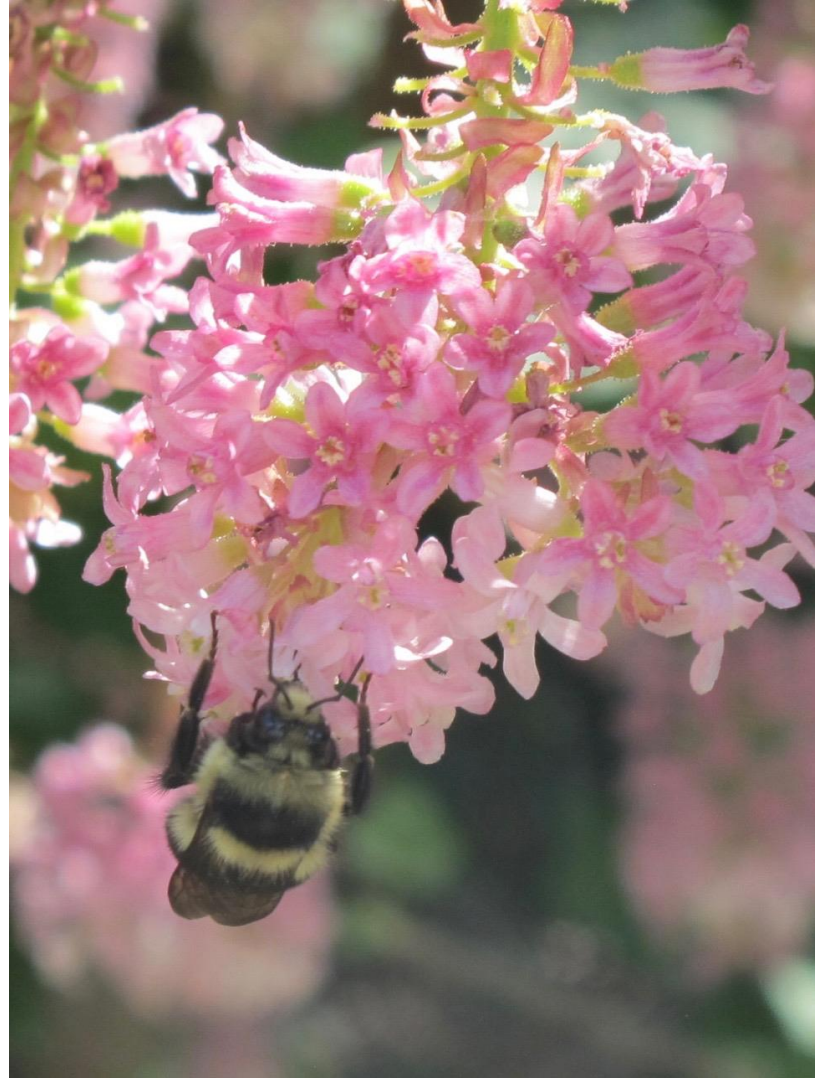


# Selecting the Best Plants for Pollinators

Ellen Zagory

The UC Davis Arboretum  
and Public Garden



# What's Best Can Depend on your Point of View

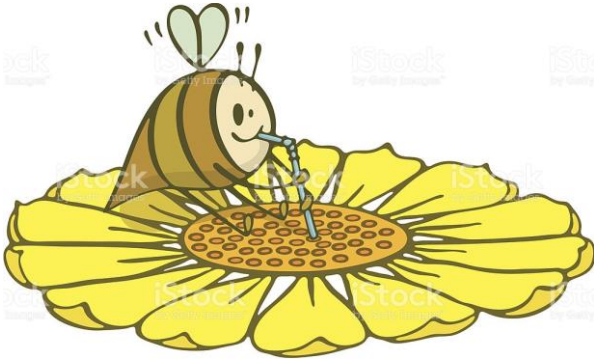


Bee needs



Gardener needs

# View of the bees vs. the gardener

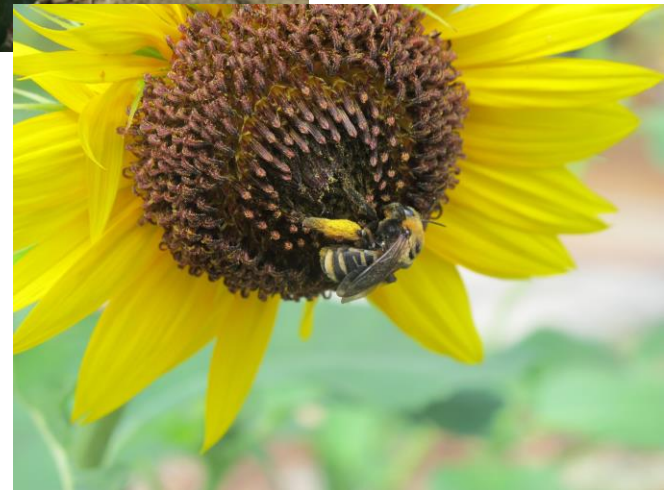


- Plants with lots of nectar and pollen
- Large masses of flowers
- Bloom over a long season
- Diversity of plants for a diversity of bees

- Plants with lots of color and interest
- Low maintenance if possible
- Grow well in local conditions (Central Valley hot summer, winds)

# What are the “Best” Pollinator Plants?

- Not all flowers are created equal.
- only nectar or both nectar and pollen—or none!
- Some plants only bloom for a short time
- Plant Families that are best for Bees: Asteraceae, Lamiaceae, Fabaceae, Boraginaceae (Scrophulariaceae)



# Why try and use as many California natives as possible

UCB studies showed:

- Of 1000 plants studied only 50 were natives and 950 non-natives

Yet:

- 80 percent of natives attracted bees (40 taxa)
- 8 percent of non-natives (76) attracted bees



An all native plant selection: woody plants can form the backbone of a planting that uses grasses and herbaceous perennial



deer grass

*Muhlenbergia rigens*

maritime ceanothus

*Ceanothus maritimus*

California fuchsia,

*Epilobium canum*

# Garden plants: annuals, perennials, some woody shrubs.

Annuals: highest maintenance

- Long blooming
- Replace every year

Perennials: medium

- Herbaceous in different sizes
- They can have different seasons of bloom
- Deciduous or evergreen
- Usually non-woody so cut back in winter.

Shrubs: low maintenance

- Woody, permanent structure
- No cutting back or replacement



# Pros and cons of annual plants

Pro: Best annuals for here

