Field Edge Planting for Pesticide Reduction and Enhanced Biodiversity on Farmlands

Rachael Long, Farm Advisor and Laurel Sellers, Project Manager
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- Field edge plantings such as hedgerows are rows of plants on field edges
- Do not take cropland out of production
- Have multiple ecosystem service benefits

Hedgerows:

- Enhance biodiversity

Hedgerow Benefits

- Enhance biodiversity
- **Weed suppression**

Hedgerow Benefits

- Enhance biodiversity
- Weed suppression
- **Water quality protection**

Hedgerow Benefits

- Enhance biodiversity
- Weed suppression
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- **Erosion control**

Hedgerow Benefits

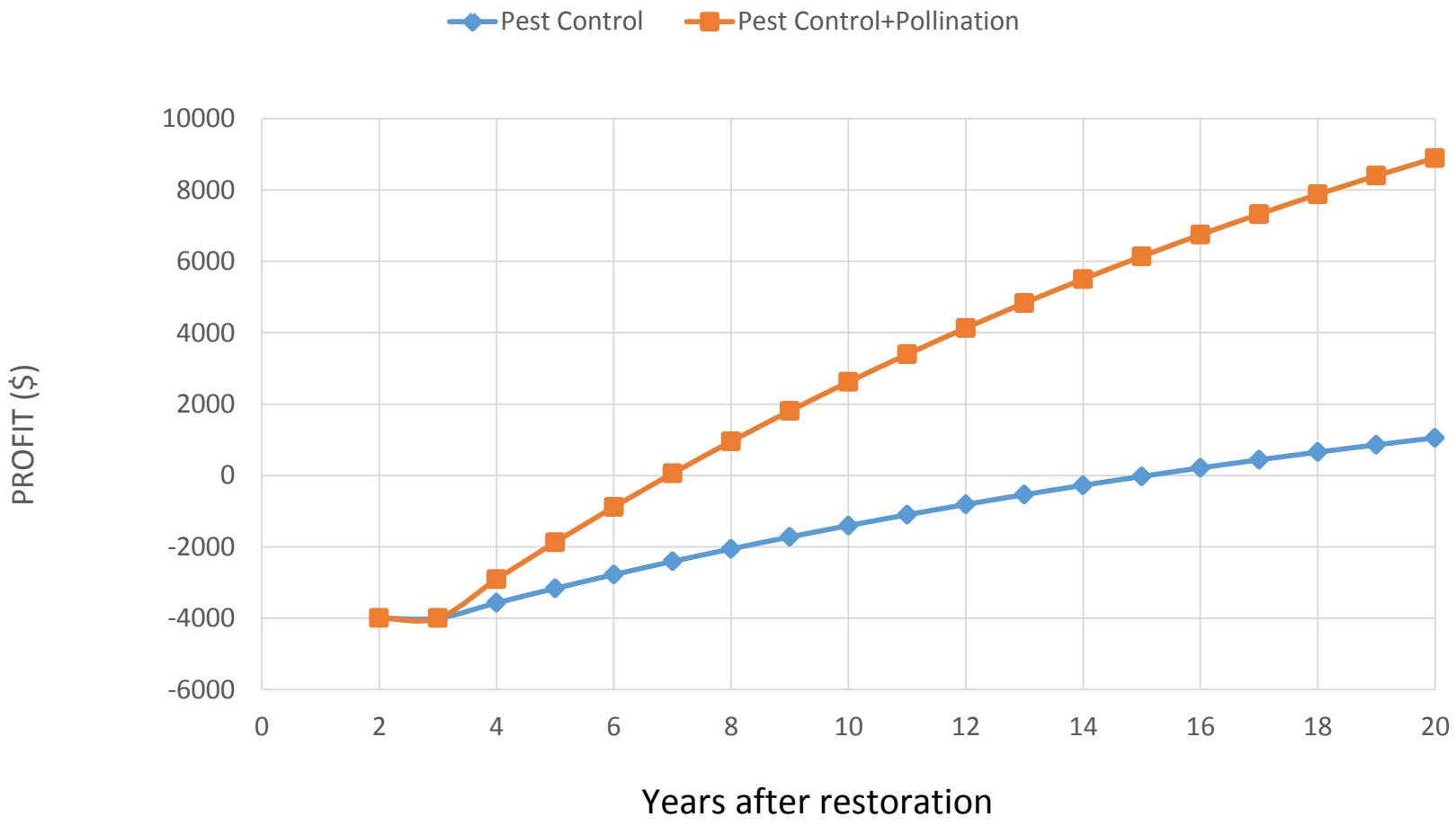
- Enhance biodiversity
- Weed suppression
- Water quality protection
- Erosion control
- **Natural enemies, Insect predators/parasitoids**

