

RESILIENT LANDSCAPING: Gardening in the Defensible Space Zone

*Garden as if life
depends on it!*

For Santa Rosa Area Communities

In Partnership with:
City of Santa Rosa Water Department

Presented By:
Resilient Landscapes Coalition

Funded By: County of Sonoma

October 11, 2022



Resilient

- a. capable of withstanding shock without permanent damage or rupture
- b. tending to recover from or adjust easily to misfortune or change

THIS IS A WEBINAR:
YOU DO NOT HAVE AUDIO
OR VIDEO ACTIVATED

THIS WEBINAR IS BEING
RECORDED.

QUESTIONS: WILL BE
TAKEN FROM THE Q&A
BOX ONLY.



(back to front)

Arctostaphylos 'Sunset': manzanita

Epilobium canum: California fuchsia

Stipa pulchra: purple needlegrass

Resilient Landscapes Coalition

Our Team:

- Fire Safe Sonoma firesafesonoma.org
 - **Roberta MacIntyre**
 - **Marika Ramsden**
- Habitat Corridor Project habitatcorridorproject.org
 - **April Owens**
- Sonoma Ecology Center sonomaecologycenter.org
 - **Ellie Insley**
 - **Jon Kanagy**
- UC Master Gardener Program, Sonoma County sonomamg.ucanr.edu
 - **Mimi Enright**
 - **Jennifer Roberts**

In Partnership with:

- County of Sonoma Fire Prevention Division
- CAL FIRE & Local Fire Departments

More info at: **SonomaResilientLandscapes.com**

Outline

- **Fire Context, Ecology & Sustainability**
Jon Kanagy (25 minutes)
- **Design and Maintenance Principles**
Mimi Enright (25 minutes)
- **Landscape Design and Planting Examples**
April Owens (25 minutes)
- ? **Questions & Conversation** (30 minutes)



