Landscaping With California Native Plants

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0. Topics

1. Introduction
2. Why California Native Plants?
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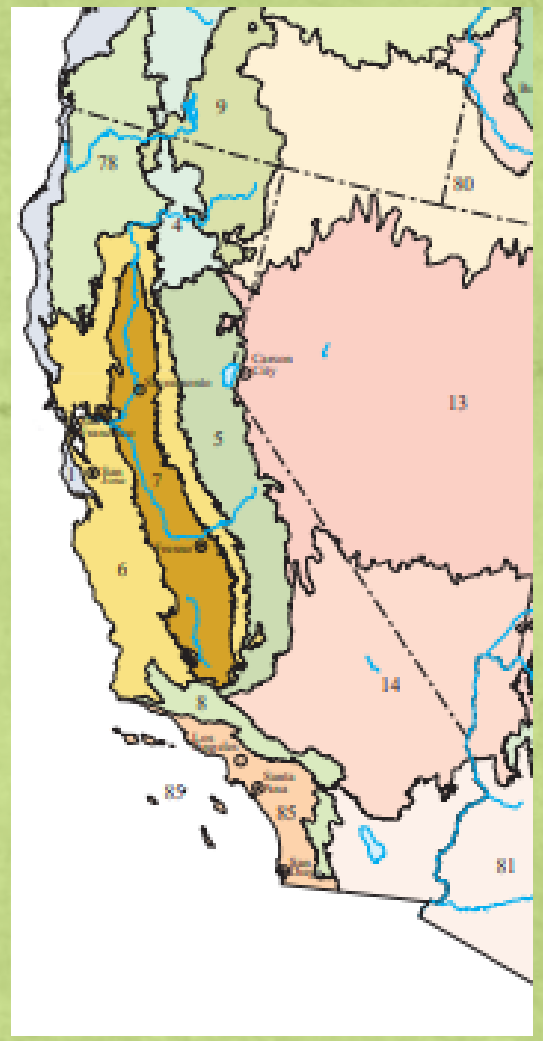
1. Introduction: What's a native plant?

- Plant growing in North America before European settlement, beginning in the 16th century
- Introduced plants often upset, even destroyed native ecosystems
- In some cases, we don't know the nature of the original landscape (San Joaquin Valley grasslands)
- Ecosystem management by indigenous peoples
- **Not really a wild, untamed nature untouched by human intervention** (cf. Anderson, *Tending the Wild*)

California Buckeye, *Aesculus californica*

1. Introduction: What's a California?

- Difficult to answer!
- Give a geographical & ecological characterization of the state
- Basically four regions:
  - Deserts: Mojave and Great Basin (Owens Valley)
  - Coastal forests north of San Francisco: redwoods
  - ➢ Mediterranean ecosystems: Central Valley grasslands, SoCal coastal chaparral, NorCal coastal chaparral, SoCal montane areas, Sierra foothills
  - ➢ Forested mountains: Sierra Nevada, Klamath Mountains, Eastern Cascades
- Many unique ecological niches within these regions
- Plants and animals with specialized adaptations
- **California Floristic Province**



Carrizo Plain: eastern San Luis Obispo County. Closest we have, it is believed, to the native plant ecosystem of the Central Valley

1. Introduction: California Floristic Province (CFP)

- 7,973 native plants
- 216 native tree species
- 1,443 native shrubs
- 3,698 perennial herbaceous plants
- 2,215 annual herbaceous plants
- Many endemic (only found in California) plants
- **Many extremely rare plants:** Case study—Franciscan Manzanita (*Arctostaphylos franciscana*)

96 species or subspecies of Manzanita in California, 105 worldwide. Indian Manzanita, *Arctostaphylos mewukka* (left) and *A.viscida*, Whiteleaf Manzanita (right)

CFP region

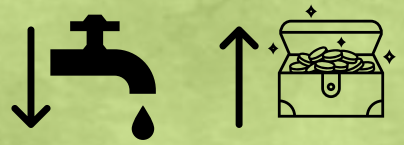
2. Why California native plants? Mediterranean climate is the key

- Mediterranean climate: hot, dry summers and cool, wet winters
- Very rare climate type: Mediterranean region, Chile, South Africa, southwest and south Australia
- **Plants must adapt to lack of summer water:**
  - Deep root systems
  - Waxy leaves, pores (stomata) only on bottom of leaf
  - High moisture content in leaves and stems
  - Grayish foliage: sunlight resistance

Canyon Live Oak (*Quercus chrysolepis*) leaf: top shiny green, bottom leathery; stomata on bottom only

2. Why California native plants? Deep root systems

- Once established, deep-rooted native plants need less (~50%) water than conventional landscape ornamentals
- Some plants require no summer water:
  - Native oaks in general
  - Flannel Bush
  - Silver Bush Lupine
- It generally takes one wet season for plants to establish deep roots; thereafter no supplemental water
- Watering oaks in the summer promotes a root fungus that can kill the tree
- Watering Silver Bush Lupine during the summer can shorten its lifetime
- **Save water & money:**



Flannel Bush (*Fremontodendron californicum*): evergreen, does not like summer water, deer resistant

2. Why California native plants? Foliage structure and color help retain moisture

- Native CA plants retain more water (up to 2X) in their leaves and stems than conventional landscape ornamentals
- Leaf structure and color:
  - Waxy surface slows transpiration (some species)
  - No stomata on top of leaf so water not lost in direct sunlight (some species)
  - Grayish color helps reflect intense sunlight (some species)
- **More foliage moisture means better fire resistance**