Syrphid fly adult and larva

Hedgerow Benefits

- Enhance biodiversity
- Weed suppression
- Water quality protection
- Erosion control
- Enhance natural enemies (predators of pests)
- **Enhance pollinators (native bees/honey bees)**

Cost Benefit Analysis of Hedgerow Plantings



Despite multiple benefits and places to plant hedgerows on farms, few growers and landowners adopt this field edge habitat practice.

Overall Goals of CA DPR Pest Management Alliance Project

Objective 1. Conduct grower/landowner survey

Objective 2. Plant 5 hedgerows

Objective 3. Outreach information on the benefits of hedgerows

2014 Field Edge Management Survey

University of California
Agriculture and Natural Resources

Survey of Field Edge Management Practices on Farms

We are interested in understanding field edge management practices in agricultural croplands and would appreciate your responses to the following survey questions. Our interest is to develop outreach material for growers and landowners interested in field edge plantings, such as hedgerows, on their farms.

Raffle Drawing: **If you'd like to be entered in a raffle for an iPad please let us know the best way to reach you by phone or e-mail:**

Name & contact for iPad raffle: _____

We value your participation, so thank you for your help and support of our programs.

Voluntary Participation: Participation in this research survey is voluntary. If you do not

- Identify grower/landowner field edge planting challenges and successes.
- Sent to 2,800 ag clientele via email with online link to survey (75%) and hard copies via USPS and workshops (25%).

Field Edge Management Survey

- 167 responses (6% response rate)
- 90% landowners and growers
- Many growers held specialized degrees or technical training
- Median age was 58 years
- Category <35 years smallest group (n = 6 respondents, 3.5% of total)

Most commonly used INFO SOURCES by growers on field edge management

1. Personal observation of farm sites & conditions

2. Personal communication with other landowners & growers

3. Reading print information (e.g., newsletters, books, magazines)

4. Personal communication with agencies (e.g., NRCS, RCD, UCCE)

Most commonly used field edge management practice in the Sacramento Valley

1. Mowing
2. Herbicides
3. Discing
4. Burning
5. No management

Potential BENEFITS of field edge plantings (top 5 ranked by growers)

1. Increased native bees and honey bees
2. Increased natural enemies of pests
3. Wildlife habitat (e.g. game birds)
4. Water quality protection
5. Reduced soil erosion