**Defensible Space that is Beautiful, Sustainable,
and Biodiverse**

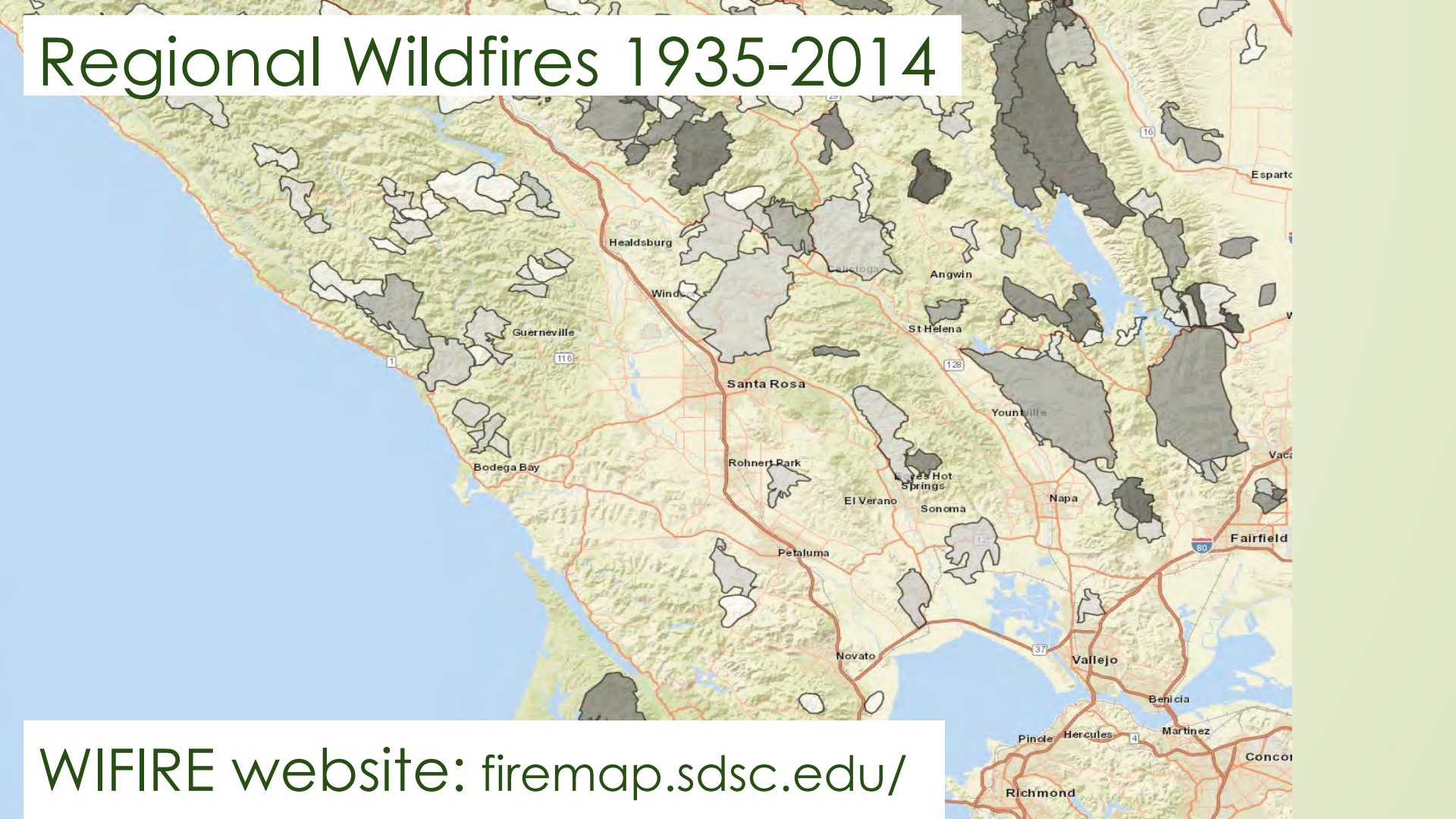


“The myth of the moonscape”





Regional Wildfires 1935-2014



WIFIRE website: firemap.sdsc.edu/

Regional Wildfires 2015-2020

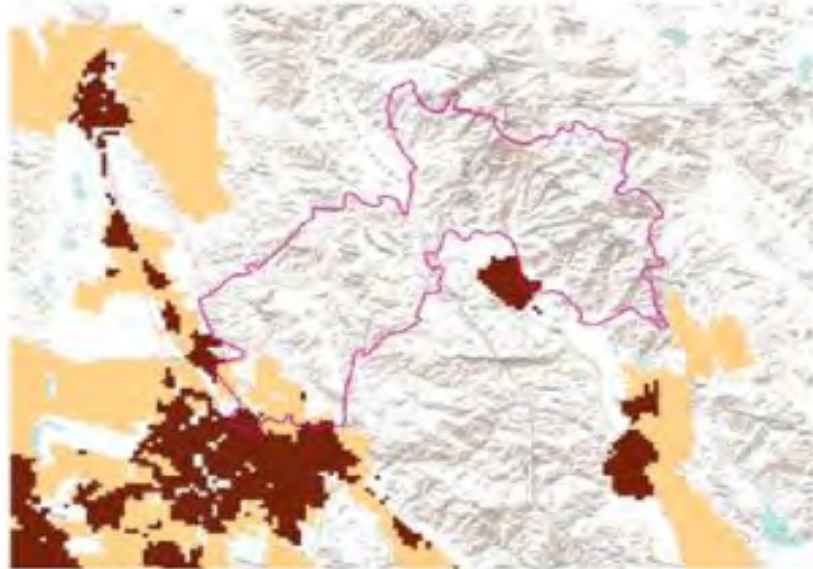


WIFIRE website: firemap.sdsc.edu/

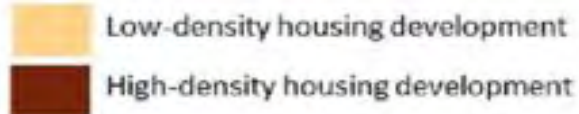
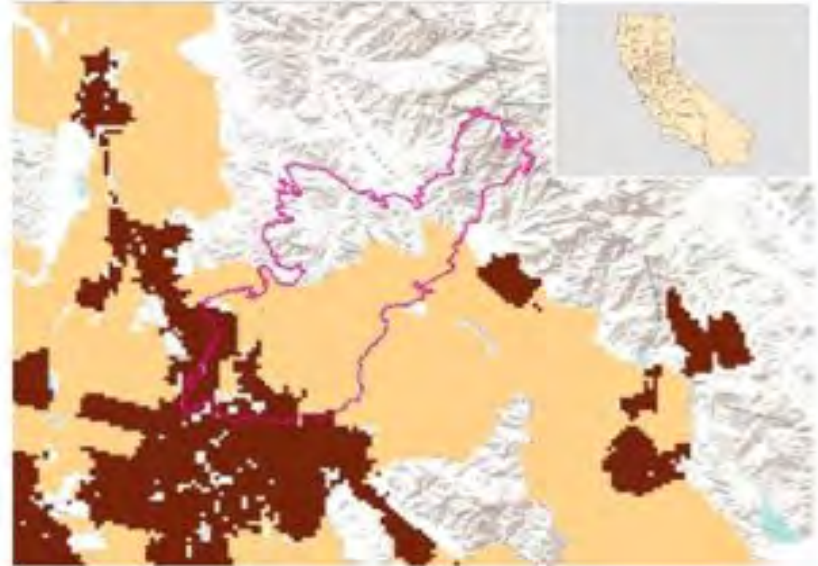
Wildland Urban Interface



a 1964 Hanly Fire



b 2017 Tubbs Fire



Jon E. Keeley and Alexandra D. Syphard,
Fremontia, 47(2), 2020.