Silver Bush Lupine (*Lupinus albifrons*): evergreen, grayish leaf

Toyon (*Heteromeles arbutifolia*): evergreen, good leaf moisture

2. Why California native plants? You can always find a plant that works

- Vast differences among CA ecological regions:
  - Deserts
  - Rain forests
  - Coastal scrub and grasslands
  - Alpine areas
- Can also try Mediterranean climate plants from elsewhere:
  - Might be more attractive ornamentals, but…
  - Often not as cold-resistant
  - Often require more water
  - Often don't have equivalent foliage moisture content
  - May not be resistant to CA plant pathogens
- **Keep in mind: there is a native CA plant that will work**

Knobcone Pine (*Pinus attenuata*): low elevations, classic pine form

Coulter's Matilija Poppy (*Romneya coulteri*): winter deciduous; long, gray-green stems; huge flowers; "fried-egg plant". Was a candidate for CA State Flower, but lost in a landslide vote to the California Poppy, *Eschscholzia californica*

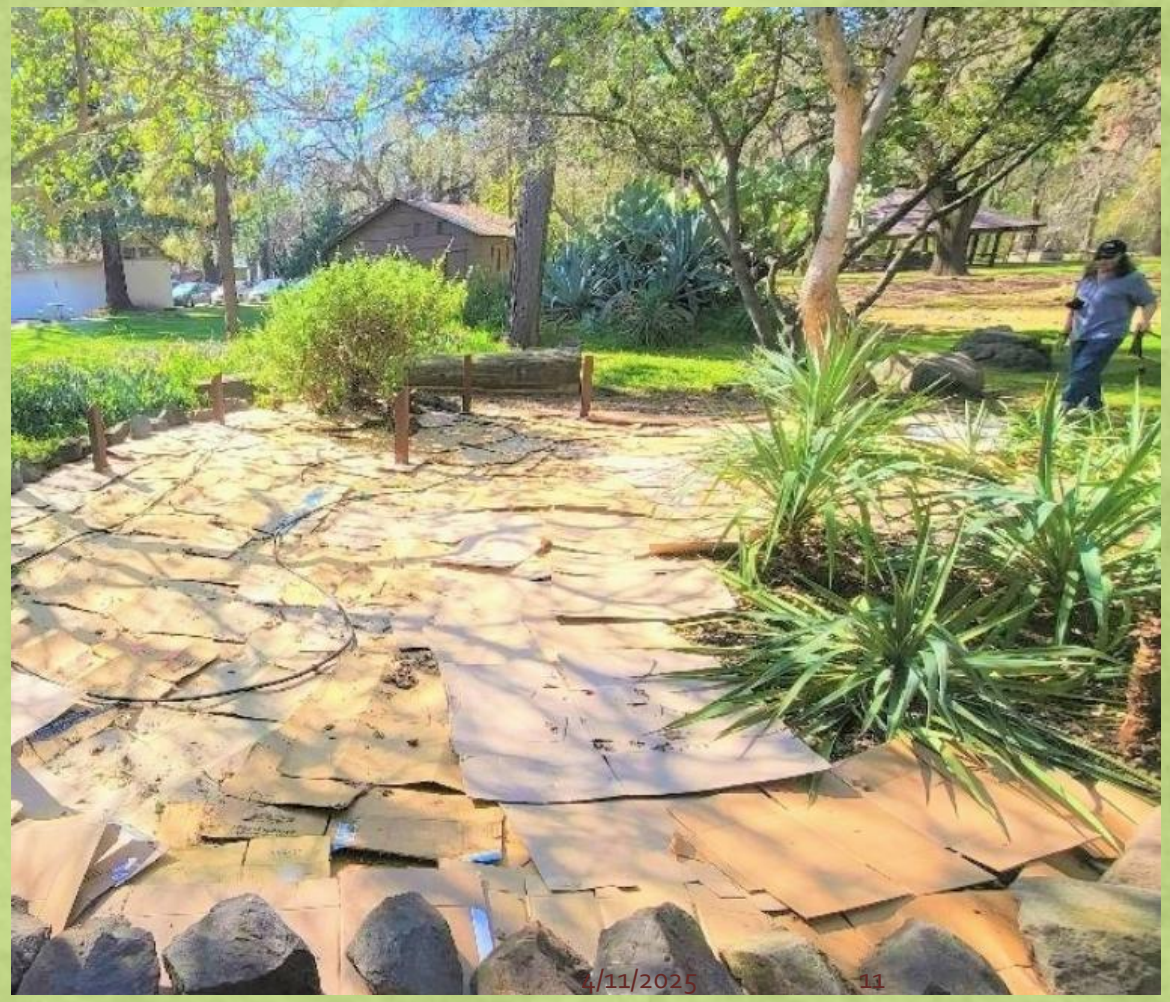
2. Why California native plants? Native wildlife dependencies and symbiotic relationships

- Many important dependencies for CA wildlife; example:
  - Native milkweeds in *Asclepias* genus
  - Monarch butterfly, *Danaus plexippus*
  - Monarchs mostly lay eggs on *Asclepias* genus milkweeds
  - Their caterpillars only eat milkweed foliage
- Be careful of Tropical Milkweed, *Asclepias curassavica*: host to a parasite (OE) harmful to Monarchs
- CA oak woodlands support 300 different species of vertebrates
- 1600 species of native CA bees
  - Often dependent on specific native plants
  - European honeybees, principal pollinators for agriculture, find Buckeye tree nectar to be toxic. Not so native bees
- *Ceanothus* genus shrubs are the most important nitrogen-fixer plants in western North America—source of protein for animals; **think: Buckbrush**

Blueblossom (*Ceanothus thyrsiflorus*): evergreen, abundant blue flowers in the spring, very popular climbing shrub in Europe and the U.K. Also, source of protein and calcium for animals.

