Conservation Plantings on Farms

CA Small Farm Conference

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Hedgerows and Farmscaping
Birds, Snakes, Lions and School Children

Conservation Practices: Ways Farmers are Using Vegetation

- Hedgerows
- Grassed Waterways
- Filter Strips
- Riparian Plantings
- Windbreaks
- Beetle Banks

Native Plant Hedgerow

Perennial Grasses In Ditch for Erosion and Weed Control

Grass Filter Strip between Field and Hedge

Windbreak, using Redwood, Incense Cedar, Pepper Tree, Giant Sequoia, Soapbark Tree, Strawberry Madrone

Beetle Banks- Perennial Bunchgrasses Providing Habitat for Pest Predators

Riparian Planting

Conservation Practices:
Ways Farmers are Using Vegetation

Hedgerows, Grassed Waterways, Filter Strips,
Riparian Plantings, Beetle Banks, Windbreaks

Functions:
- Soil erosion control
- Weed control
- Beneficial insect and pollinator habitat
- Wildlife habitat
- Sequester carbon
- Non-point source water pollution reduction
- Air quality and dust control
- Barriers
- Riparian stabilization
- Windbreak and climate modification
- Aesthetic value
- Economic returns
- Increase in local and regional biodiversity

Buffering Climatic Extremes – Making Farms More Resilient

FUNCTIONS OF CONSERVATION PLANTINGS:

- Protecting, building soils
- Increasing water infiltration
- Erosion control
- Creating habitat and corridors for beneficial insects, pollinators and other wildlife
- Sequestering carbon
- Protecting from winds and climatic extremes
- Increasing biodiversity

Hedgerows In England

Dust Bowl, Kansas

Hedgerow at John Anderson's Farm, Yolo Co.: Wild Rose, Toyon, Redbud

Life Zones of California

Elevation
Rainfall
Climate
Biota

FIGURE 3 Life zones of California.

Zones

Boreal-alpine
Transition-mountain
Upper Sonoran-foothill
Lower Sonoran-valley

Non-Native Plants = Little Food

Alien Plants Attract Fewer Insects, Thus Fewer Birds

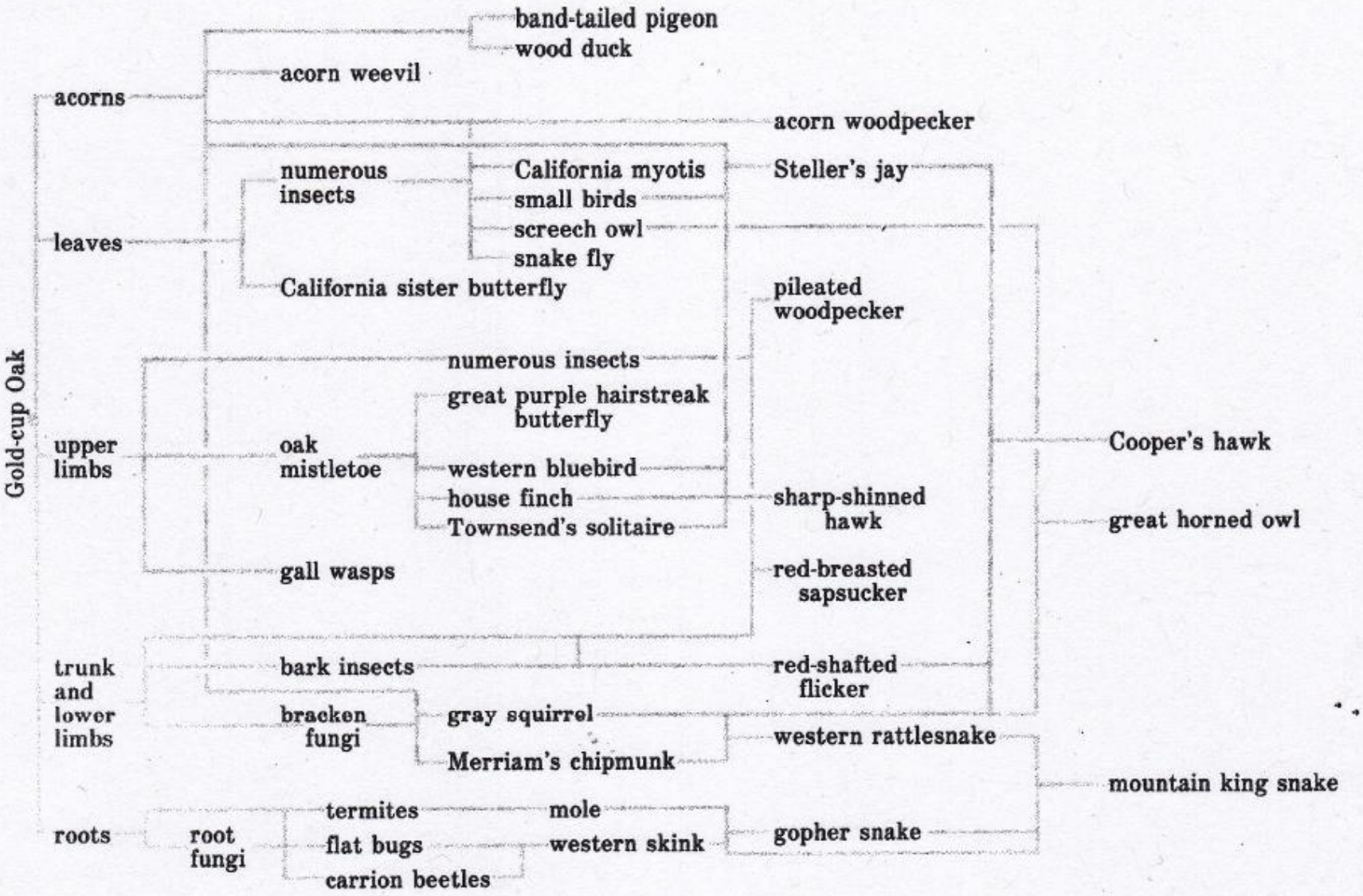
Directory of Native Plant Nurseries

www.calscape.org

Coast Live Oak *Quercus agrifolia*

Do you think it supports any biodiversity?