Field edges serve multiple purposes

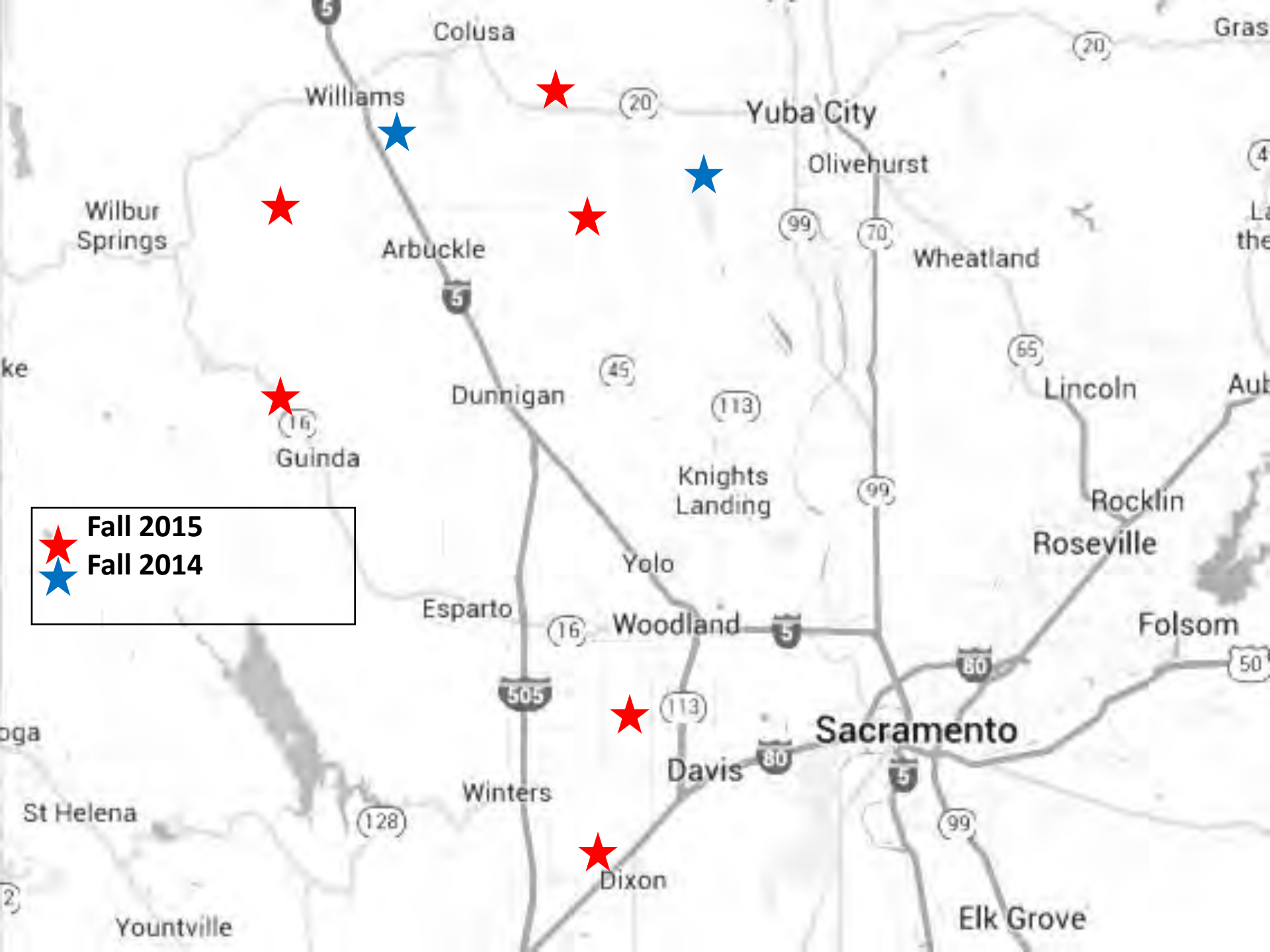
Potential CONCERNS of field edge plantings (top 5 ranked by growers)

1. Weeds
2. Costs of field edge plantings
3. Increased time commitment
4. Limit equipment movement
5. Pests (insects, birds, rodents)

Current studies show that weeds, rodents, and pest birds (blackbirds) are problems in crops regardless of field edge habitat.

Objective 2. Demonstration hedgerow sites:

2 planted in 2014 in Colusa County


Fall 2015
Fall 2014
Colusa
Williams
Yuba City
Olivehurst
Wilbur Springs
Arbuckle
Wheatland
Dunnigan
Lincoln
Guinda
Knights Landing
Rocklin
Roseville
Yolo
Esparto
Woodland
Folsom
Sacramento
Davis
Winters
St Helena
Dixon
Yountville
Elk Grove

Objective 3. Outreach via workshops, printed materials, and online resources

- Held 12 workshops, Colusa, Yolo, Solano, Napa counties with local RCD's.
- 10 on farms, 2 at Colusa Farm Show
- Reached about 400 growers, landowners, NRCS, RCD, beekeepers

On-Farm Benefits of Hedgerows Workshop

Pull out on the West side of Currey Road,
0.3 miles North of Higby's Country Feed Store, Dixon, CA
Thursday, May 21, 2015 I 8:30 a.m. – 10:30 a.m.
1 CE Hour

Bring walking shoes, water, and a hat for our tour.