- Some will bloom all summer (with enough water)
- Summer bloom annuals: sunflower (*Helianthus annuus*, *Tithonia*) need irrigation.
- California native annuals sown in fall for spring bloom: lupine, poppies, clarkia, *Phacelia tanacetifolia* and more.





# Cons of annual plants

## *Labor* needed:

- Bed preparation often needed to improve soil--  
compost addition, mixing
- Removal of existing weeds especially perennial  
weeds (bindweed and bermuda especially)
- Weeding seedlings after germination
- Repeat each year



At Arboretum we focus on **perennials** not **annual** plants: both herbaceous and woody

- Native annuals go dormant (turn brown) in summer
- mow to clean up after seed drop
- Areas tend to become weedy since mulch is not used—higher maintenance



# How much work will it take?

- Annuals:

High rate of return but extra work

- Perennials:

Many peoples choice, annual maintenance and shaping only

- Shrubs:

Often only need occasional shaping and seed removal



# Need to select plants that work with your local climate, soil and resources

- In Central Valley summer heat often forces plants from bloom and plant may require extra water.
- Drought may restrict water supply and cost
- Soils (heavy clay, loam, poor drainage) vs. well drained or rocky slopes
- Time and money (contractors triangle fast, cheap good pick any 2)



# Perennials: a plant that if it doesn't die returns every year

- Herbaceous perennials die to ground in winter
- *Sedum* 'Autumn Joy' and relatives
- *Asters*, many
- *Echinacea*,  
*Oregano*



“true” herbaceous perennials and grasses do not have woody bases and are cut to ground in winter



# Some *evergreen* perennials retain foliage over winter

- *Teucrium X lucidrys*
- *Salvias* (depends on type)
- *Aster chilensis*
- *Erigeron glaucus*



One of the best is seaside daisy: *Erigeron* 'W.R.'