Flow Chart: The Gold-cup Oak and Various Associated Consumers



Flowering Chart over One Year

Known Pollen and Nectar Sources for Beneficial Insects

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Willow spp.	■	■	■	■	■							
Ceanothus spp.		■	■	■	■	■	■	■				
Yarrow			■	■	■	■	■					
Elderberry			■	■	■	■	■	■	■			
Coffeeberry				■	■	■	■					
Hollyleaf Cherry				■	■							
Toyon					■	■	■					
Buckwheat spp.					■	■	■	■	■	■	■	■
Deergrass					■	■	■	■	■			
Saltbush, Fourwing					■	■	■	■				
Milkweed					■	■	■	■	■	■		
Goldenrod							■	■	■	■	■	
Coyote Brush	■							■	■	■	■	■

Good Site for a Beneficial Insect Hedgerow

Hedgerow 7 Years Old: Ceanothus, Coffeeberry, Baccharis, Elderberry, Toyon

Short Flowers and Shrubs on Berm:
Attract Insects, Replace Weeds and Prevent Erosion

Hedgerow on Strawberry field, 18 months old

Providing Barrier, Dust Protection

Two-row hedgerow

Three-row hedgerow

Bare Soil, no Habitat in Central Valley

Layout, Compost, Planting
November 2008

Watering in, with Wand

One Year's Growth

Eight Years Later

Hedgerows creating habitat

Placing Bee Hives near Hedgerow

Planting on a Berm or High Bed

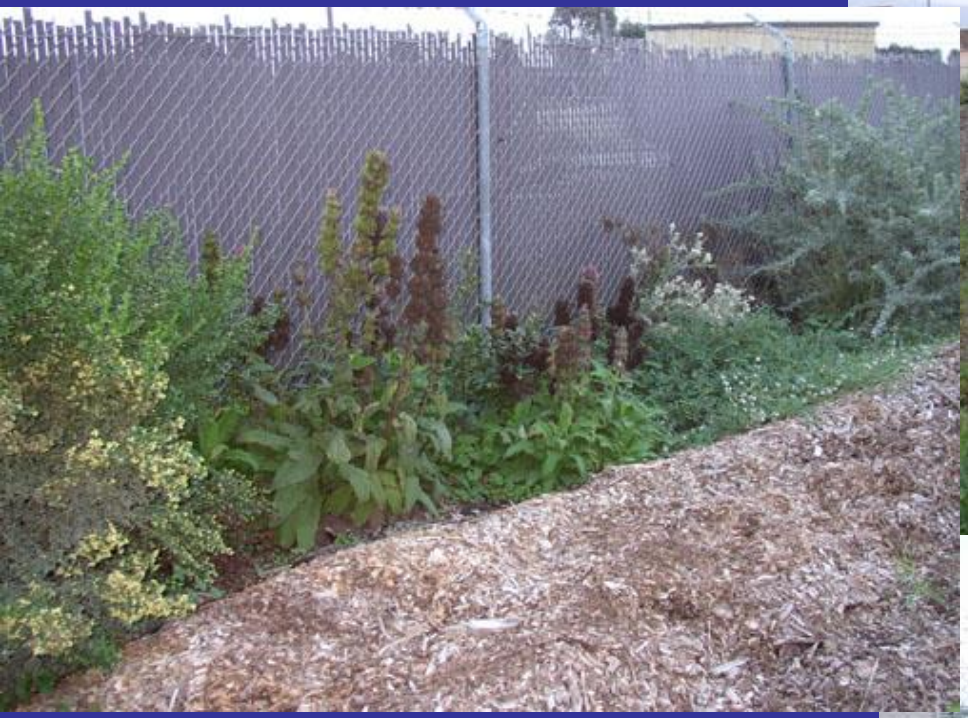
Alyssum as Insectary, Weed Control

Use of Weed Fabric in Hedgerow

Solarizing beds to kill weed seeds

Using Mulch to Control Weeds And Regulate Moisture

Mulched Hedgerow



Mulch:
Smothers Weeds
Conserves Soil Moisture

Mulching for Weed Control and Retaining Moisture

Site Preparation & Planting

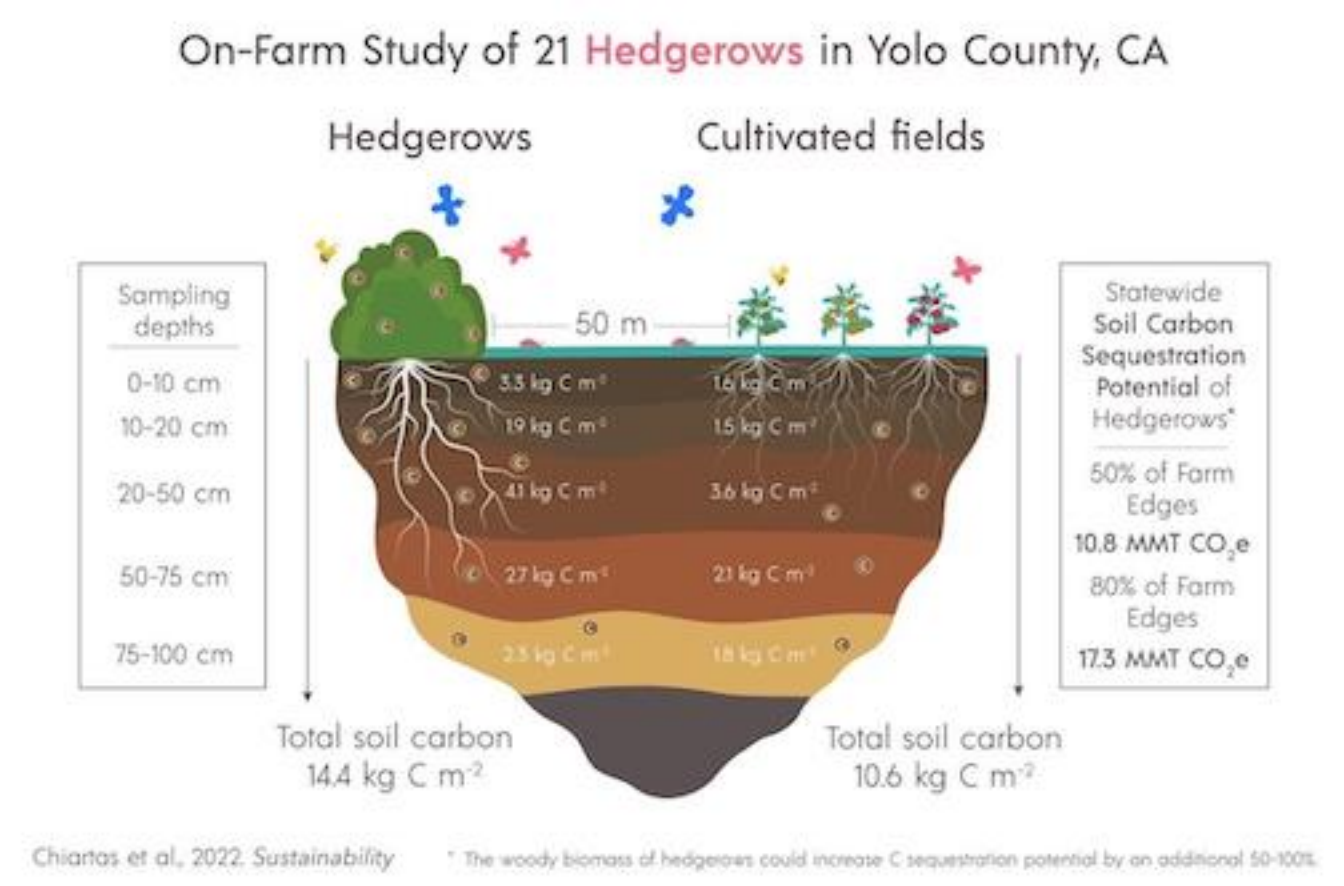
- Cardboard and Mulch

Windbreak

Windbreak

11-months Growth on Riparian Trees

Riparian Trees and Shrubs, Two years old



Soil Carbon Stored from Hedgerows

RESEARCH- Insects Associated with Native Hedgerows

From Long, R.F., A. Corbett, C. Lamb, C. Reberg-Horton, J. Chandler, and M. Stimmann. 1998. Movement of beneficial insects from flowering plants to associated crops. California Agriculture. 52(5): 23-26.

Plant species sampled:

California lilac	Ceanothus
Buckwheat	Eriogonum fasciculatum
Coffeeberry	Rhamnus californica
Coyote Brush	Baccharis pilularis
Toyon	Heteromleles arbutifolia
Elderberry	Sambucus mexicana

Beneficial Insects Monitored:

Minute pirate bug
Assassin bug
Soldier beetle
Green lacewing
Colops
Lady beetle
Damsel
Hymenoptera
Hoverflies
Tachinid flies

RECENT REFERENCE: Morandin L, Long RF, Pease C, Kremen C. Hedgerows enhance beneficial insects on farms in California's Central Valley. *California Agriculture* 65(4):197-201. DOI: 10.3733/ca.v065n04p197. October-December 2011.

