livestock production dominates U.S. agriculture with some devastating consequences. The majority of the top three U.S. crops — corn, soybeans, and hay — are largely dedicated to fattening livestock. In addition, an estimated 13 percent of the ocean's wild fish harvests are diverted to cattle rations.

Midwestern prairies that hold the vast potential to support free-ranging livestock (and native game set amidst a matrix of grasslands, wetlands, savannas, and forests) have been converted into an ocean of corn and soybeans. The impacts of soil loss and chemical use in industrial monocultures are



Dairy farmer Art Thicke (left) and USFWS biologist Tex Hawkins discuss grass pasture systems. *Photo by Dan Imhoff.*

enormous. And more than a thousand miles away in the Gulf of Mexico, as a result of industrial corn and soybean production and concentrated animal feedlot operations (CAFOs), excess nutrients draining into the Mississippi River have generated an 8,500 square mile "dead zone," almost completely depleted of marine life.

The Thicket's intensive rotational management system is based on maintaining a balance between activity and rest. The 90 acres of hilly pastures on Enchanted Acres have been divided into 42 grazing units, approximately 2-acres in size. The 90-plus cows in the dairy herd are usually moved twice per day. By carefully responding to changing conditions on the land, as well as to the pulses of wildlife, the Thicket has created a stable ecosystem within which to make their living as productive farmers. No chemical fertilizers or herbicides have been applied to the pastures for 25 years, and the land hasn't been plowed in 15 years. And while alfalfa, corn, and soybean farms throughout the Midwest lose topsoil to erosion on an annual basis, living



Photo by Dan Imhoff.

pastures such as these keep soil from washing away and preserve healthy hydrological cycles, much like the prairies that sprang from the glacial silt deposits that characterize the region's fairly fragile soils.

In fact, the Thicket has been operating their grass-fed dairy since long before "management-intensive" rotational grazing systems became popular. Their approach is based largely on intuition rather than prescribed management techniques, and the results are healthy animals that live a noble life among other species in the biological community.

Grassland-dependent birds are among other victims of habitat conversion to massive-scale, industrial agriculture and development. The western meadowlark, for example, was one of Wisconsin's more common birds in the 1960s. Since then, its numbers have declined by over 90 percent (Wisconsin Breeding Bird Survey, 1966-1999). This fate has befallen many of Wisconsin's-and the nation's-grassland dependent species, such as the vesper sparrow (a 70 percent decline) and the bobolink,

(a 50 percent decline). Other grassland flora and fauna, from plants and insects to reptiles and amphibians, have also experienced significant losses. Turn to page 6 for a grassland bird population trend graphic. For more information, view these websites: www.grazeonline.com/thicke.html www.eatwild.com.

LINKING BOTH AQUATIC AND TERRESTRIAL NEEDS

Watershed and upland habitat corridor, Methow Valley Conservancy, Northeastern Washington

Planning for broad-scale habitat linkages at the regional level is a rare and beautiful thing. In a remote farming valley east of the Cascade Mountains in northern Washington, one such effort began with a songbird survey. In the winter of 2001, the Methow Conservancy sent landowners in the Methow River watershed a letter asking if they were willing to participate in a study to map critical habitat for endangered birds. An added incentive for the first 25 who registered was a brand new Sibley's birding guide. Much to their surprise, nearly one-third of the 225 owners contacted agreed to participate in the program.

Biologist Katharine Bill, along with biologist Kent Woodruff and former Methow Conservancy director Brad Martin began by creating a scoring system with which they could qualitatively assess habitats. The score



Western entrance of the Methow Valley. *Photo by Dan Imhoff.*



The snowmelt-fed Methow River. *Photo by Gary Randorff.*

sheet established a matrix of six different species in cottonwood forested banks of the riparian bottomlands and in shrub-steppe upland habitats. The team hoped this approach would produce a more complete

picture of various species and their different habitat needs on a given property.