This workshop will focus on the benefits of hedgerows of native California plants in agricultural landscapes as well as establishment practices for field edge plantings and plant selection. For more information, contact Laurel Sellers or Rachael Long, Yolo County UC Cooperative Extension, at Laurel.Sellers@gmail.com or rflong@ucanr.edu or 530-666-8143. There is no need to preregister.

8:30 **Welcome,** *John Currey, District Manager, and Kelly Huff, Project Manager, Dixon County Resource Conservation District (RCD)*

8:40 **DPR Grant Project Update,** *Laurel Sellers, Project Manager, Yolo County UC Cooperative Extension (UCCE)*

8:45 **Vegetation's Role in Nitrate and Sediment Transport,** *Alex Klein, PhD Candidate, UC Davis, Department of Plant Sciences*

9:05 **Planting Hedgerows and Wildflower Strips to Support Pollinators,** *Katharina Ullmann, Crop Pollination Specialist, Xerces Society*

9:25 **Hedgerows and Integrated Pest Management,** *Rachael Long, Farm Advisor, Yolo County UCCE*

9:40 **Hedgerows, Rodents, and Food Safety,** *Laurel Sellers, Project Manager, Yolo County UCCE*

9:55 **Plant Selection and Hedgerow Establishment,** *Miles DaPrato, Restoration Project Manager, Solano County RCD*

10:25 **Summary and Audience Survey**

10:30 **Adjourn**

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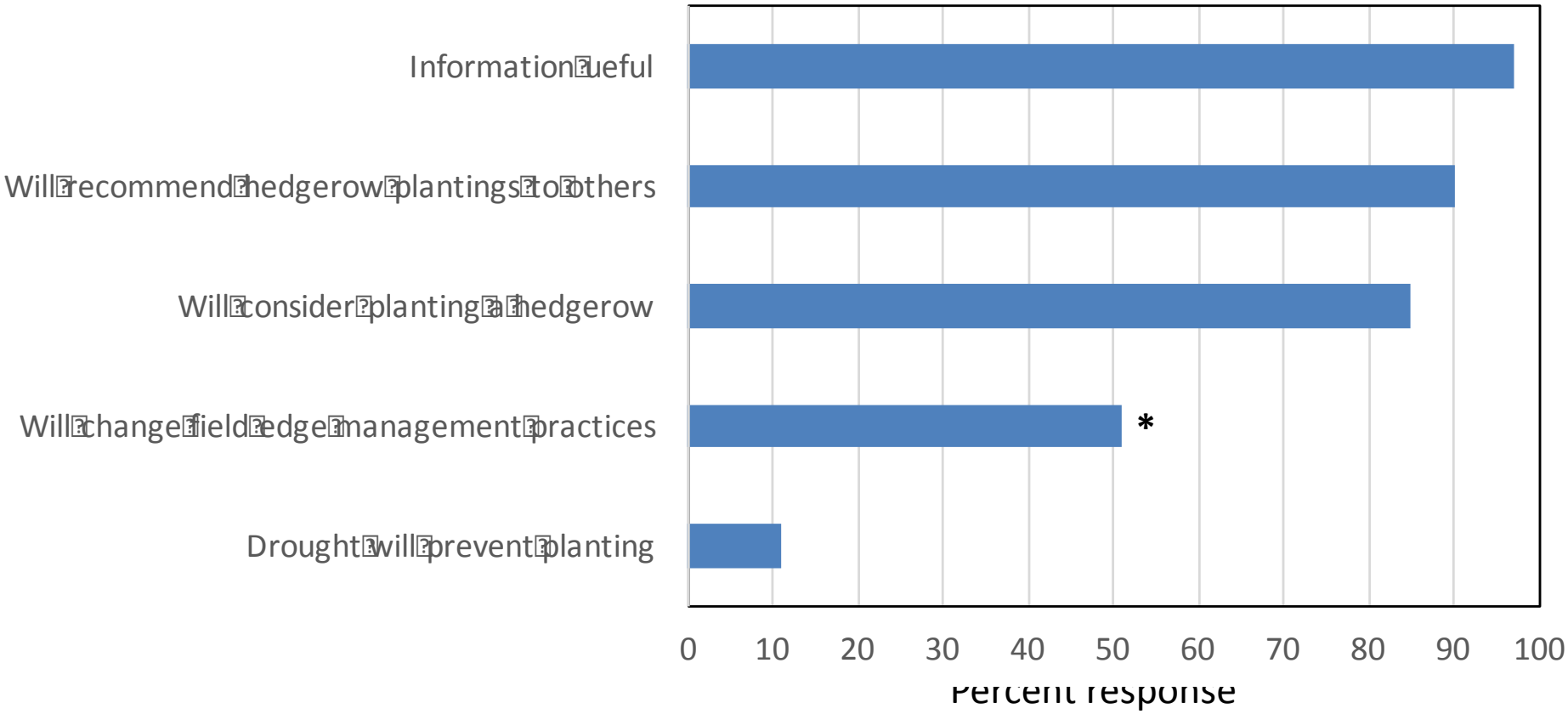
Post survey hedgerow workshop results