Pest Insects Controlled

Aphids
Mealy Bugs
Leaf Hoppers
Scale
Mites
Corn Earworm

Whitefly
Thrips
Squash Bug
Stink Bug
Lygus Bug

Beneficial Insects

Beneficial Insects

Ceanothus and Perennial Buckwheat Are Especially Attractive to Syrphid Flies

Pisani Gareau and Shennan 2010

Yarrow Is Especially Attractive to Minute Pirate Bugs

Pisani Gareau and Shennan 2010

Yarrow Is Especially Attractive to Damsel Bugs

Pisani Gareau and Shennan 2010

Yarrow Is Especially Attractive to Big-eyed Bugs

Pisani Gareau and Shennan 2010

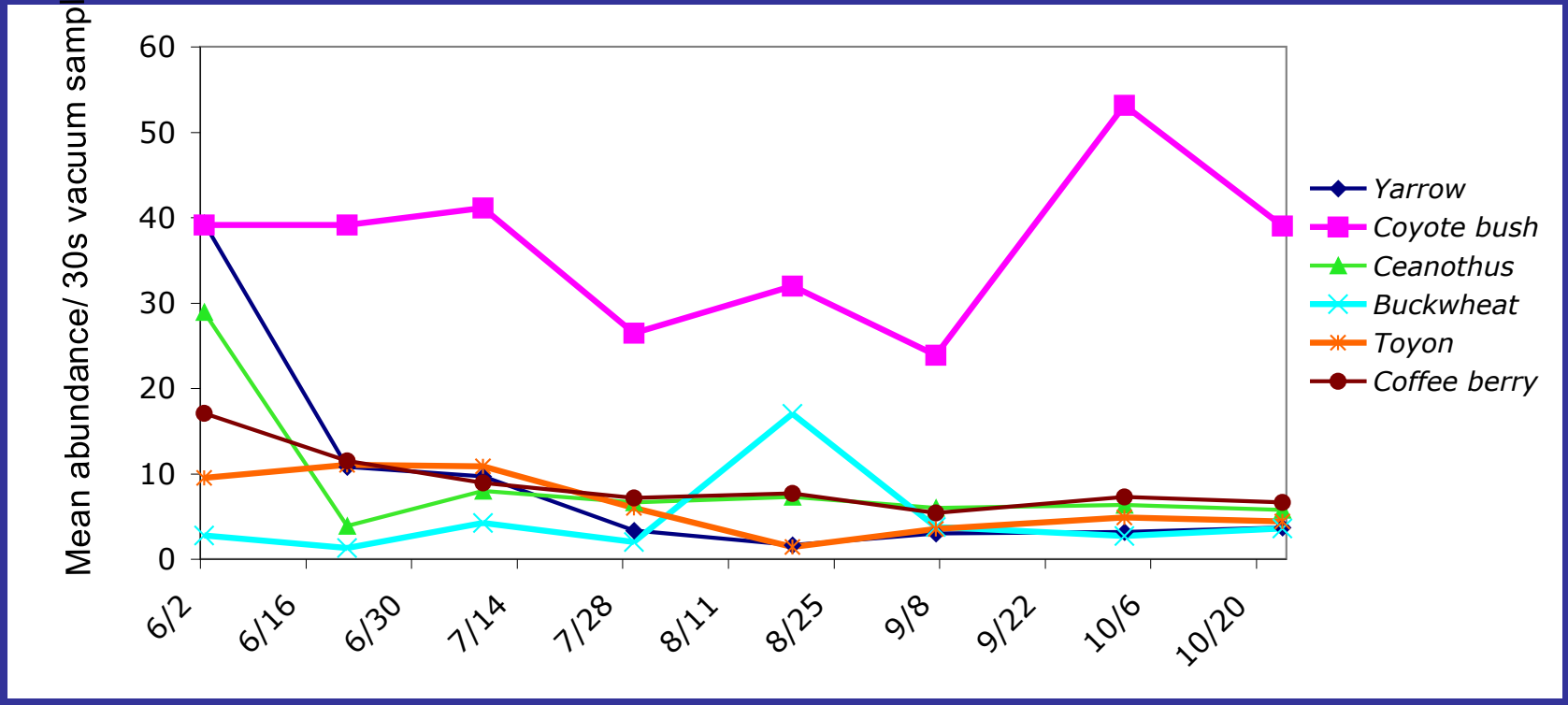
Wasps

Coyote Brush Is Especially Attractive to Parasitoid Wasps

Pisani Gareau and Shennan 2010

Abundance of Wasp Parasitoids

Photos credit: UC IPM website