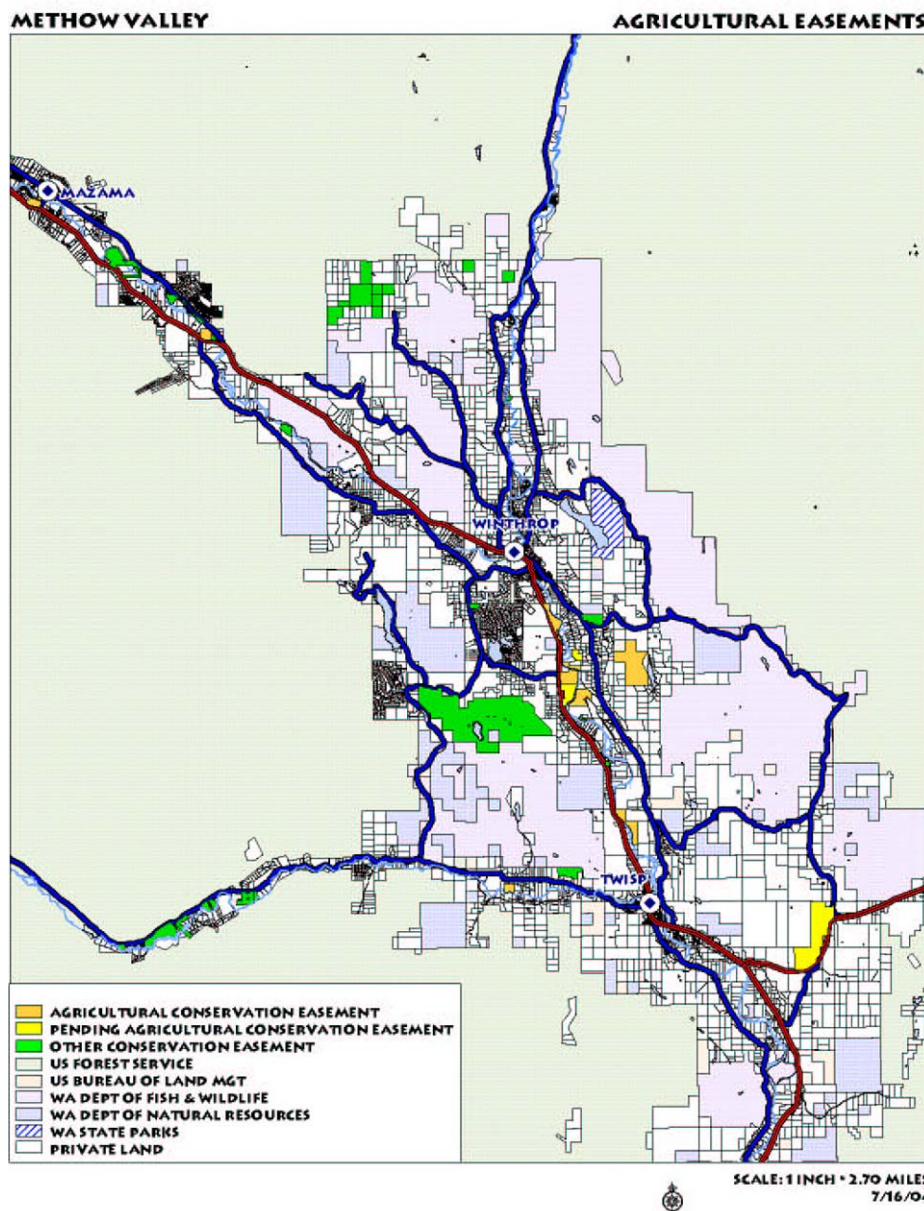
Conducted over the summer months, the survey examined 7,000 acres. The individual scorecards for each property were then used to generate a color-coded map identifying priority habitats throughout the valley. With

the goal to protect pristine habitat and to connect the bottomlands through the uplands with linkages and patches of contiguous habitat, this map became invaluable in ranking priority properties.

"Our goal is to keep common birds common and to protect what is rare," says

Bill, a Yale-educated biologist and avid rock climber who now directs the Methow Conservancy.

The conservation easement was one of the primary tools the Conservancy used, along with a program for habitat restoration plantings. The timing of the effort couldn't have been more opportune. In the summer of 2002, they received nearly \$2 million to purchase perpetual easements for development rights and to assist owners in restoring habitat. For landowners and the



regional in general, there were a number of objectives for using easements as a conservation tool: (1) to protect farmland; (2) to preserve open space; (3) to lower taxes; and (4) to prevent subdivision.

Three years later, the Methow Conservancy had succeeded in negotiating more than 30 easements protecting over 3,000 acres of land in four categories: (1) riparian; (2) forest; (3) agricultural land; and (4) shrub-steppe. The project spans from Mazama to Twisp and includes easements along the Methow, Twisp, and Chewuch rivers. By the end of 2004, the conservancy expects to have 15 easements enrolled in its Farm and Ranchland Protection Program alone, totaling over 800 acres.