3. Landscaping basics: Clear an area

1. Sheet mulching with cardboard is best::
   a) Cheap & get rid of all that cardboard from shipping boxes
   b) Suppresses weeds, organic, cardboard decomposes
   c) If there's an irrigation system, ensure that the risers are in place
2. Remove labels and tape from cardboard
3. Use large sheets, overlap them by 6-8 inches
4. Might need to stake sheets down; use a stick or wooden stake
5. Synthetic weed block cloth is OK for footpaths--covered with gravel, sand, slate, or decomposed granite
6. Water down cardboard to seal sheets together (sort of)
7. Cover cardboard with 2-4 inch layer of coarse mulch: oak or pine chips are good, as is shredded redwood bark
8. Dig holes through the mulch & cardboard for setting plants



3. Landscaping basics: Put a plant in the ground

1. 1, 2, or 3 gallon plants are better starters than 5 or 15 gallon plants:
   a) Cheaper
   b) Often grow larger over time
   c) Fewer root problems from container life
2. Plan your areas:
   - Supplemental summer water required
   - No summer water
   - Group plants accordingly
3. Dig a hole twice as big as container; rough up the sides
4. Deep enough so that plant root ball becomes level with ground or ½ inch higher; don't put the plant in a trough!
5. Set plant, refill hole with original soil, no amendments. Gopher screen? Deer?
6. Mulch around plant, not right up to stem
7. Water thoroughly to remove air pockets

3. Landscaping basics: Water a plant

1. Fall and winter planting:
   a) Water the plant in well
   b) If there are good rains, no supplemental water is needed
   c) The plant will continue to put down roots over the winter and spring
   d) If there's a dry spell or dry winter, supplemental water is necessary

2. Spring and summer planting:
   a) Water the plant in well
   b) Apply 1 gallon of water once per week, water larger plants proportionately
   c) After the first soaking rain in the wet season, stop supplemental watering
   d) Plant will continue to establish itself over the winter and spring

3. Rule of thumb: If a plant is droopy in the late afternoon, that's normal. If the same plant is droopy the next morning, then it needs water

4. If watering by hose, water the area around the plant, not right at the stem, to promote root growth. And give the plants a little rinse; they like it

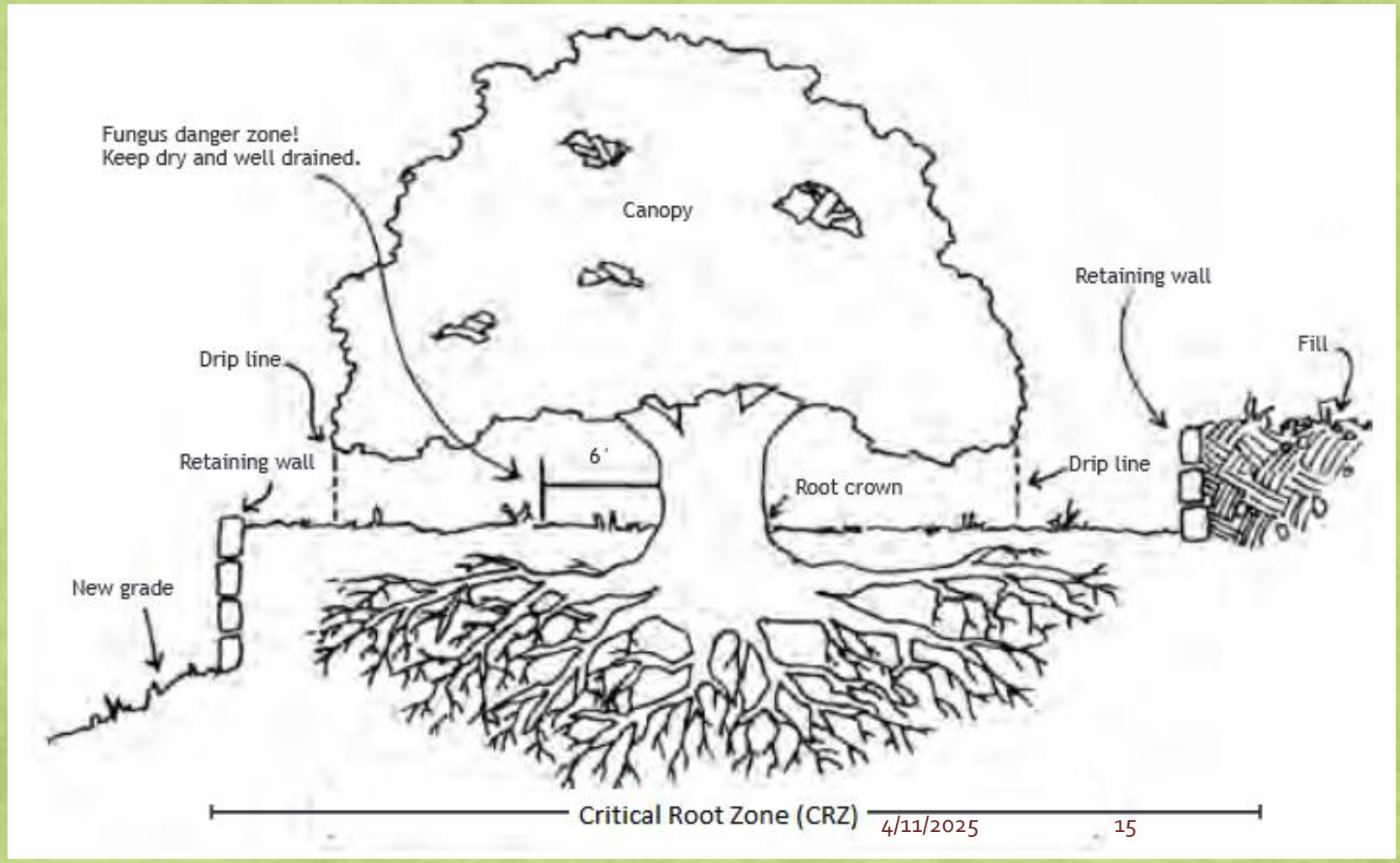
5. **Generally, CA native plants should be allowed to dry out a bit between waterings; they generally don't like soggy roots**