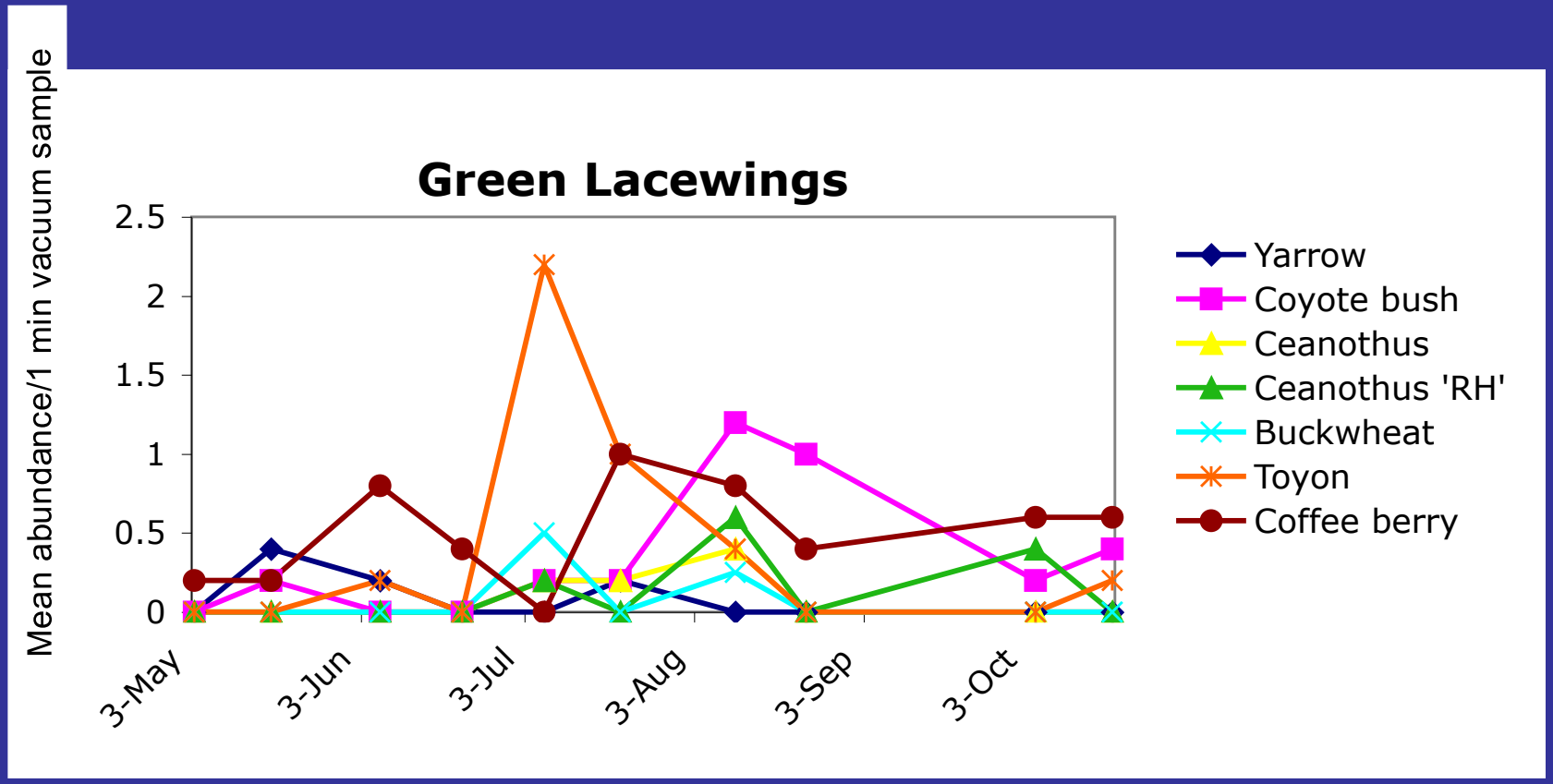
Means of 5 sites, 2005

Data from Tara Pisani Gareau <tlp19@psu.edu>

Coffeeberry Is Especially Attractive to Lacewings

Pisani Gareau and Shennan 2010

Abundance of a Predator



San Juan Bautista site, 2006

Toyon Is Attractive to Lady Beetles and Lacewings

Pisani Gareau and Shennan 2010

Ladybug on Coyote Brush

Deergrass - Habitat for Spiders and Ladybugs

Alyssum Attracts Wasps, Syrphid Flies - Helps Manage Aphids

Owl Boxes, Used for Rodent Control

Things You Find in Owl Boxes

Nest Boxes Attract Birds

Birds Eat Pests

<u>Birds Eat Rodents, and the Following Insects:</u>

Caterpillars
Ants
Grubs
Moths
Grasshoppers
Leafhoppers
Aphids
Snails
Scale insects
Sow bugs
Codling Moth
Insect eggs
Weed seeds