Wildland Urban Interface

- WUI: an area where homes and associated structures are built adjacent to or among forests, shrubs, or grasslands.
- Climate change + fire suppression + increased development in wildland = increased fire risk
- = increased potential for catastrophic fire
 - loss of homes & lives; air/water pollution, disposal, increased use of resources to rebuild



CONTINUUM OF WILDLAND TO URBAN DENSITIES



Know your Hazard Zone LRA or SRA

Sonoma County Fire Hazard Severity Zones adopted by CAL FIRE 2007

Defensible Space Regulations:

- State Public Resources Code 4291 (SRA)
- Local Ordinances: Sonoma County Ordinance Chapter 13A; City of Santa Rosa
- Additional requirements in **High and Very High Fire Hazard Severity Zones**

FIRE HAZARD SEVERITY ZONES in State Responsibility Area (SRA)

- Moderate
- High
- Very High

FIRE PROTECTION RESPONSIBILITY

- Federal Responsibility Area (FRA)
- Local Responsibility Area (LRA) - Unincorporated
- Local Responsibility Area (LRA) - Incorporated

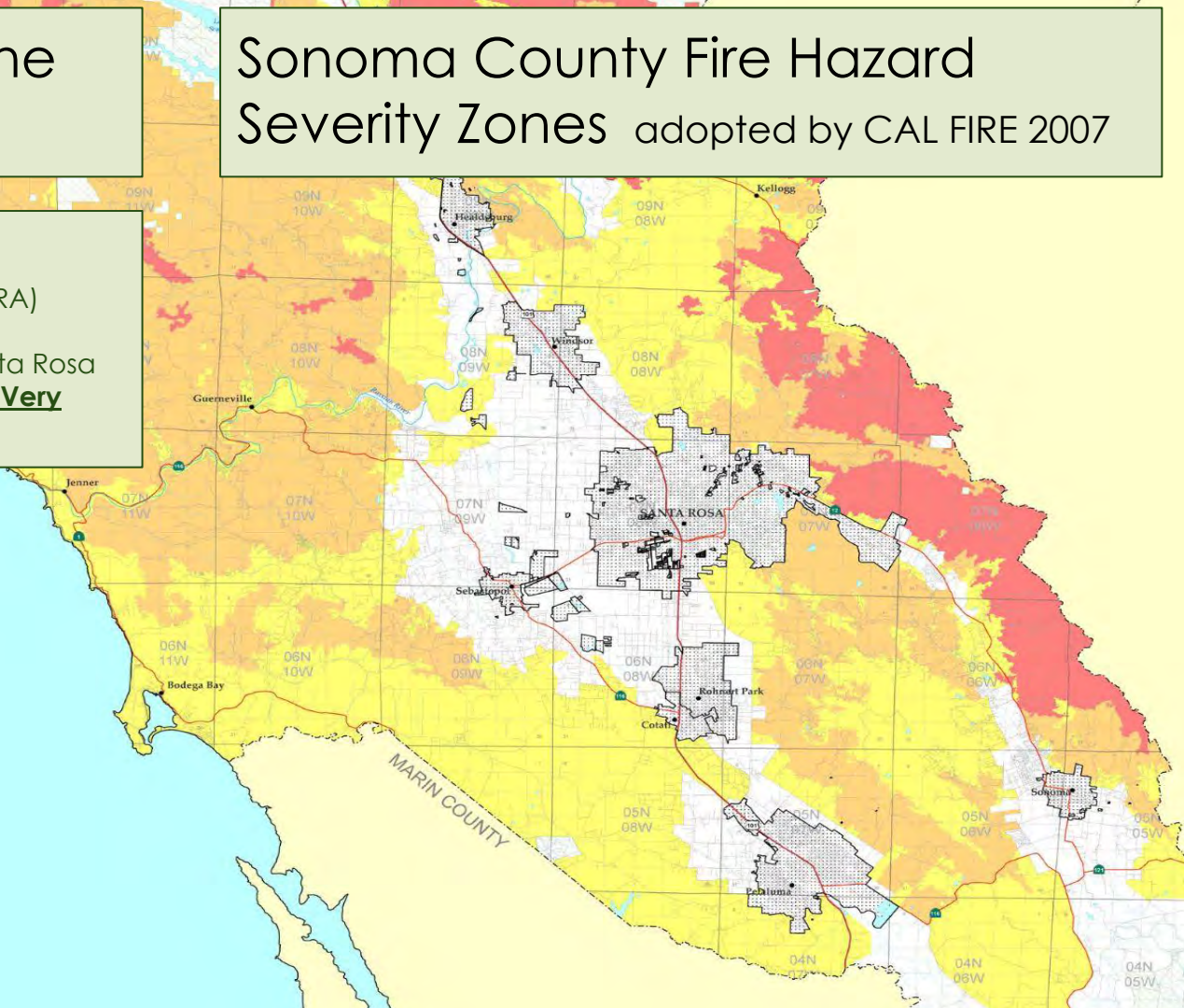
Public Resources Code 4291-4294 direct the California Department of Forestry and Fire Protection (CAL FIRE) to map fire hazard within State Responsibility Areas (SRAs), based on relevant factors such as fuels, terrain, and weather. These statistics were passed after significant wildland-urban interface fires, consequently these hazards are described according to their potential for causing ignitions to buildings. These zones referred to as Fire Hazard Severity Zones (FHSZ), provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfire fire. The zones also relate to the requirements for building codes designed to reduce the ignition potential to buildings in the wildland-urban interface zones.