The Methow Conservancy also offer baseline surveys, annual monitoring and landowner outreach, and stewardship planning. And to think it all began with an aspen woodland songbird survey.

NON-LETHAL PREDATOR MANAGEMENT

Predator Friendly Ranching, Lava Lakes Ranch, Idaho



Pioneer Mountains.
Photo by Mike Stevens.



Little Wood River drainage. *Photo by Mike Stevens.*

Ranching commands a staggering acreage of both private and public lands throughout the arid West, despite its relatively small output to the overall conventional livestock industry. For example, grazing takes place on 300 million acres of public lands in the western states alone, even though less than 5 percent of all beef is produced on those lands. Still, ranching remains an essential component of land use in the West and ranchers wield significant political

clout even in the face of a number of conditions that necessitate urgent change in order to maintain biodiversity on these lands.

Grazing over long periods of time in areas of inadequate rainfall results in severe impacts on the land. Soils become

compacted. Scarce seed banks are consumed rather than regenerated. The ability of ground water reservoirs to replenish themselves becomes interrupted. In addition, large predators — from coyotes, to bears, mountain



Gray wolf. *Photo by Hank Fischer, Defenders of Wildlife.*

across the country at a taxpayer cost of over \$10 million per year.

Change is underway, however. Drought cycles, poor economics, and ageing ranching populations are forcing many people out of business. Awareness is growing about the importance of protecting large unbroken acreage from subdivision and other uses. Concerns about health dangers from the conventional animal factory system is driving consumers toward grass-fed, antibiotic-free, and hormone-free, organic meat and dairy

lions, and reintroduced wolves — are persecuted in the name of protecting an increasingly fragile ranching economy. This includes over 200 coyotes hunted and poisoned daily

products. Interest is rising in developing economic incentive packages to protect or retire certain lands that are inadequate for grazing. Hard work is being done to actually create a "wildlife economy" in many areas of



Little Wood River drainage. *Photo by Mike Stevens.*

the arid West that may one day include free-ranging bison herds as well as a matrix of protected critical habitats within working landscapes.

Lava Lake Land and Livestock:

Ranching with Lions, Wolves, and Bears

Lava Lake Land and Livestock is a recent emerging example of a large private ranching initiative that attempts to balance agricultural production with high standards for biodiversity protection. Located in south-central Idaho, the ranch is bordered on two sides by the Craters of the Moon National Monument, and

on a third by one of the lower 48 states' largest roadless areas. Begun in 1999 with the purchase of a 24,000-acre historic sheep and cattle operation, the ranch is now comprised of noncontiguous blocks of nearly 750,000 acres. Federal grazing allotments that span several habitat types comprise the vast majority of this acreage, from the Snake River Plains through the foothills to mountaintops, including the uplands of several major river drainages.

Understanding the enormous biological values of this sagebrush steppe landscape began with a comprehensive vegetation and species study conducted by veteran range ecologist Alan Sands. From those baseline studies, a series of plans were initiated to protect critical habitats, restore impaired riparian areas, and establish long-term monitoring projects. The region itself serves as a vital linkage for numerous wide-ranging species, including elk, deer, wolverines, coyotes, mountain lions, black bears, wolverines, lynx, and, occasionally, reintroduced gray wolves. Efforts to protect rare plant communities, songbirds, reptiles,



Sheep band trailing through Picabo. Photo by Mike Stevens.

amphibians, and the sage grouse have also been undertaken.

Part of the balancing act of managing the land both for economic viability and conservation values means maintaining approximately 8,000 sheep on various pastures. Mike Stevens is a former Nature Conservancy field biologist who now heads up Lava Lake Land and Livestock. He works with a team of shepherds who carefully

monitor flocks as well as wildlife movements and other variables. Stocking levels are kept flexible to maximize mobility and adjust to conditions on the land, including drought, fire, and the presence of predators. Lava Lake Land and Livestock has also adopted a non-lethal approach to controlling predators, which occasionally cause problems with the flocks.