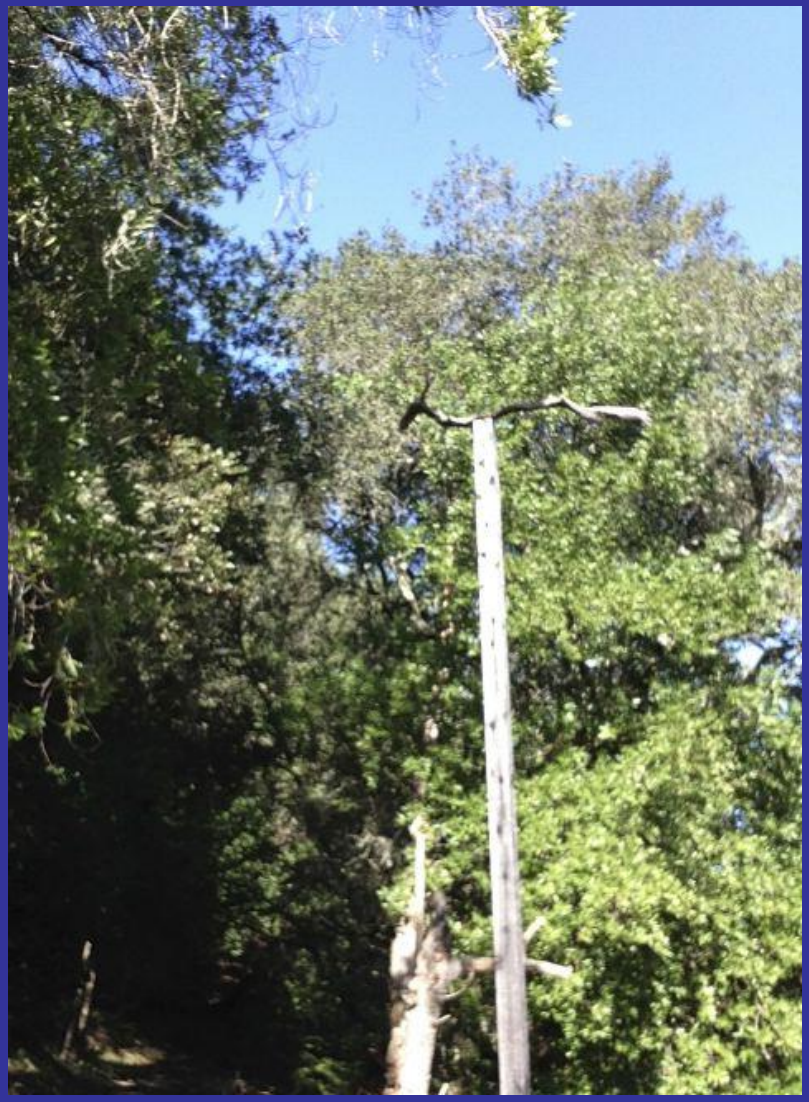
Birds eat bugs

Great Blue Heron eating gopher

Red Shouldered Hawk with Mouse

Perches for Raptors

Raptor Perches, using Manzanita branches



Redtail Hawk with Gopher

Pollination: Flowers Attract Bees

Bees Increase Yields

Resources for Attracting Bees With Vegetation

UC Berkeley Urban Bee Lab

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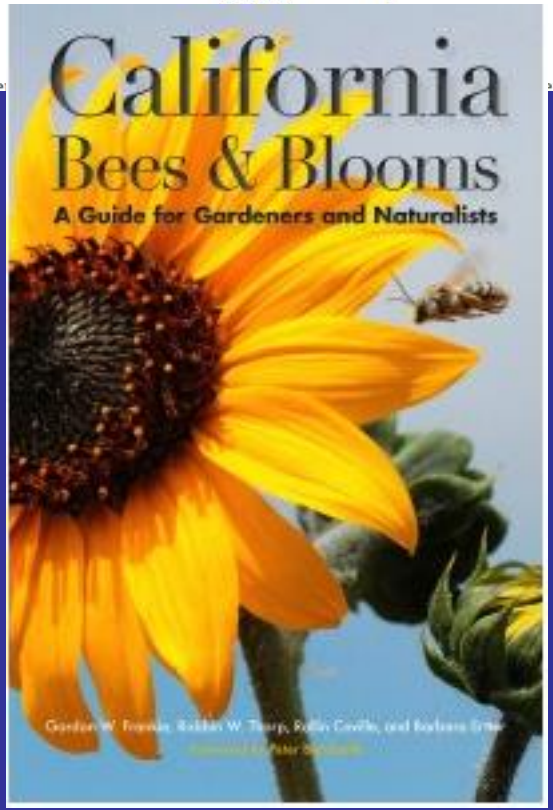
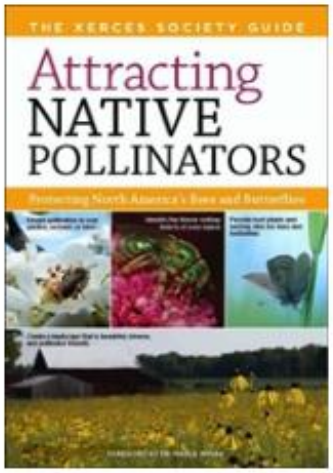
Our research group at the Unive… …enting bee diversity and…



XERCES SOCIETY
for Invertebrate Conservation

Attracting Native Pollinators



Attracting Native Pollinators: was published in 2011 by Storey… *Native Pollinators* is coauthored… Matthew Shepherd, Mace Vaugh… LeBuhn, a San Francisco State U… Project.

Since Xerces published the grou… conservation practices have evol… 380 pages, *Attracting Native Po…* detail, reflecting the latest unders… Illustrated with hundreds of color…

“Flowering Hedgerow” Next to Almonds

Seen in Hedgerow on Green Valley Road

Vegetated Ditch Connecting Habitat: Reservoirs for Beneficial Insects; Corridors for Wildlife

Coyote in Hedgerow

Issues, Problems with Native Plantings

- Pests (insects, rodents, birds) attracted to plantings - Food Safety concerns
- Movement of insects into fields
- Genetic Pollution-not using plants from specific area
- Hosting Diseases: Pierce's Disease, Sudden Oak Death (SOD), Eutypa, Phytophthera
- High costs of maintenance

Hedgerow next to Spinach Field in Salinas

Tree Frog in Hedgerow

Gopher Snake in Hedgerow

Snakes Catch Rodents

Snakes Eat Rodents

Now, that's a snake!

John Anderson, with gopher snake

Factors to be considered before deciding on whether animals are a food safety concern:

- number of animals
- type of animals
- type of crop
- harvest procedure
- neighboring influences
- pathogen of concern
- additional processing

Monitor the crop, not the habitat planting.