These maps have been created by CAL FIRE's Fire and Resource Assessment Program (FRAP) using data and models describing development patterns, estimated the land-use characteristics based on potential fuels over a 30-50 year time horizon, and expanded burn probabilities to quantify the likelihood and nature of vegetation fire exposure to new construction. Details on the project and specific modeling methodology can be found at <http://www.fire.ca.gov/arcgis/arcgis/rest/info?layers=0&f=json>.

The version of the map shown here represents the official Maps of Fire Hazard Severity Zones in the State Responsibility Area of California as required by Public Resources Code 4291-4294 and entitled in the California Code of Regulation, Title 14, Section 1289 Fire Hazard Severity Zones, and as adopted by CAL FIRE on November 7, 2007.

An interactive system for viewing map data is hosted by the UC Center for Fire at <http://firecenter.berkeley.edu/#!/>.

Questions can be directed to David Sappin, at 916-445-5399, david.sappin@fire.ca.gov.

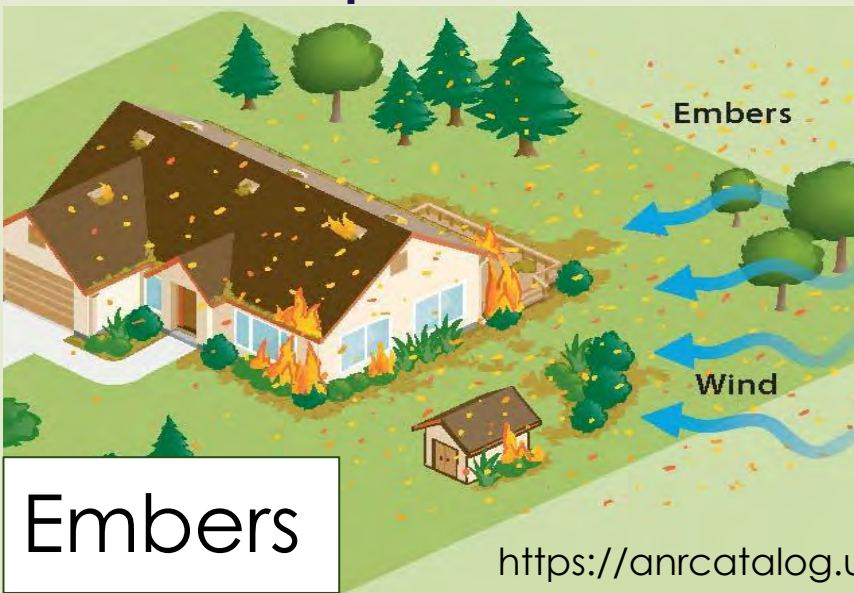
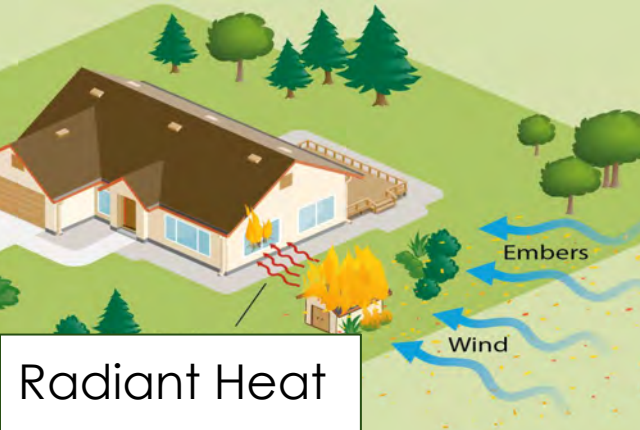


Assessment of Risk

Ask yourself:

- What are the vegetation patterns in the broader landscape around my community, and how do they contribute to potential fuels?
- What are the resources and conditions in my neighborhood?
- What are the conditions on my own property, including the topography? Has the house been assessed? Have home hardening practices been completed? If so, what steps should be taken working out into the landscape?
- What is my own personal perspective on risk? How will I balance risk and other factors such as sustainability, aesthetics, and home improvement costs?
- Public Resources Code (PRC) 4291
 - “The amount of fuel modification necessary shall consider the flammability of the structure as affected by building material, building standards, location, and type of vegetation.”
- Each individual must assess their own personal risk and tolerance, but:
- Your risk decisions intersect with those of your neighbors!

Three types of Fire Exposure



Embers



Embers

The greatest cause of structure ignition

Your house may be the greatest fire threat to your neighbors!





Ecology and Sustainability in the Defensible Space Zone:

Taking Care of All our Neighbors



- We have an important role in protecting homes, habitat, ...
- “For the first time in history...gardeners have become important players in the management of our nation’s wildlife.” - Douglas Tallamy



Defensible Space: Ecosystem Services

- Shade (air conditioning)
- Aesthetics
- Enrich soil and hold it in place
- Clean & manage stormwater (slow it, spread it, sink it, store it)
- Sequester carbon
- Support birds and other pollinators (biodiversity)





Defensible Space: Supporting Biodiversity



Biodiversity: the web of life above and below ground, is declining alarmingly.