3. Landscaping basics: Irrigation

- Drip, sprinkler, or hose?
- Disadvantages of drip system:
  - Create a mud pocket underground near the plant
  - Don't moisten the mulch layer; it stays dry and decomposes into the soil very slowly
  - In general, native plants don't like the mud pocket
- Some sprinklers create a mist which is easily evaporated
- Recommendation: Hunter MP Rotator product line--
  - Thin stream of heavy drops; don't evaporate before hitting the ground
  - All kinds of coverage options and range
  - Set for early A.M. operation to ¼ inch depth twice per month
  - Moisten the mulch, promote decomposition
  - Give the plants a simulated summer shower: they like it
- **The garden hose is pretty good too; you just have to remember to do it**

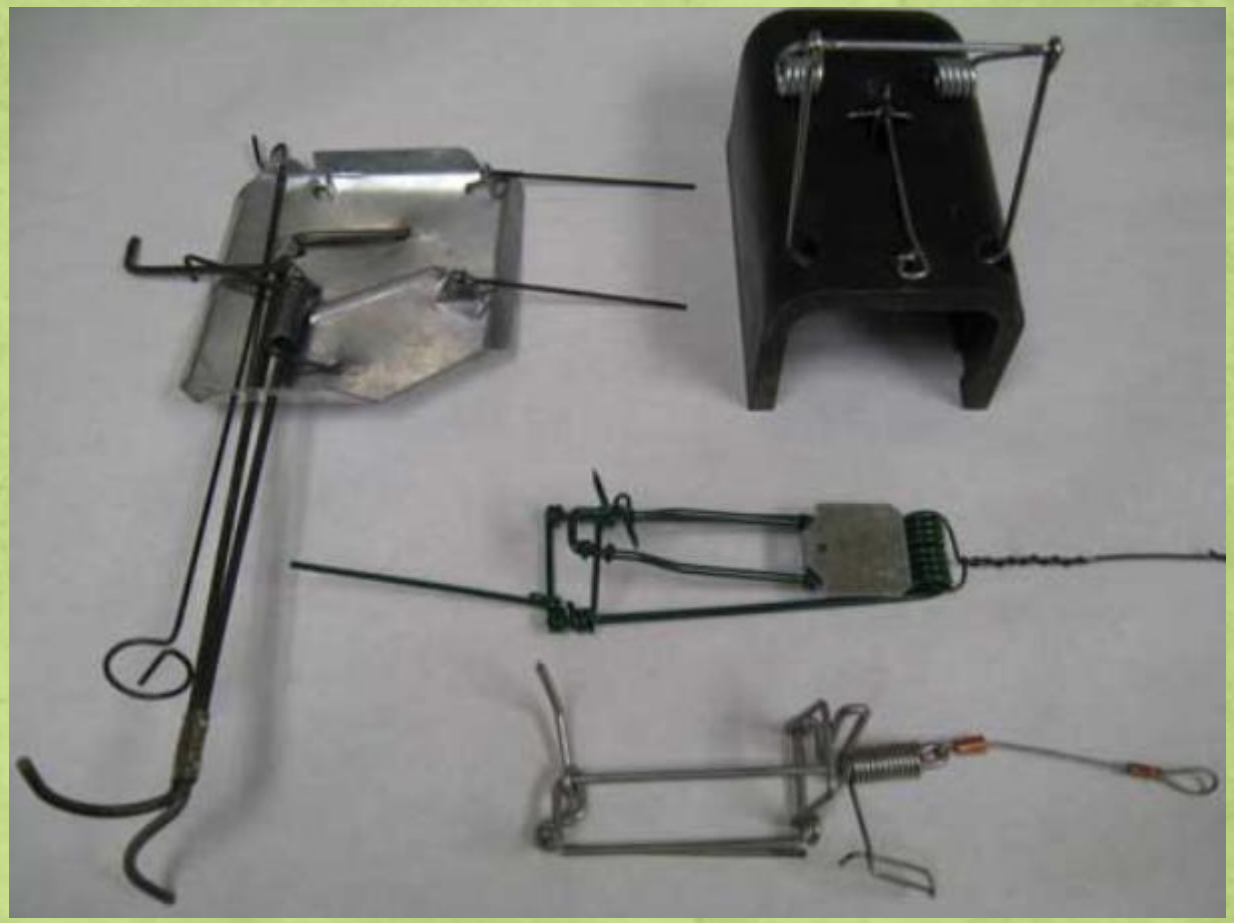
3. Landscaping basics: About that oak tree

- Do not water an established oak in the summer:
  - Can promote a soil fungus that can attack the roots and kill the tree
  - Native CA oaks may drop their leaves in hot, dry weather
  - It's a defense by the tree to preserve water
- No plants within 6 feet of the trunk
- A few native CA plants within the drip line is OK
- Avoid excavation, construction, or operating heavy vehicles in the Critical Root Zone
- Prune in the late fall & early winter; near structures maintain 6 feet clear under the tree
- Allow leaf litter to accumulate under the tree
- **Never prune more than 20% of the canopy at one time. Never prune more than 30% of the canopy within a 2-year period**