Take action if crop damage or animal feces are observed.

Source: Wild Farm Alliance - www.wildfarmalliance.org
CAFF Food Safety Contact – Dave Runsten dave@caff.org>

Fence Barrier Encircling Field

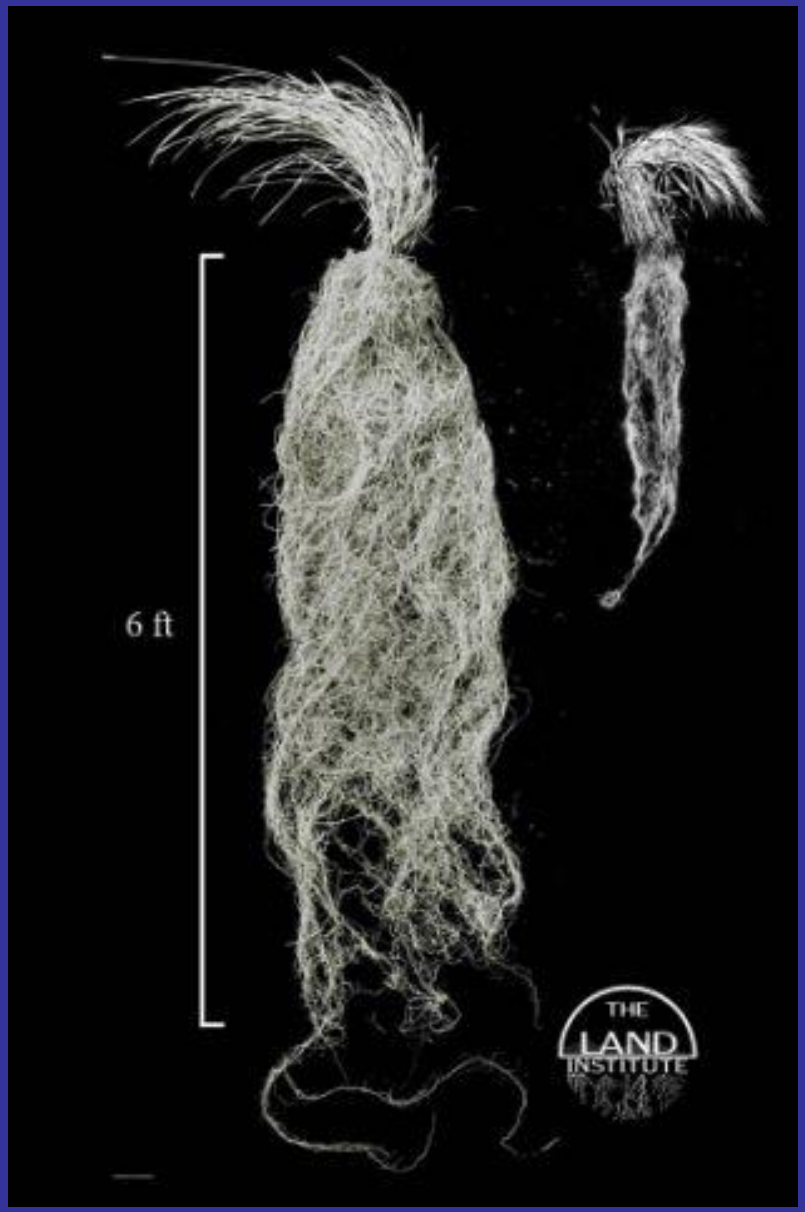
Field Barriers

Field Barriers

Grassed Waterway With Field Barrier

Erosion

Perennial vs. Annual Roots



From Bare Dirt to Perennial Native Grass

Perennial Grasses Seeded into Waterway

Perennial Grassed Filter Strip

Filter Strips

Native Grass Production Field
Hedgerow Farms, Winters, CA

Perennial Grass from seed on steep ground

Planting Creeping Wildrye plugs, one at a time

Converting Eroding Ditch To Grassed Waterway

From Eroding Ditch to Grassed Waterway

Erosion Control- Grass and Shrubs vs. Bare Soil

Erosion Control in Swale with Grasses, Wetland Plants and Yarrow

Before

After

Storm Runoff down Swale Jan. 1, 2004

Swale Vegetation Preventing Formation of Gully Erosion 1/02/04 (one day after storm)

Before Vegetation

Deergrass as a Border

Staking Willows in Eroding Ditch

Looking Downstream

Looking Upstream

- Irrigation system
- Animal pressure

Maintenance & Follow-up

a. Maintain irrigation system
b. Remove weeds while they are small
c. Control rodents where necessary
d. Replant where necessary
e. Track performance of plants

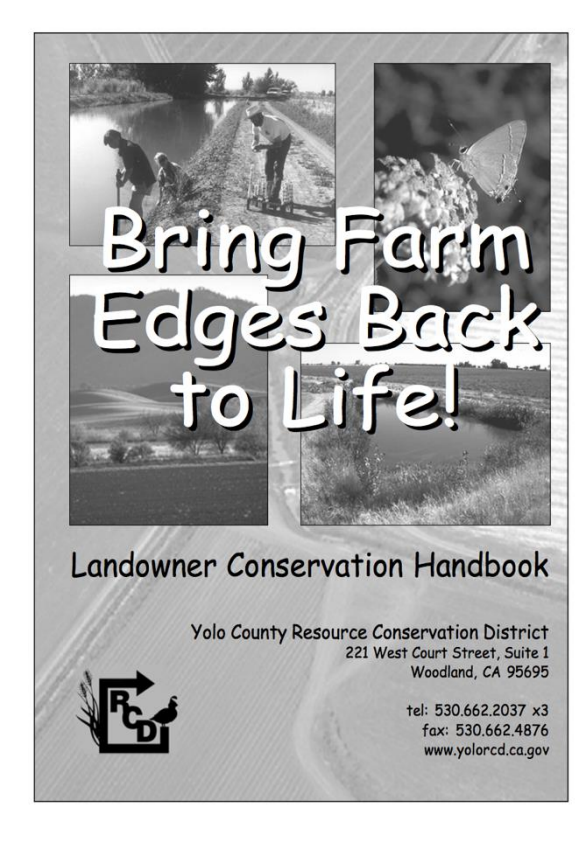
Involving School Children in Conservation Plantings