Traditional techniques are being used, such as the introduction of Great Pyrenees guard dogs, or the experimentation with "fladry"-the hanging of fabric strips in long lines to deter coyotes. The movement of the flags scares them for a time until they eventually habituate to it. Stevens and his

team of Peruvian shepherds have also worked closely with various agencies in response to the occasional appearance of reintroduced gray wolves. The shepherds are armed with guns loaded with rubber bullets and noise-making shotgun shells in the event that predators do appear. Flyovers have been increased to track wildlife movements. Perhaps most importantly, livestock are kept away from any known or suspected denning areas.

Among the many impressive achievements that Lava Lake Land & Livestock has made in its short existence has been its choice of active board members.

The board combines a depth of experience in conservation biology with advisors such as Reed Noss and Bob Unnasch; with on-the-ground knowledge from conservation-minded ranchers such as Greg Simmons, a veteran ranching consultant with a strong record of keeping ranching operations in the black with increased biodiversity values; Ben Brown of the Gray Ranch in New Mexico, and Becky Weed, a rancher and co-founder of the Predator Conservation Alliance.

Visit these links for more information:

www.predatorconservation.org

www.lambandwool.com

IV. BENEFITS AND CHALLENGES OF MANAGING FARM LANDS FOR HABITAT VALUES

POTENTIAL BENEFITS TO LANDOWNERS

- Enhanced wildlife habitat
- Pollination (enhanced yields)
- Biological pest control (reduced yield losses)
- Wind and snow protection
- Erosion control and sediment filtration (improved water quality)
- Lower long-term maintenance costs
- Aesthetic values
- Predation reduction
- Additional income
- Farmland protection
- Buffering against genetic contamination or chemical drift
- Community interaction and support
- Enhanced public image
- Cost-share opportunities
- Better market perception
- Increased land values

POTENTIAL CHALLENGES

- Short-term costs of resources and money
- Time commitment
- Can potentially attract and host unwanted pests or weeds
- Depending on practices, may require taking some land out of production
- Need for technical expertise and monitoring
- Access to programs
- Confusing array of programs

TEN WEB SITES WORTH EXPLORING

Wild Farm Alliance is a leading advocacy organization working to promote agricultural systems that honor wild nature, <http://www.wildfarmalliance.org>

Chesapeake Bay Foundation is dedicated to restoring the health of the Chesapeake Bay by working with agricultural landowners to improve water quality on critical watersheds, <http://www.cbf.org>

Quivira Coalition works to promote western ranching practices that are ecologically and economically sustainable, <http://www.quiviracoalition.org>

Salmon Safe is a Northwest ecolabel organization working to minimize or eliminate harmful chemicals and sediment from farms, ranches, and publicly managed properties into waterways that support salmonid fish species, <http://www.salmonsafe.org>

Bat Conservation International is a science-based organization that works for the protection and restoration of native bat populations, <http://www.bci.org>

North American Pollinator Protection Campaign is an organization focused on educating about the importance of protecting and restoring native habitats for pollinating insects, birds, and bats, <http://www.nappc.org>

The Wildlands Project aims to protect and restore that natural heritage of North America through the establishment of a system of interconnected wildlands, <http://www.twp.org>

The Occidental Arts and Ecology Center is a model of small-scale, organic horticulture combined with conservation biology and an emphasis on community involvement and teaching, <http://www.oaec.org>

Appropriate Technology Transfer for Rural Areas provides technical assistance to farmers, extension agents, market gardeners, agricultural researchers, and other agricultural professionals, <http://www.attra.org>

American Bird Conservancy is dedicated to the conservation of wild birds and their habitats, <http://www.abcbirds.org>

V. RECOMMENDED READING

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- Imhoff, Daniel, *Farming with the Wild: Enhancing Biodiversity on Farms and Ranches*, Watershed Media/Sierra Club Books, 2003.
- Jackson, Dana and Laura Jackson, *The Farm as Natural Habitat: Reconnecting Food Systems with Ecosystems*, Island Press, 2002.
- Logsdon, Gene, *All Flesh is Grass: The Pleasures and Promises of Pasture Farming*, Swallow Press, 2004.
- Sayre, Nathan, *The New Ranch Handbook: A Guide to Restoring Western Rangelands*, Quivira Coalition, 2001.
- Wrynski, Jeanette, *Monitoring on Your Farm: A Guide to Tracking and Understanding the Resources and Wildlife on Your Land*, Yolo County Resource Conservation District, 2002.
- Yolo County Resource Conservation District, *Bring Farm Edges Back to Life!* Yolo County Resource Conservation District, 2001.
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