*Of the 51% growers and landowners surveyed
40% response rate

Outreach Materials

HEDGEROW PLANT SELECTION FOR THE SACRAMENTO VALLEY
All plants listed are California native perennials

SHRUBS (size: small = 3-5' tall, large >10' tall and/or wide; use 1 gallon container stock)
Manzanita *Arctostaphylos spp.*, var. Howard McMinn – small; var. Louis Edmonds – large
Western redbud *Cercis occidentalis* – large
California lilac *Ceanothus spp.* – large; Nitrogen fixing plants; var. Yankee Point and Ray Hartman
Flannel bush *Fremontodendron californicum* – large; Minimize summer watering
California coffeeberry *Rhamnus californica* – large
Blue elderberry *Sambucus nigra* – large; host to valley elderberry longhorn beetle, a protected species
Cleveland sage *Salvia clevelandii* – small
Toyon, Christmas berry *Heteromeles arbutifolia* – large
California wild rose *Rosa californica* – small
California buckwheat *Eriogonum fasciculatum* – small
Coyote brush *Baccharis pilularis* - Plant males only to prevent spreading – large

FORBS & GRASSES (Plug planted)	FORBS[1] & GRASSES[2] (Seeded)
California phacelia *P. californica*	Purple needlegrass *Stipa pulchra*, 35%
Summer lupine *Lupinus formosus*	Slender wheatgrass *Elymus trachycaulus*, 25%
Mugwort *Artemisia douglasiana*	California onion grass *Melica californica*, 15%
Goldenrod *Euthamia occidentalis*	Blue wildrye *Elymus glaucus*, 25%
Narrow leaf milkweed *Asclepias* fascicularis, Monarchs	Creeping wildrye *Elymus triticoides*, add where good soil moisture
Pacific aster *Symphyotrichum chilense*	[1]Gumplant *Grindelia camporum*, 0.8 lb/ac add to grass seed mix
California fuschia *Epilobium canum*, var. Catalina	[2]Drill grass seed at 20-25 lbs/ac; broadcast at 30-35 lbs/ac, using percent of seed in mix (bulk lbs/ac) as listed above.
Deergrass *Muhlenbergia rigens*	

Trees: Valley oak *Quercus lobata*, Blue oak *Q. douglasii*, Grey pine *Pinus sabiniana*, California buckeye *Aesculus californica*

Bloom times for California native perennial shrubs, forbs and grasses

Plants	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Manzanita	■	■										
Redbud		■										
California lilac					■							
Flannel bush					■							
Phacelia					■	■						
Coffeeberry					■	■						
Cleveland sage					■	■						
Elderberry					■	■						
Gumplant						■	■	■	■	■		
Toyon						■	■	■	■	■		
Wild rose						■	■	■	■	■		
Buckwheat						■	■	■	■	■		
Deergrass						■	■	■	■	■		
Milkweed						■	■	■	■	■		
Summer lupine						■	■	■	■	■		
Mugwort						■	■	■	■	■		
Goldenrod						■	■	■	■	■		
Aster						■	■	■	■	■		
California fuchsia						■	■	■	■	■	■	
Coyote brush						■	■	■	■	■	■	