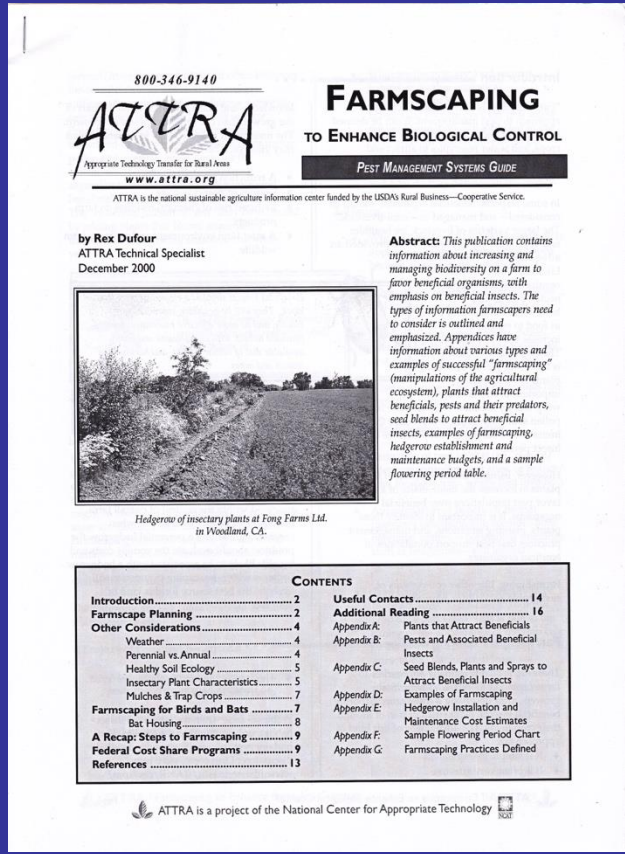
Planning and Design

Investigate and initiate cost-share possibilities

Planning a Hedgerow

Utilize Resources – Manuals, Websites





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ATTRA
Appropriate Technology Transfer for Rural Areas
www.attra.org

FARMSCAPING
TO ENHANCE BIOLOGICAL CONTROL

PEST MANAGEMENT SYSTEMS GUIDE

ATTRA is the national sustainable agriculture information center funded by the USDA's Rural Business—Cooperative Service.

by Rex Dufour
ATTRA Technical Specialist
December 2000

Abstract: *This publication contains information about increasing and managing biodiversity on a farm to favor beneficial organisms, with emphasis on beneficial insects. The types of information farmscapers need to consider is outlined and emphasized. Appendices have information about various types and examples of successful "farmscaping" (manipulations of the agricultural ecosystem), plants that attract beneficials, pests and their predators, seed blends to attract beneficial insects, examples of farmscaping, hedgerow establishment and maintenance budgets, and a sample flowering period table.*

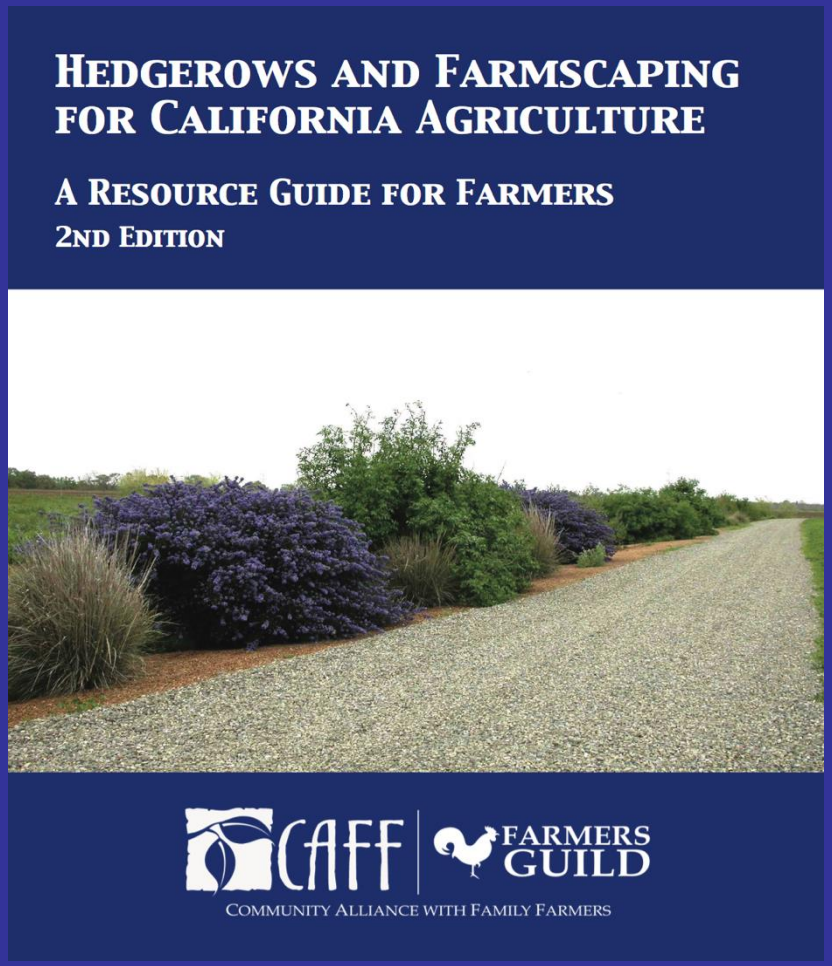
Hedgerow of insectary plants at Fong Farms Ltd. in Woodland, CA.