# Sages and Lavender

- “subshrubs” like Salvias and Lavenders are woody at base
- provide structure in an herbaceous perennial planting
- Both of these groups have members with long season of bloom



# Plants woody at the base

sub-shrubs: *Salvia greggii* and *Salvia X jamensis* hybrids



# Provide long season bloom: Teaching nursery demonstration

- Pollinator support: a succession of spring, summer and fall blooming plants
- Plants that individually stay in bloom a long time.
- Repeat bloomers



# Perennials over the seasons can provide food over “bee seasons”

## Spring

- Early perennials like herbaceous *Salvias*, *Penstemons* combined with *Alliums*.
- Woody plants like manzanita, redbuds and *Ceanothus*.



# Perennials over the seasons can provide food over “bee seasons”

## Summer

- Warm weather perennials like California fuchsia, Russian sage, summer asters (A. ‘Monch’)
- Woody plants like barometer bush (*Leucophyllum*), chaste tree, and some Salvias.

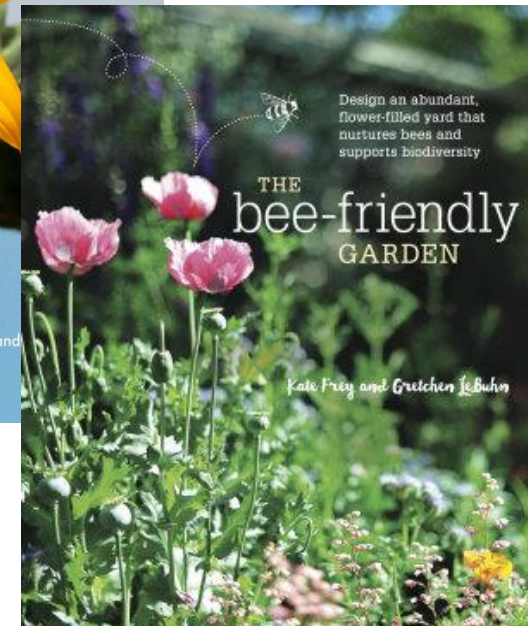
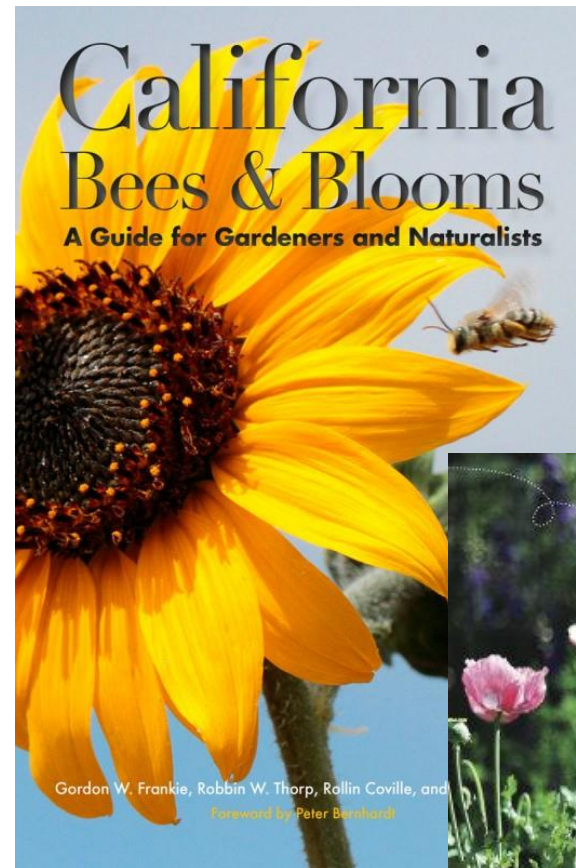


# 2009 plantings to attract and observe insect visitation—pollinator bed



# When selecting “bee” plants: best to use *local* info

- Bees and Blooms
- The Bee Friendly Garden
- UC Berkeley Urban Bee Lab info
- [www.helpabee.org](http://www.helpabee.org)
- <https://hbhgarden.ucdavis.edu>