3. Landscaping basics: Pests, greatly simplified

- Gophers are probably the #1 threat:
  - Use a gopher screen: Make your own from hardware cloth or buy ready-made meshes; should extend 3-4 inches above ground
  - Best to use traps not poisons
  - Raised beds with ½-inch hardware cloth underneath good choice
- Deer right in line behind gophers:
  - Stakes and screen around young plants
  - Tricks such as sprinklers, pinwheels, and chimes don't work
  - Floppy fence or rigid fence 7 feet high
- Insects:
  - Try to rely on predators such as lady beetle
  - Sucking insects: 1% solution Dawn dishwashing liquid spray; rinse after 1-2 hours; or, a Spinosad-based insecticide
  - Foliage eating insects: Bt-based insecticide
- Squirrels: traps again best; avoid spreading poisons to wildlife and pets
- **IPM: Integrated Pest Management—some damage from pests is acceptable, minimize pesticides, keep plants healthy**



4. Specific applications: Lawn removal

- Something to consider, unless you need the grass for recreational purposes:
  - It's a tremendous waste of water
  - Generally has no ecological value
  - It's not a very good defense against wildfire
  - Mowing is a waste of gasoline and electricity
  - Probably takes a lot of chemicals to look good
- If you want the "lawn aesthetic", you can replace your lawn with CA native grasses or sedges:
  - Half the water requirements compared to traditional turf grasses
  - Stay greener longer into the hot season, because of deeper roots
  - Some can be mowed as well
- Clustered Field Sedge (*Carex praegracilis*) is a great choice; can be mowed to 3-4 inches
- Idaho Fescue (*Festuca idahoensis*) has a bluish tint; looks like a blue meadow
- Foothill Sedge (*Carex tumulicola*) is another meadow sedge good for lawn replacements
- **Sheet mulching the lawn and putting down native shrubs and hardscape is great too**

Idaho fescue (above), bluish bunch grass.
Clustered Field Sedge (right) as a meadow, but can be mowed & accepts foot traffic

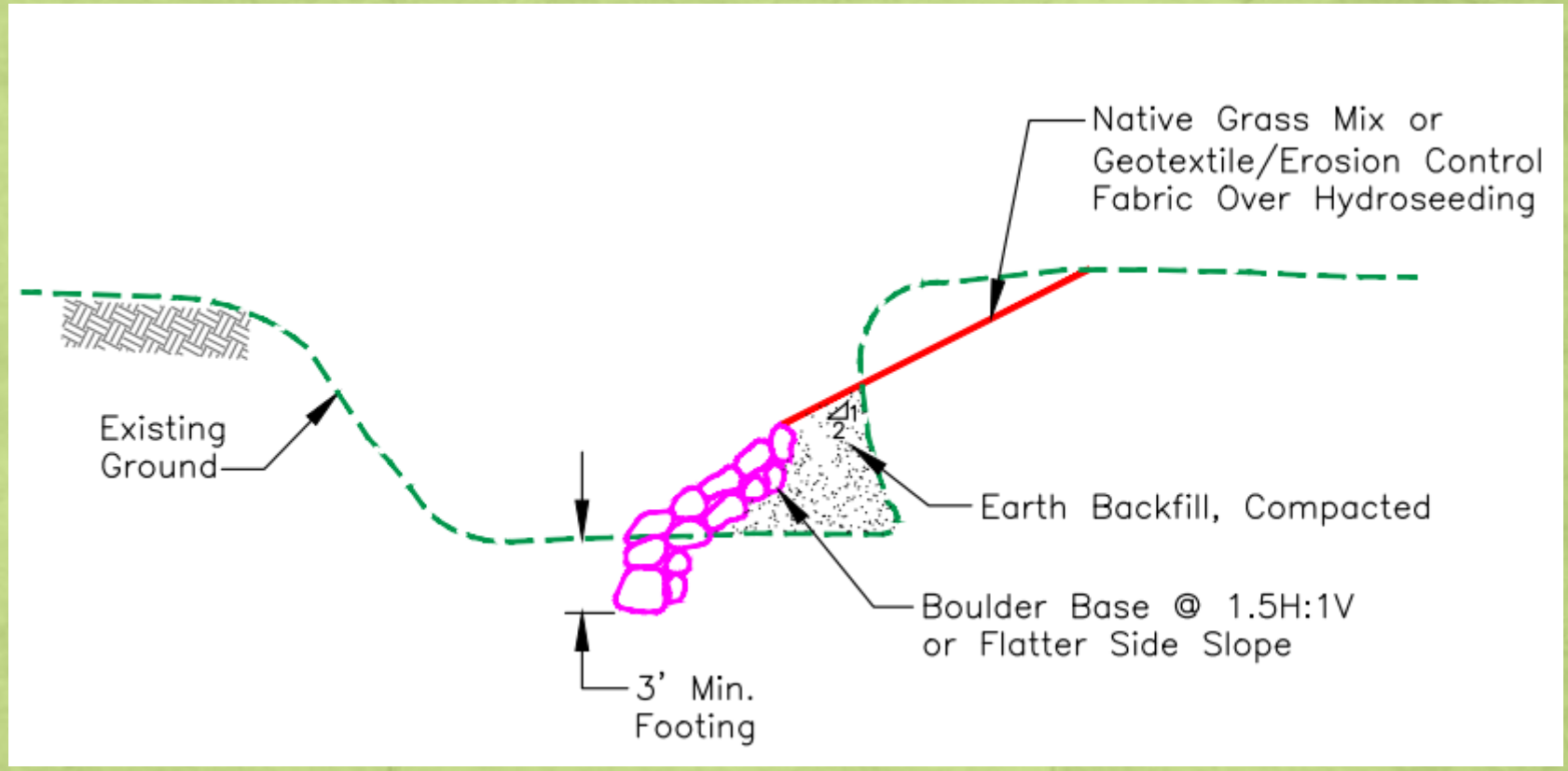
4. Specific applications: Pollinator gardens