Sacramento Valley Native Plant Nurseries:
Cornflower Farms, Elk Grove, www.cornflowerfarms.com
Floral Native Nursery, Chico, www.floralnativenursery.com
Hedgerow Farms Inc., Winters, www.hedgerowfarms.com

For more information on plants visit *Calflora:* www.calflora.org

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Hedgerow Work Group

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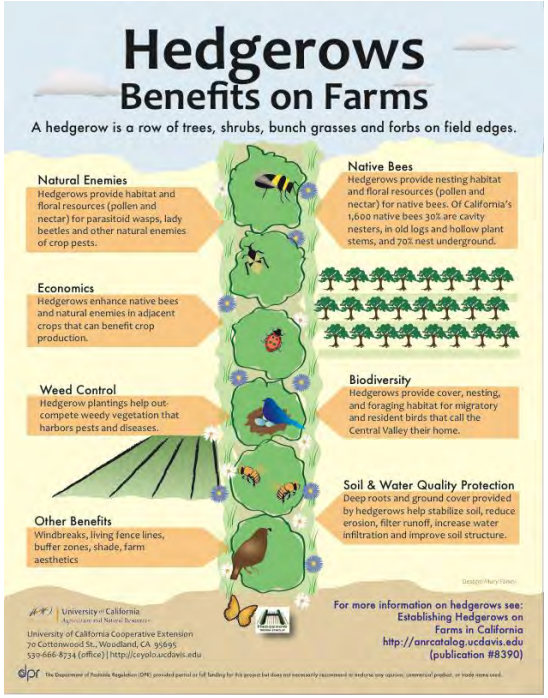
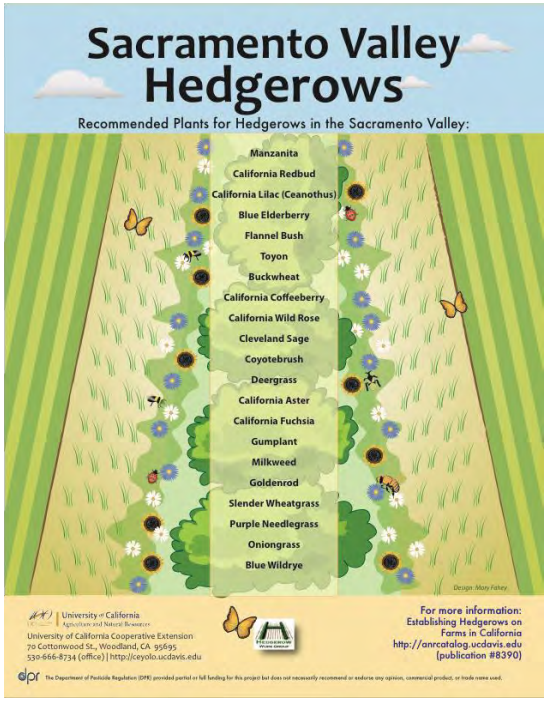
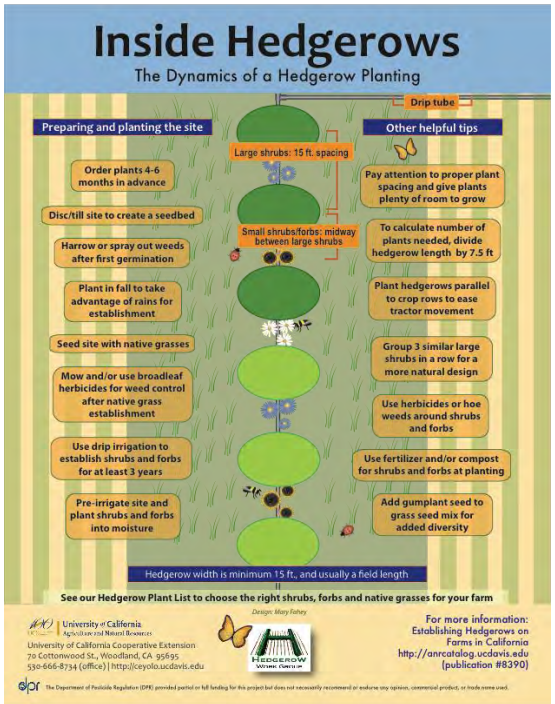
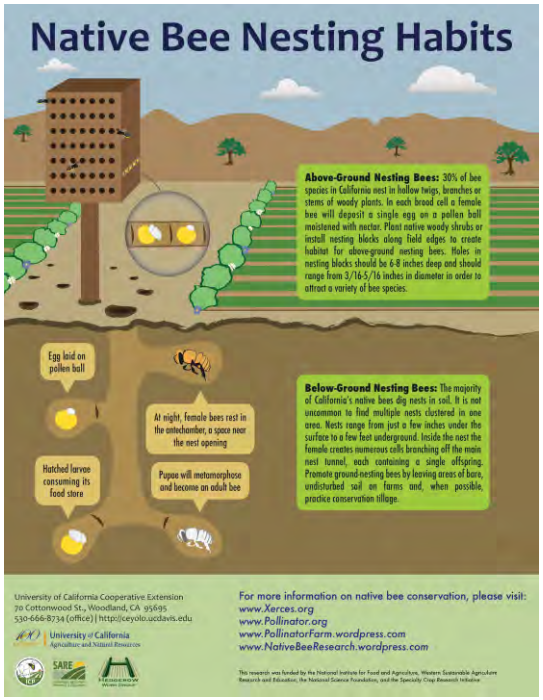
November 2014