Defensible Space:

Biodiversity = Redundancy

- Choose native species, at least 70%-80% - native pollinators prefer them
- Consult Calscape.org for appropriate plants and the habitat they provide
- Plant islands for bird and butterfly food and shelter
- Use integrated pest management
- Provide a water source





Defensible Space:

Supporting Biodiversity

- Keep all plants healthy (appropriate mulch and irrigation)
- A healthy plant is also more fire resistant.
- Oak trees have highest food productivity (acorns, caterpillars)
- Leaf litter supports insects, birds, microorganisms and roots



Defensible Space: Supporting Sustainability

- Avoid over-clearing to protect soil, streams, and fish, and reduce flammable invasive plants





Defensible Space:

Supporting Biodiversity

- Timing of vegetation management is important
- Birds nest March-August
- Trim and prune Sept-February (when most plants are dormant)



Defensible Space:

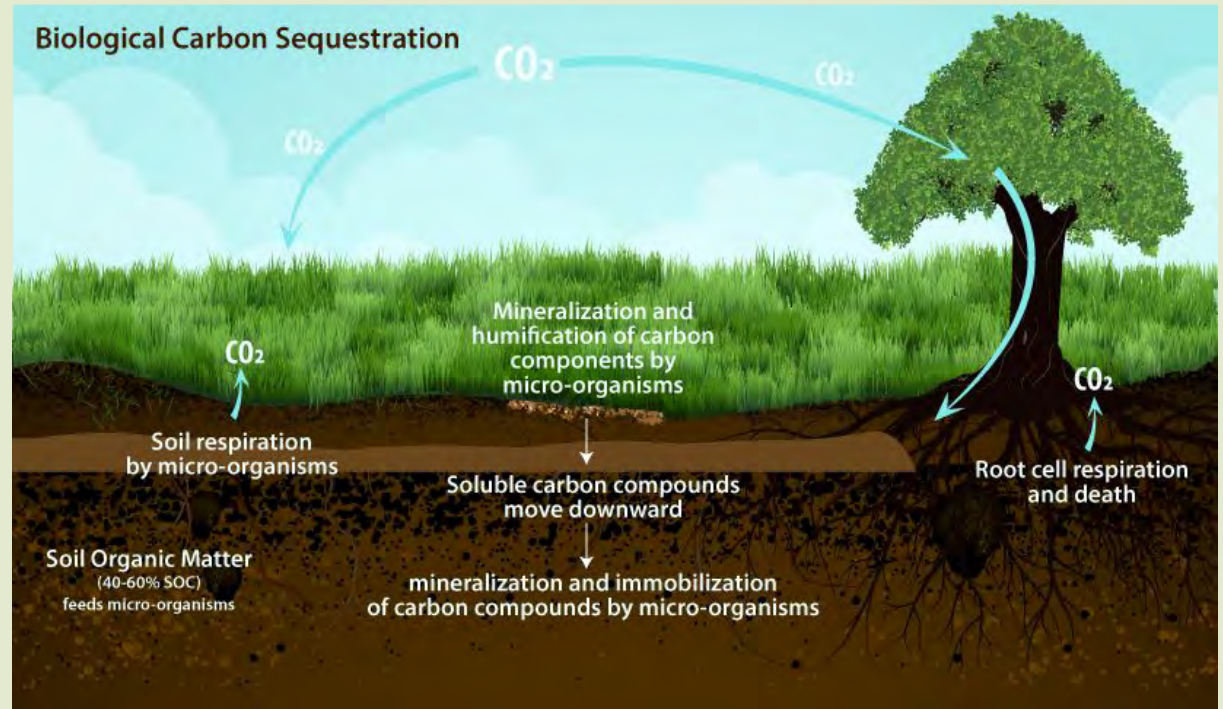
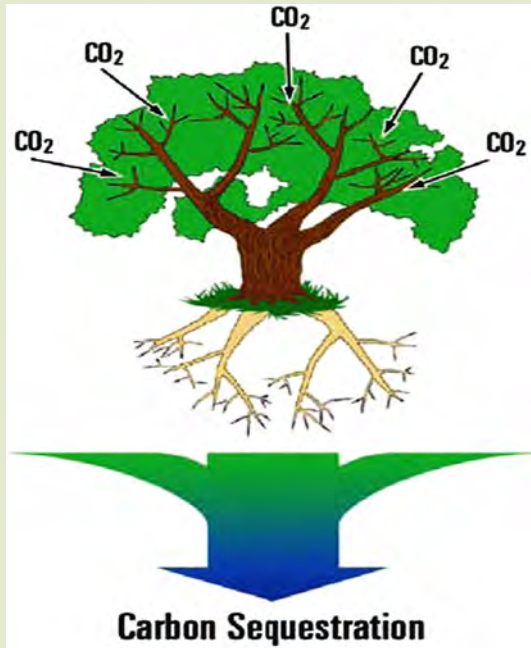
Supporting Sustainability

- Enrich soil and hold it in place
- Carbon sequestration
- Encourage water to infiltrate
- Protect water quality



Defensible Space: Sequestering Carbon

- Healthy soil sequesters more carbon, retains moisture and supports a healthier, more fire resistant landscape



Defensible Space: Nurturing soil



Soil is a complex network that includes plant roots, insects, fungi, and organic matter supplied by fallen leaves and organic mulch.