- Bees, butterflies, moths, and birds attracted to flowering plants
- *Asclepias* genus milkweeds to support the monarch butterfly:
  - Monarch females only lay eggs on *Asclepias* genus milkweeds
  - Their caterpillars feed on milkweed foliage
  - Milkweeds are deep-rooted and some maintain their green leaves and flowers until winter
- Hummingbirds: California Fuchsia (*Epilobium canum*) and Coyote Mint (*Monardella villosa*) are great choices
- Some late season flowers:
  - Great Valley Gumweed (*Grindelia camporum*)
  - California Aster (*Symphyotrichum chilense*)
  - California Buckwheat (*Eriogonum fasciculatum*)—no summer water
- Plants in the *Salvia* genus are popular
- **See Schmidt & Greenberg, *Growing California Native Plants*, UC Press, 2012; and Rubin & Warren, *Drought-Defying California Garden*, Timber Press, 2016**

Monarch butterfly (above) on Narrowleaf Milkweed, *Asclepias fascicularis*; California Fuchsia (above right); Coyote Mint (below right)..

4. Specific applications: Bank stabilization

- Deep-rooted plants required
- Almost any CA native plant will suffice if it tolerates the sun exposure at the site
- Main worry is usually stream banks:
  - Geotextiles
  - Hydroseeding (watch out for seed species)
  - Native grasses and other plants
- Plants to consider:
  - Purple Needle Grass (*Nassella pulchra*)
  - Showy Milkweed (*Asclepias speciosa*)
  - California Buckwheat (*Eriogonum fasciculatum*)
  - Arroyo Willow (*Salix lasiolepis*)
  - Bigleaf Maple (*Acer macrophyllum*)
- **Riparian grass-like plants such as sedges (*Carex* spp.) and rushes (*Juncus* spp.) are good choices near water**



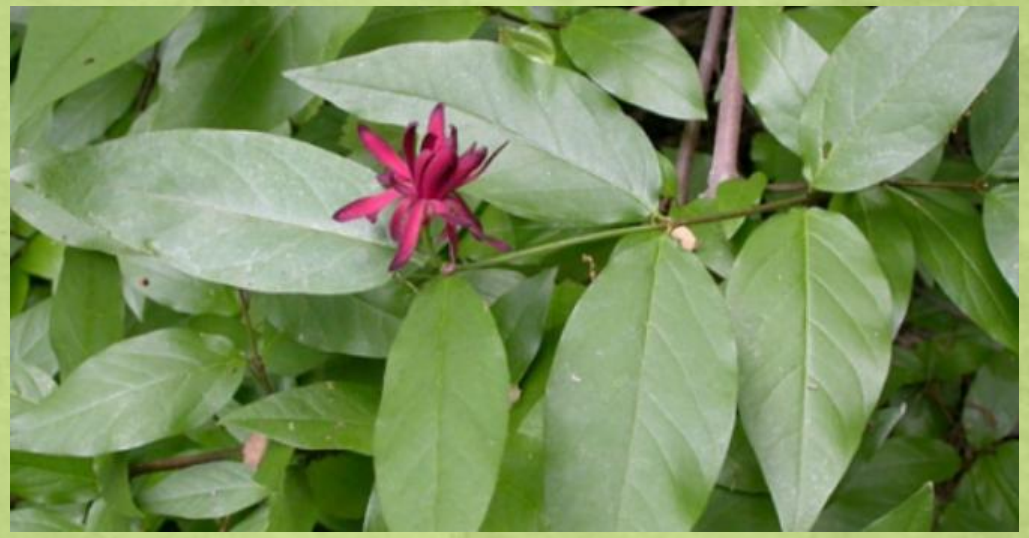
4. Specific applications: Ground covers

- Low-growing plants required
- Sun exposure and water requirements must be considered
- Plants to consider:
  - Kinnikinnick (*Arctostaphylos uva-ursi*)
  - Hummingbird Sage (*Salvia spathacea*)
  - Dwarf Oregon Grape (*Mahonia repens*)
  - Indian Lettuce [Rooreh, Miner's Lettuce] (*Claytonia perfoliata*)
  - Pinemat [Mahala Mat] (*Ceanothus prostratus*)
- **Avoid noxious non-natives such as English Ivy and Vinca Minor**

Kinnikinnick (above); Hummingbird Sage (above right); Pinemat (below right)..

4. Specific applications: Hedgerow

- Quick growing shrubs and small trees
- Probably full-sun plants
- Plants to consider:
  - Blue Elderberry (*Sambucus nigra (mexicana)*)
  - Desert Willow (*Chilopsis linearis*)
  - Spice Bush (*Calycanthus occidentalis*)
  - Toyon (*Heteromeles arbutifolia*)
  - Deerbrush (*Ceanothus integerrimus*)
  - Lemonade Berry (*Rhus integrifolia*)
  - California Wild Grape (*Vitis californica*)
  - Sugar Bush (*Rhus ovata*)



Blue Elderberry (above left) is quick growing to 10-12 feet; winter deciduous, and has edible berries; Spice Bush (above) has lush green foliage with a camphor aroma, is winter deciduous, and has deep red flowers; Lemonade Berry (below left) is an evergreen shrub/small tree with berries that can be used to make a decent lemonade.