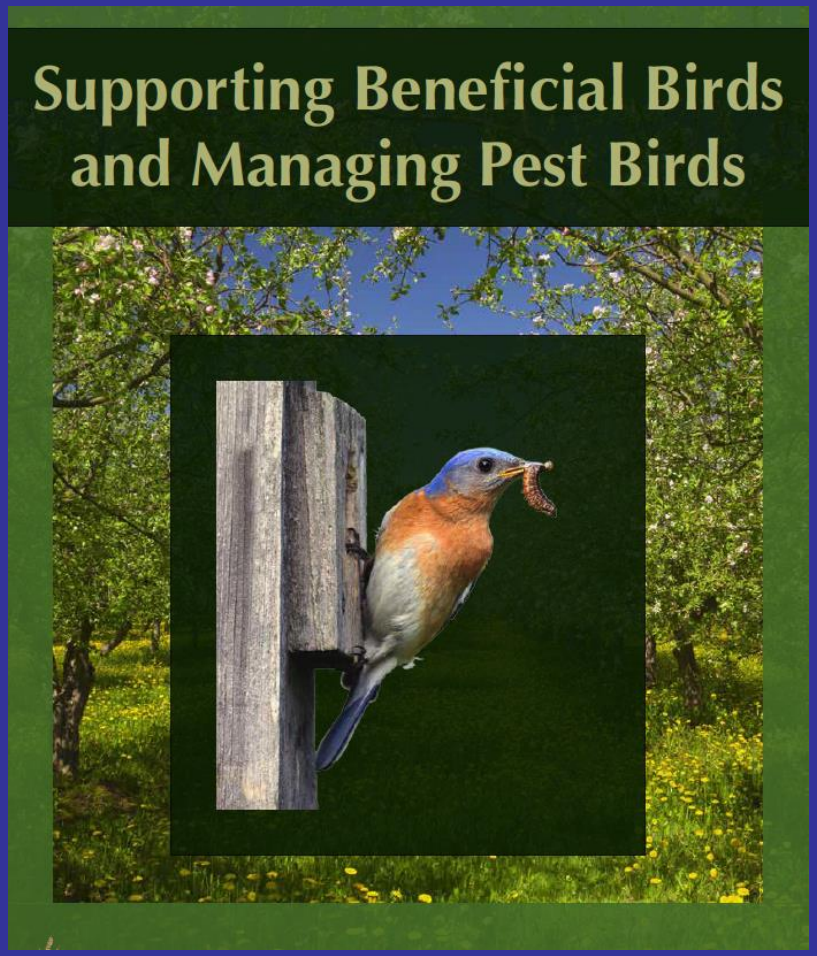
CONTENTS

ATTRA is a project of the National Center for Appropriate Technology

www.attra.ncat.org

Hedgerows and Farmscaping Resource Guides

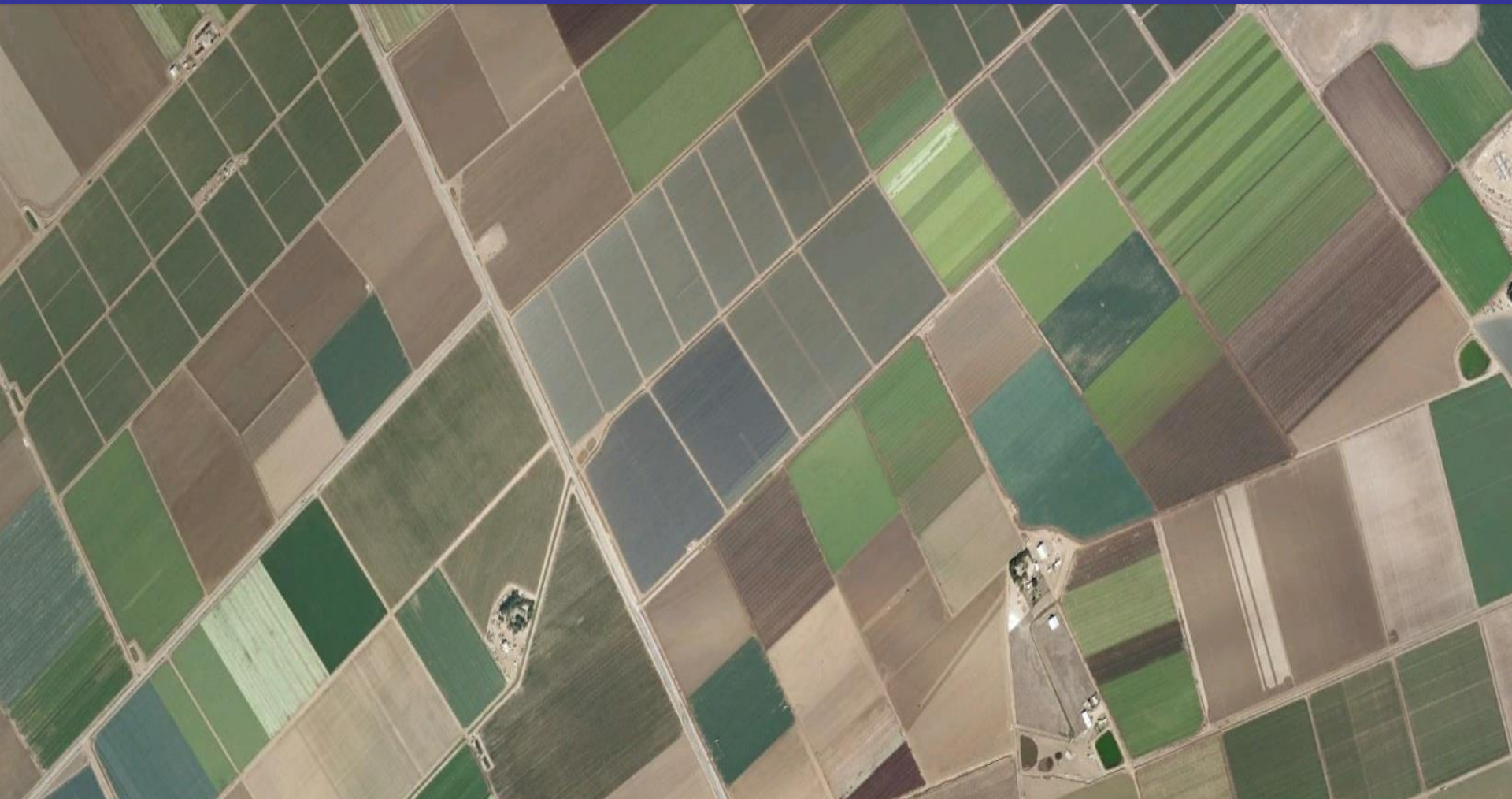




Download at www.HedgerowsUnlimited.com/Resources and *www.wildfarmalliance.org/bird_resource*

Hedgerows In England

Lack of Diversity on Farms in the Salinas Valley



Diversity within Monocultures: ALBA Farms in the Salinas Valley

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www.HedgerowsUnlimited.com

Questions?