Online Resources:

1) Developed Hedgerow Hub Website: www.hedgerowhub.org

2) UC ANR Yolo County Website: http://ceyolo.ucanr.edu/Custom_Program/Hedgerows/

Hedgerow Hub

About Contact Forums Resources Project Updates U

Growers, Extension Specialists, and Scientists Discuss Field Edge Plantings to Enhance Ecosystem Services in California's Central Valley

> *What can be done to enhance biodiversity and ecosystem services on active farms? How can field edges and other marginal areas be used to support crop production and on-farm benefits as well as benefits that farmlands provide to society as a whole?*

These questions and more catalyzed the formation of the Hedgerow Work Group. We held our first face-to-face meeting in Spring 2014 with growers, extension advisors, and scientists interested in approaches to managing field edges to increase biodiversity and ecosystem services.

The Hedgerow Work Group brings together growers, extension specialists, scientists, industry and conservation partners to discuss field edge management, impacts on agriculture and our water and soil resources, and approaches to make agricultural landscapes both productive and ecologically healthy. We investigate existing and new practices for field edges that can help growers sustain competitive agriculture and enhance the ecological integrity of the landscape at the same time.

HEDGEROW WORK GROUP

Audubon-Miles DiPrato

Project Updates:

Milestones Achieved

- On track with grant administration
- Exceeded grant expectations by planting 3 more hedgerows on farms than planned and 60% more survey respondents than anticipated.
- Workshops helped find new grower and landowner collaborators.
- Integrated graduate students and their research into this project to help develop and disseminate information on benefits of field edge plantings.

Lessons Learned

- Champion needed in ag community to promote hedgerows.
- More cost share money needed to fund field edge plantings.
- More research needed on ecosystem service benefits of field edge plantings.

Plans for remainder of grant duration (2013-2016).

- Plant 6 hedgerows
- Publish Field Edge Survey results
- Disseminate hedgerow information (NRCS, RCD's, Fish and Wildlife Service)
- Submit final CA-DPR report

CA DPR Pest Management Alliance Project

Team Members

R. Long, Principal Investigator, Farm Advisor, UC Cooperative Extension

Dr. Garbach, Asst. Professor, Env. Science Dept., Loyola University, Chicago

Dr. Williams, Assistant Professor, Dept. of Entomology, UC Davis

Team Partners

J. Wyrsinski, Yolo Resource Conservation District (RCD)

C. Rose, Executive Director, Solano County RCD

J. Anderson, Hedgerow Farms

M. Fahey, Colusa County RCD

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