# Urban California Native Bee Survey: California Agriculture ANR 2009

- Summary of research survey of 7 cities across California
- “targeted ornamental plants...can predictably increase bee diversity and abundance...”
- Bees visit non-native flowers

## Native bees are a rich natural resource in urban California gardens

by Gordon W. Frankie, Robbin W. Thorp, Jennifer Hernandez, Mark Rizzardi, Barbara Ertter, Jaime C. Pawelek, Sara L. Witt, Mary Schindler, Rollin Coville and Victoria A. Wojcik

*Evidence is mounting that pollinators of crop and wildland plants are declining worldwide. Our research group at UC Berkeley and UC Davis conducted a 3-year survey of bee pollinators in seven cities from Northern California to Southern California. Results indicate that many types of urban residential gardens provide floral and nesting resources for the reproduction and survival of bees, especially a diversity of native bees. Habitat gardening for bees, using targeted ornamental plants, can predictably increase bee diversity and abundance, and provide clear pollination benefits.*



About 1,600 native bee species have been recorded in California. The bees provide critical ecological and pollination services in wildlands and croplands, as well as urban areas. Above, a female solitary bee (*Svasta obliqua expurgata*) on purple coneflower (*Echinacea pupurea*).



# Results put plant attraction in categories

- Attract restricted bee groups
- Attract diverse (prominently 2-3) bee groups
- Taxa that attract diversity of bees no prominent groups

TABLE 2. Ornamental plants and their origins and flowering season visited by diverse bee taxa with no prominent bee groups in seven California cities, 2005–2007

Plants	Family	Flowering season	Origin*
Monch ( <i>Aster x frikartii</i> )	Aster.	Summer	NN
Bidens ( <i>Bidens ferulifolia</i> cvs)†	Aster	Spring/summer	NN
Coreopsis ( <i>Coreopsis grandiflora</i> cvs)†	Aster.	Summer	NN
Cosmos ( <i>Cosmos bipinnatus</i> )	Aster.	Summer	NN
Cosmos ( <i>C. sulphureus</i> )	Aster.	Summer	NN
Sea daisy ( <i>Erigeron glaucus</i> )‡	Aster.	Spring/summer	CA
Black-eyed Susan ( <i>Rudbeckia hirta</i> )§	Aster.	Summer	NN
Tansy phacelia ( <i>Phacelia tanacetifolia</i> )	Hydro.	Spring	CA
Catnip mint ( <i>Nepeta</i> spp.)¶	Lamiac.	Spring/summer	NN
Rosemary ( <i>Rosmarinus officinalis</i> cvs)#	Lamiac.	Spring/summer	NN
Black sage ( <i>Salvia mellifera</i> )	Lamiac.	Spring	CA
Wild lilac ( <i>Ceanothus</i> spp.)**	Rham.	Spring	CA
Toad flax ( <i>Linaria purpurea</i> )	Scroph.	Spring/summer	NN

\* Origin: CA = native to California; NN = nonnative to California.

† cvs = several cultivars.

‡ Mostly *E. glaucus* 'Wayne Roderick'.

§ Mostly large, single-flower cultivars.

¶ Mostly catnip mint species (*Nepeta x faassenii* and *Nepeta* 'Six Hills Giant').

# Several cultivars, especially *R.* 'Ken Taylor' and *R.* 'Lockwood de Forest'.

\*\*Mostly *C.* 'Ray Hartman', *C.* 'Julia Phelps' and *C.* *thyrsiflorus* 'Skylark'.

# Abundance and diversity of bee groups is our goal!

- Attract and support many different kinds
- Helps build garden diversity and support wild bees
- *Perhaps highest rated plant should be used despite increase in maintenance and water use*



# Perennial plants visited by diverse bee groups

- *Aster X 'Monch'*
- *Bidens ferulifolia*, beggars tickseed
- *Coreopsis grandiflora*, tickseed
- *Erigeron glaucus*, seaside daisy
- *Rudbeckia hirta*
- *Nepeta* spp.