- Retain and incorporate organic matter
- keep soil covered with plants, mulch, and leaf litter where appropriate
- avoid synthetic fertilizers



Defensible Space: Clean and manage water

Keep water on your property: slow it, spread it, sink it, store it!



Credit: April Owens Design



Find resources at:
dailyacts.org/savewater

We encourage you to become more intimate with your garden and your wildlife neighbors, while reducing fire risk and enhancing biodiversity.

It is worth the time & effort!





RESILIENT LANDSCAPES



University of California
Agriculture and Natural Resources

UCCE Master Gardener Program
Sonoma County

Creating a Firewise & Sustainable Landscape

- Basic Principles
- Recommendations by Defensible Space Zone
- Maintenance & Mulch
- Recap

Homeowner action is key.

- There is no such thing as a fireproof home, especially in extreme conditions, but you can reduce your risk.
- Increasingly, there is more fire than there are firefighters.



YOUR WORK will be the most effective defense for your home.

Fire and Fuels

Fuel + Oxygen + Heat = Fire

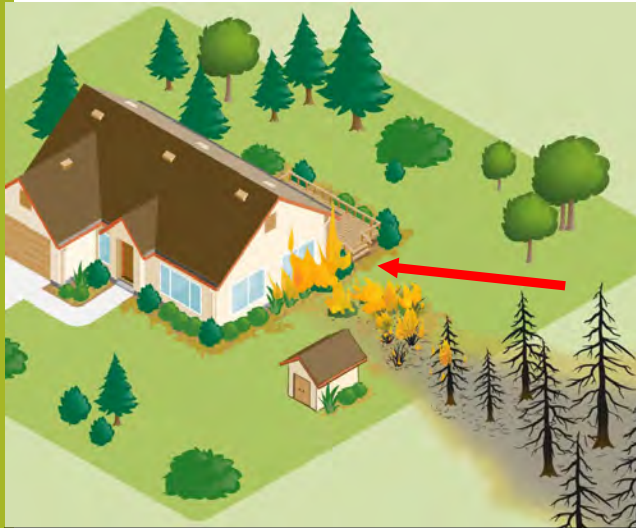
Fuel + Weather + Topography = Fire Behavior

Fuel is... anything that will burn

- Vegetation (trees, woody shrubs, perennials)
- Landscape mulch
- Fencing, roofing, decks
- Lawn furniture
- Arbors, trellises, planter boxes

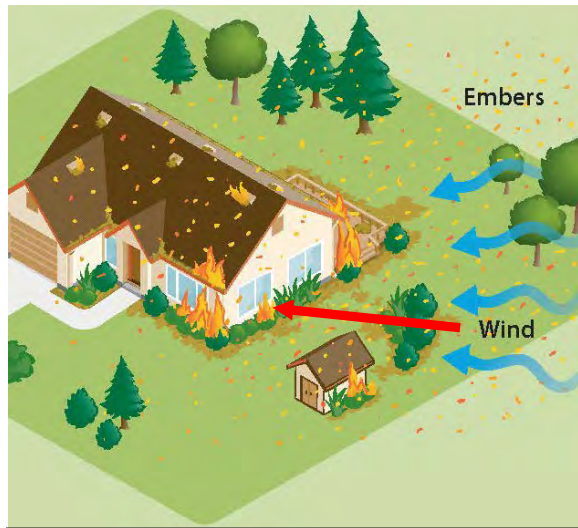
Techniques to reduce exposures

Direct flame contact



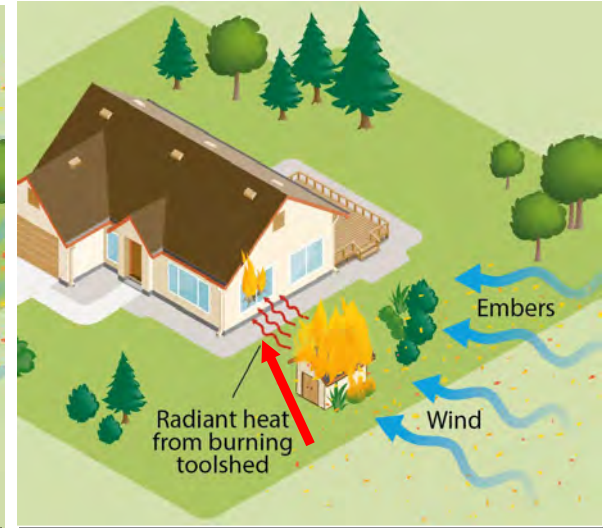
Defensible space implementation interrupts fire pathways and reduces the potential for direct flame contact

Embers



Home hardening with defensible space can help mitigate ember exposure

Radiant heat



Home hardening and fuel reduction can address potential radiant heat exposure

Our Basic Principles for Creating a Firewise & Sustainable Landscape



All plants in your landscape should be selected & placed carefully and should be regularly maintained & hydrated



Design for ease of maintenance!