5. Fire!

5. Fire! How did the Millikin's house survive?

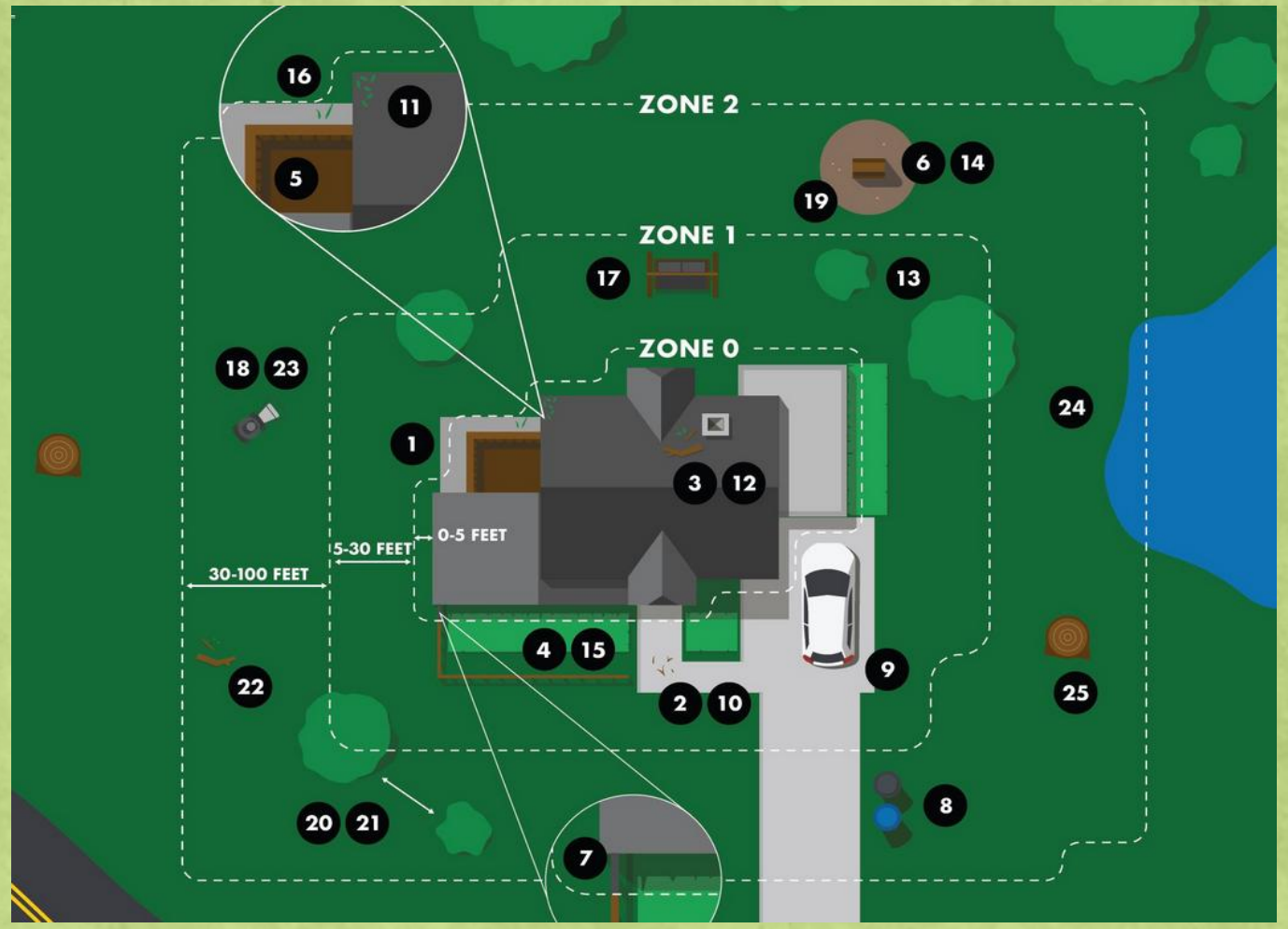
- Couple purchased the 100-year-old house in 2021 and began to remodel it
- Replaced asphalt roof with commercial grade steel roof
- Worried about termite damage, they removed vegetation around the structure and placed river rock adjacent to the outside walls
- According to fire experts the Millikin's establishment of a combustibles-free Zone Zero around the house was the key to saving it
- **Blown embers: (1) hit the roof, fall off and ignite surrounding vegetation; or (2) are blown against house walls, fall to the ground, and catch combustibles on fire**

5. Fire! Clear the landscape around a house?

- Blown embers are the main threat to structures in a wildfire
- A clear landscape promotes a **laminar flow** in the wind
- Laminar flow forcefully carries embers up to an obstruction, i.e. a house
- Well-placed vegetation around a structure breaks up laminar flow, creating a **turbulent flow**
- Turbulent flow is more likely to drop embers; less likely to strike house
- Properly situated plantings break down laminar winds and protect structures from blown embers
- **No, do not completely clear landscape around structures!**