# Woody plants visited by diverse bee taxa

- *Rosmarinus officinalis*, rosemary
- *Ceanothus*, California lilac
- *Salvia mellifera*, black sage



# Perennial and woody plants attractive to 2 or 3 bee groups (ones thriving in Davis)

- *Solidago californica*, goldenrod
- *Lavandula* spp., lavender
- *Perovskia atriplicifolia*, Russian sage
- *Vitex agnus-castus*, chaste tree
- *Gaillardia X grandiflora*, blanket flower



(annuals, non-hardy and high water not shown)



# Beware: Of the recommended plants

- Some may be *aggressive* in gardens if irrigated
- Very useful in low water area!
  - *Aster* 'Point St. George
  - *Solidago californica*
  - *Origanum* cultivars (seeds about)



# Some recommended bee plants

- May be **short-lived** in the Central Valley
  - *Agastache*,
  - *Gaillardia*, blanket flower
  - *Sphaeralcea ambigua* globe mallow



# Some recommended plants

Need **deadheading** to keep them in bloom

- *Erigeron glaucus* and E. 'W.R.'
- *Coreopsis grandiflora*, tickseed
- *Gaillardia*, blanket flower





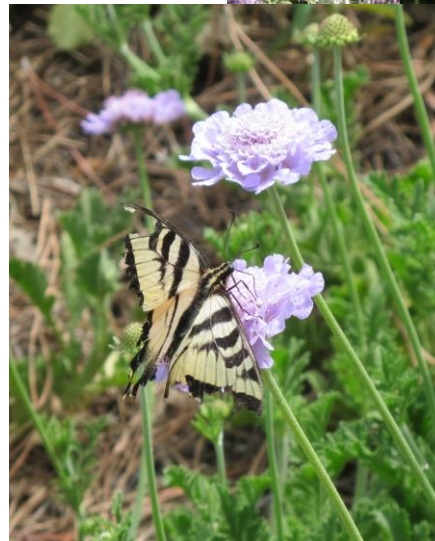
# Some recommended plants

- Need regular and **consistent moisture** to perform
  - *Helenium* (inconsistent)
  - *Salvia* 'Indigo Spires'
  - *Rudebeckia hirta*



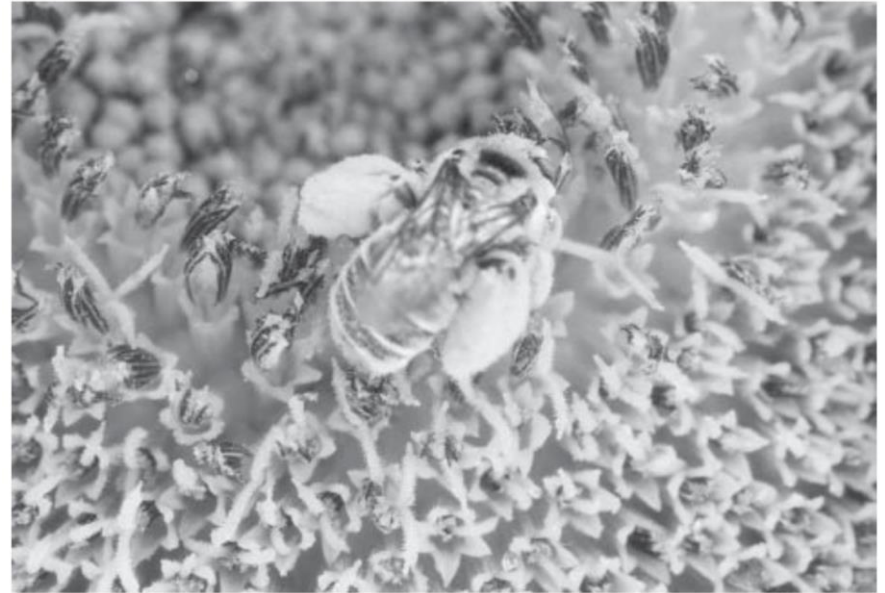
# The “tough ones” long lived in the Arboretum, low water

- *Perovskia atriplicifolia*, Russian sage
- *Nepeta X faasennii*, catmint
- *Scabiosa atropurpurea*



# Another source of information

- Fremontia, the Journal of the California Native Plant Society July-October 2002
- Study on role of native bees in Capay Valley.