Each home and landscape is unique and must be considered individually



Do what is required by law



Use science to inform your decisions – most of this information is science based but research is ongoing

Fire-wise Landscape Design & Maintenance Basics

Remove ALL dead or dying plants and branches and remove ladder fuels

Create islands of plantings with non-combustible paths between to interrupt the path of fire

Avoid planting or mulching close to structures

Prune tree limbs up at least 6' (or 1/3 of tree height) from ground

Gates & Fencing

- Consider alternatives to wood fences such as concrete or rock walls or metal fences
- Wire mesh fencing can reduce fuel mass while preserving views
- Gates made from organic material should not attach to the house



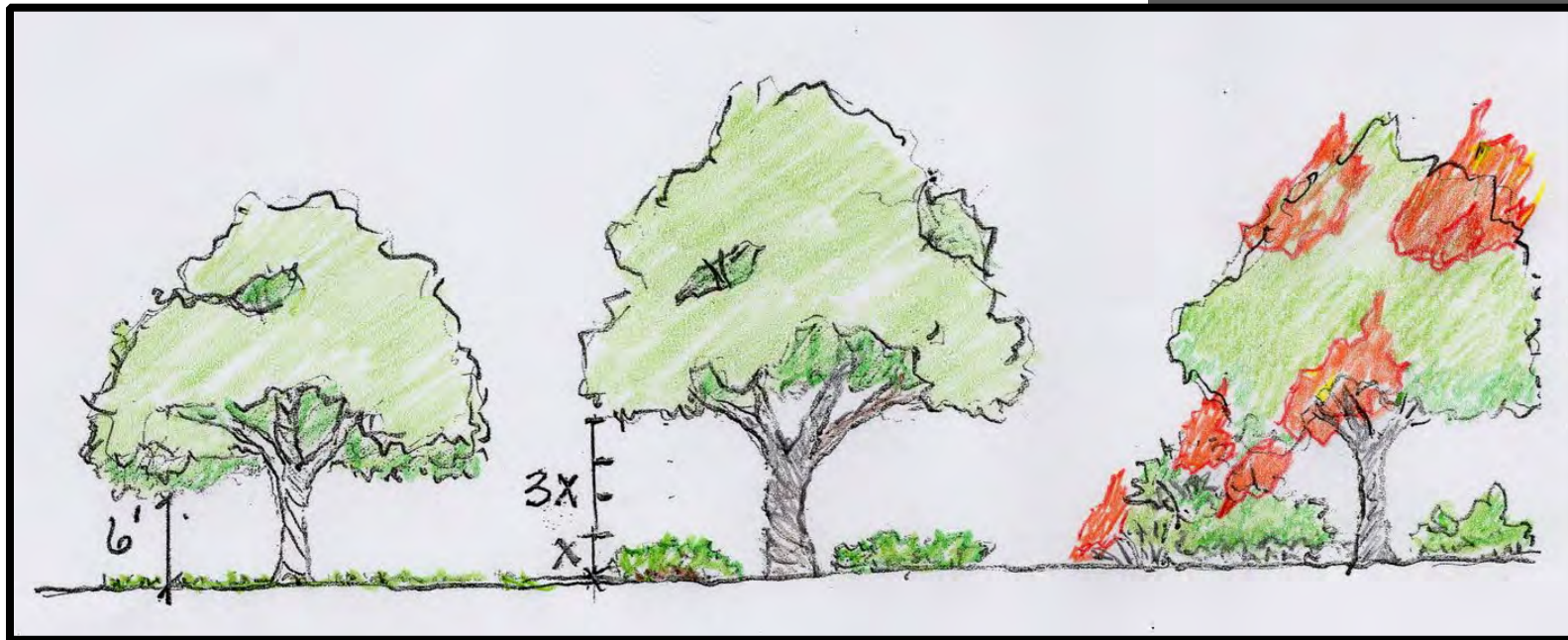
Coffey Park, Tubbs Fire 2017



Photo courtesy of Institute for Business & Home Safety

Eliminate Ladder Fuels

- Allow 3 times the height of the shrub to the lowest tree limb
- Keep fire from moving from ground into trees
- Limb up all trees at least 6' or 1/3 height of tree



drawing courtesy of Ellie Insley



← Ladder Fuels: Before



Ladder Fuels: After →




Photos courtesy of Ellis Insley

Firewise Plant Selection Considerations

- **How large** will this plant grow? (affects placement, fuel load & maintenance, PG&E lines)
- **Will it thrive** where it will be planted? (affects health & vigor and flammability)
- Will it require more **maintenance** than can be provided now or in the future? (affects fuel load)
- Is it **invasive**? (affects fuel load over wide areas)
- Consider how a plant changes over its **lifespan** (affects fuel load)

A large orange circle with a flat edge on the left side, partially overlapping the white background.