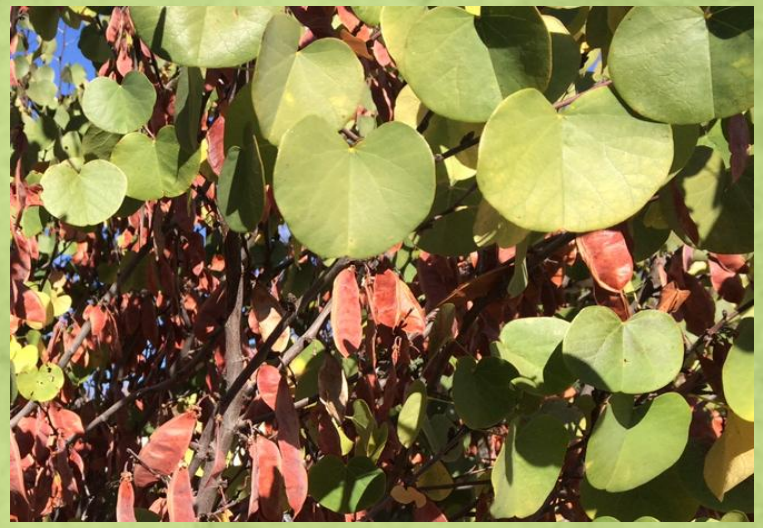
5. Fire! Importance of defensible space zones

- Zone 0 [0-5 feet]: hardscape only, no flammable materials or plants
  - Hardscape: gravel, pavers, sand, concrete apron
  - No combustible fencing, trellises, arbors attached to house
  - No branches overhanging roof
  - No branches within 10 feet of chimney
- Zone 1 [5-30 feet]: well-spaced trees, shrubs, and grasses
  - 10 foot separation between trees
  - 6 foot clearance to branches for trees (minimum)
  - 3X rule for plants under trees
- Zone 2 [30-100 feet/property line]:
  - The Zone 1 rules for separation and clearance apply
  - Mow grasses to 4-inch height
  - Leaf litter, dead branches, etc. to 3-inch depth
- **Zone 0 is new; wildfire experts believe, however, that it's the most important (Lahaina)**



5. Fire! Plant selection: It's mostly wide open

- Almost all CA natives are adapted to wildfire
  - 15 million years of evolution under fire regime
  - They don't burn readily…if they are well-watered
- The kind of plant you select is almost irrelevant!
- Some considerations, though, in plant selection:
  - Avoid resinous trees and shrubs near structures
  - Pines, cedars, manzanitas
  - Watch out for shrubs that develop woody, dry interior branches
  - Favor evergreen shrubs and trees in Zone 1
  - Succulents and irises: good, fire-resistant choices
- Layout principles:
  - Space them out, 2 feet between clusters
  - Stagger them so no clear path for wind to house
  - Thin layer of coarse mulch or hardscape
  - Regular, light watering keeps plants well-hydrated and mulch moistened
- **Arrangement of plants is key**



Western Redbud (*Cercis occidentalis*, above left and right) maintains good leaf and stem moisture during the summer and looks great in early spring. Douglas Iris (*Iris douglasiana*, left) and other plants in the iris family, such as Blue-Eyed Grass (*Sisyrinchium bellum*), are excellent low-water, fire-resistant plants

5. Fire! Landscape design with fire in mind

Dry stream bed separates plant groups with different water requirements

Hardscape path between bands of native plants: trap and snuff embers

5. Fire! OK, that didn't work: Fire restoration

- Immediate concern is erosion control:
  - Soil might be hydrophobic: the fire so hot that organics are burned out and it can't absorb water
  - Wattles, berms, rock barriers, split logs on slopes, but…
  - Shredded redwood bark is good, but must be watered down
  - T-stakes and woven branches in stream beds
- Might need soil amendments:
  - Mulch to begin rebuilding soil
  - Ordinarily don't add soil amendments to new plants
  - Add mycorrhizal fungi soil amendments, especially for very hot fires
- Do not reseed with annual grasses, such as rye: more harm than good, long-term
- **Work your way away from structures, keeping in mind the concepts of defensible space**

Drive t-stakes across an arroyo where erosion is anticipated. Weave fallen, burned branches into the stakes. Also, build one-rock dams (ORD)—a layer of rocks with the largest ones across the streambed on the upstream side. An ORD is an easy and effective way to slow water flow and build up local ground water.

5. Fire! Basic restoration principles—some things *to do*

- Seed with native species:
  - Bulk native plant seed can be hard to obtain (but Hedgerow Farms, Winters, CA is a source)
  - Good choice if the site did not have native grasses before the fire
  - If the site did have natives prior to the fire, then the plants will come back on their own
  - Select native species appropriate to the local ecology
- Larger landscape plants:
  - Plant conifers and broadleaf trees according to the site ecology
  - Shrubs and small trees can be planted, working out from structures
- Replanting work needed on flats and slopes
- **Riparian area plants will usually reestablish themselves quickly and naturally**

Natural recovery of a chaparral and meadow area after the Valley Fire, Lake County, CA (2015)

6. Resources

1. Calscape web site, California Native Plant Society: https://calscape.org/
2. https://www.cnps.org/gardening/prepping-and-planting/planting-california-natives
3. Santa Clara Valley Water District: Bank Stabilization Methods (PDF)
4. https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/
5. https://www.cnps.org/flora-magazine/fire-resistant-landscaping-23654
6. https://ucanr.edu/sites/fire/Recovery/ForestRecovery/TreeMortality/
7. CNPS Guide to Fire Recovery (need to register, but free for download)
8. Help line, UC Master Gardeners, Mariposa County: (209) 966-7078

7. References

1. Kat Anderson, *Tending the Wild*, (Berkeley: University of California Press), 2005
2. M. Schmidt & K. Greenberg, *Growing California Native Plants*, (Berkeley: UC Press), 2012
3. G. Rubin & L. Warren, *Drought-Defying California Garden*, (Portland: Timber Press), 2016
4. R.W. Halsey, *Fire, Chaparral, and Survival in Southern California*, (San Diego: Sunbelt), 2005
5. G. Rubin & L. Warren, *California Native Landscape: The Homeowner's Guide to Restoring Its Beauty and Balance*, (Portland: Timber Press), 2013