*Diadasia*, the sunflower bee, on *Helianthus annuus*. Photograph by D.L. Briggs.

## NATIVE BEES, NATIVE PLANTS, AND CROP POLLINATION IN CALIFORNIA

by Claire Kremen, Robert L. Bugg, Nikki Nicola, Sarah A. Smith,  
Robbin W. Thorp, and Neal M. Williams

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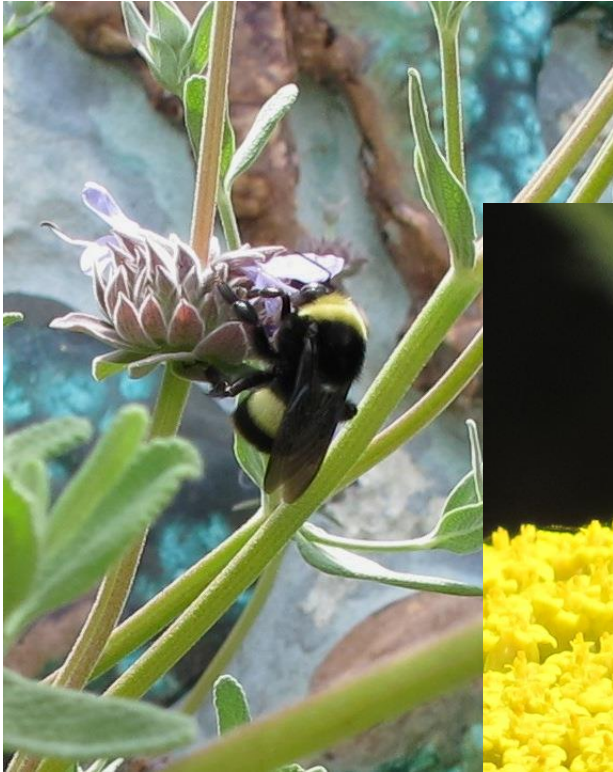
		NUMBER OF BEE SPECIES					
Plant species	Currently used in hedgerow or tailwater plantings	Important crop visitors	Other crop visitors	Parasitic bee crop visitors	Non-crop visiting bees	All bees	
Toyon	<i>Heteromeles arbutifolia</i> <sup>+</sup>	Y	10	8	1	20	39
CA buckwheat	<i>Eriogonum fasciculatum</i>	Y	8	8	4	11	31
---	<i>Baccharis salicifolia</i> <sup>+</sup>	Y	5	8	0	19	32
---	<i>Mentzelia laevicaulis</i> <sup>+</sup>	–	5	2	0	1	8
---	<i>Eriodictyon californicum</i> <sup>+</sup>	–	4	4	1	26	35
Redbuds	<i>Cercis occidentalis</i> <sup>+</sup>	Y	4	9	1	10	21
---	<i>Rosa californica</i> <sup>+</sup>	Y	4	1	1	0	6
---	<i>Lotus scoparius</i> <sup>+</sup>	–	3	3	0	15	21
Chamise	<i>Adenostoma fasciculatum</i> <sup>+</sup>	*	3	7	1	3	14
Lupine (ann)	<i>Lupinus succulentus</i> <sup>+</sup>	–	3	1	0	3	6
---	<i>Cornus sericea</i> <sup>+</sup>	*	3	3	0	1	6
---	<i>Eremocarpus setigerus</i>	–	3	1	1	1	6
Woolly sunflower	<i>Eriophyllum lanatum</i>	–	2	2	0	8	12
Coyote brush	<i>Baccharis pilularis</i> <sup>+</sup>	Y	2	4	0	6	12
---	<i>Hemizonia congesta</i>	–	2	0	0	1	3
---	<i>Lupinus microcarpus</i>	–	2	0	0	1	2
---	<i>Ceanothus cuneatus</i> <sup>+</sup>	Y	1	8	0	11	20
---	<i>Lepechinia calycina</i> <sup>+</sup>	–	1	4	1	10	16
California fuchsia	<i>Epilobium canum</i> <sup>+</sup>	*	1	4	0	4	9
---	<i>Stephanomeria virgata</i>	–	1	1	0	4	6
---	<i>Salix laevigata</i> <sup>+</sup>	Y	1	4	0	2	7

These local species can be added to our gardens to enrich them for bees.

- Starting to mix more of these in ornamental landscapes



What are best plants we have seen so far?



# Some recommended plants: buckwheats

*Eriogonum grande var rubescens*



*Eriogonum fasciculatum*  
California buckwheat





Early shrubs: *Arctostaphylos densiflora*  
'Howard McMinn'



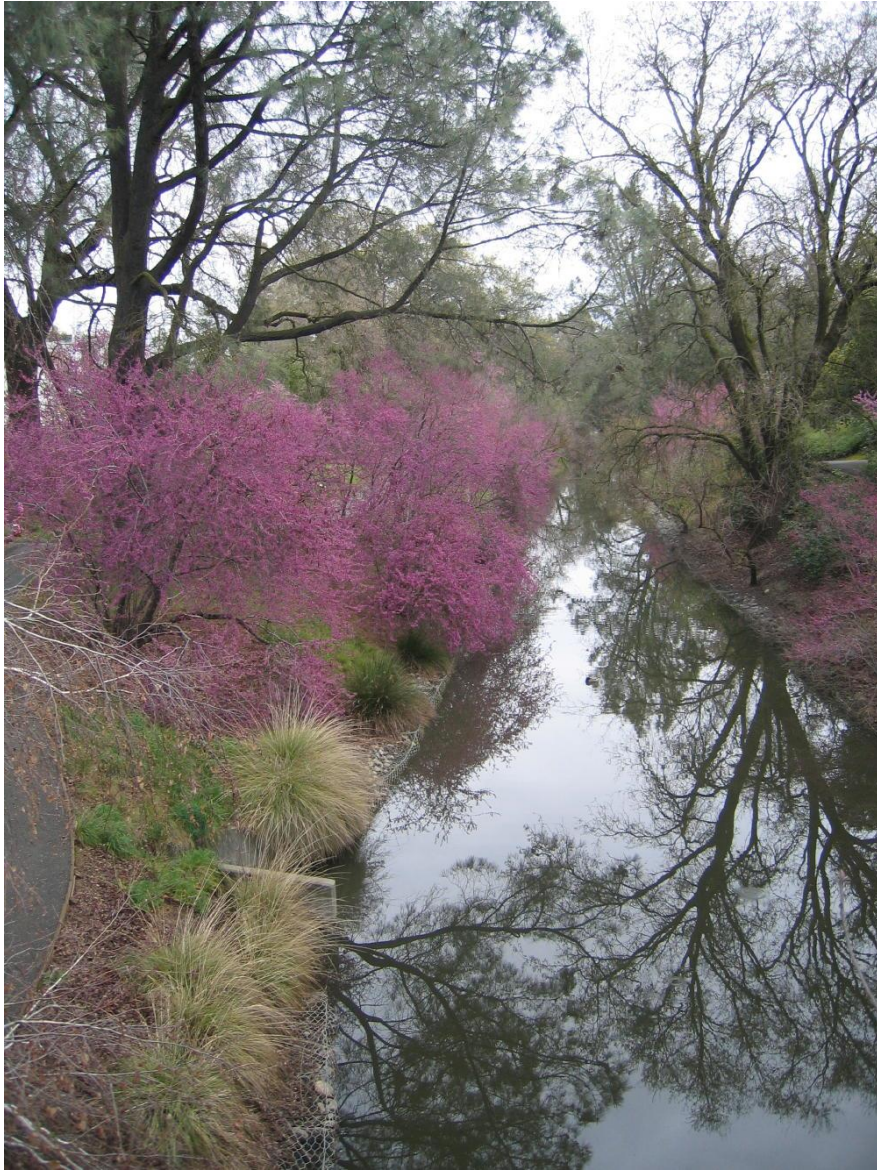
*Arctostaphylos pajaroensis*



Woody plants for native bees: *Cercis occidentalis*,  
redbud



Western redbud: native to the Putah Creek watershed “native here”



# Toyon

*Heteromeles arbutifolia*



# *Ceanothus* 'Ray Hartman'



# California Lilac

- *Ceanothus maritimus* 'Valley Violet'
- *Ceanothus* 'Concha'



# Berberis aquifolium 'Compactum'

- shiny, evergreen
- Yellow flowers in spring
- A number of different varieties available

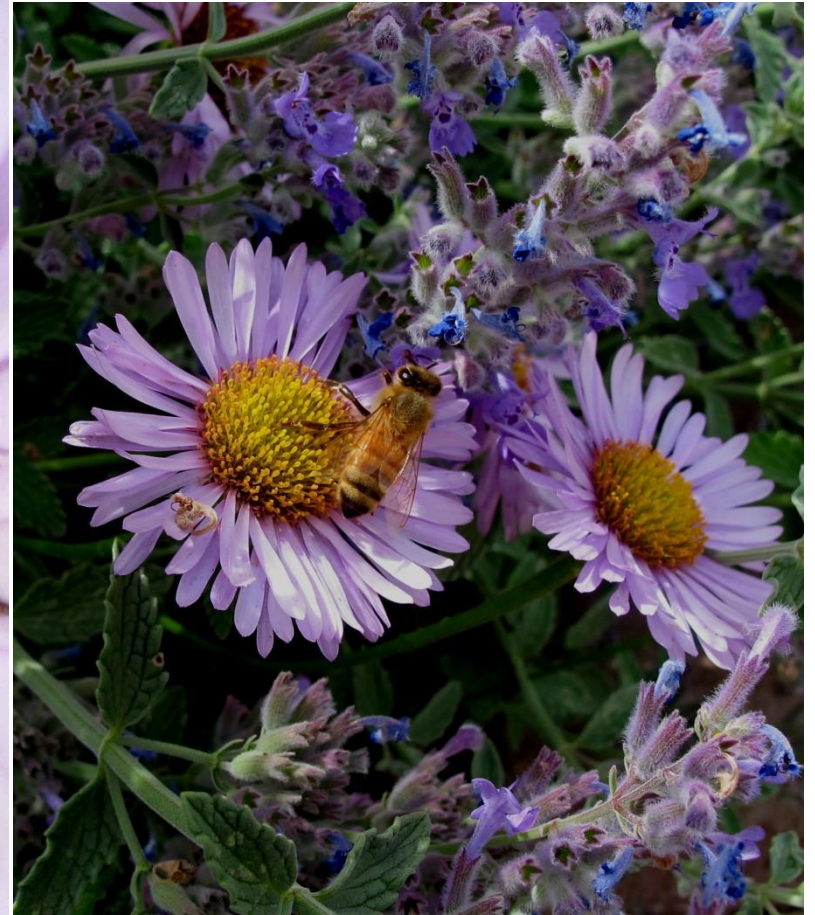




*Lavandula* 'Goodwin Creek Grey'  
*Lavandula stoechas* 'Otto Quast'



# Seaside daisy (*Erigeron*) Popular with many bees



for later season bloom: Goldenrod and asters



*Sedum* 'Autumn Joy', many new varieties too



*Epilobium canum*, California fuchsia



# Combinations of Mediterranean and California plants **early season**



- Spanish lavender (*Lavandula* ‘Otto Quast’ )
- Catmint (*Nepeta X faasennii*)
- Toyon or Christmas berry (*Heteromeles arbutifolia*)
- Seaside daisy (*Erigeron* ‘W.R.’)

Natives can be arranged in pleasing combinations: **mid to late season**



goldenrod

*Solidago* 'Cascade Creek'

pink buckwheat

*Eriogonum grande* var.  
*rubescens*

California fuchsia

*Epilobium canum*

# All of this effort is to increase diversity

- More plant types and larger patches result in greater abundance and diversity
- Diversity of ecosystems contributes to their stability under stress





# Why convert to pollinator supporting landscapes?



“Gardens can provide oases of safe habitat for migration through ‘deserts’ of concrete or intensively cultivated farmland”

Royal Horticulture Society *The Garden* April 2012

# Our urban landscapes

- Will then contribute to ecosystem services
- Provide sustenance for a diversity of pollinators
- Possibly even supply needed services to create food stability



Thank you!