Where to not to plant

- 0-5' out from the house
 - Under vents and eaves
 - In front of windows or combustible siding
 - Under or near decks
 - Inside corners
- 
- A yellow curved line graphic consisting of two segments, one on the left and one on the right, curving towards each other.

Start at the house and work out!



Zone Zero - 0-5': Ember defense zone

- Optimally **no** combustible materials in this zone!
- Minimize/remove planting here especially:
 - Under vents and eaves
 - In front of windows or combustible siding
 - Under or near decks



Photo by Mimi Enright and
Garden Design: April Owens

Zone 0: 0'-5' Ember defense zone

- Roof litter maintenance critical!
- Maintain tree limbs 6' above roof
- **County Code** mandates cutting tree limbs 10' from stove pipe or chimney outlet
 - **MAINTAIN YEAR ROUND!**



Photo by Mimi Enright

Zone 1 - 5-30' Home defense zone

- Plant in “islands” separated by non-combustible pathways
- Use smaller shrubs and groundcovers (to 3') & herbaceous perennials
- Trees are OK if they're green & free of dead plant material



Photo & garden design April Owens

Zone 1 - 5'-30' Home defense zone

Low growing,
mostly perennial

Low fuel = Well
Maintained

Great place for
hardscape close to
house

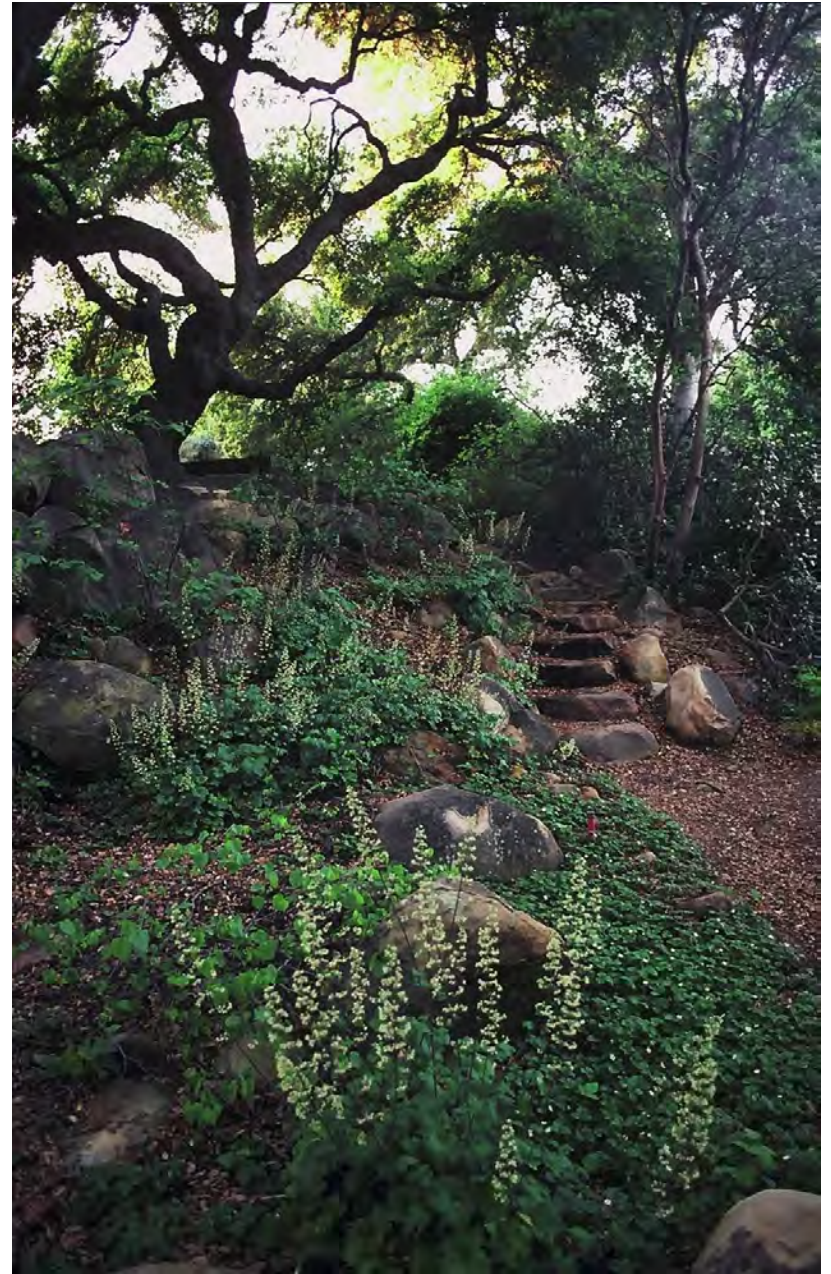
Make sure you can
access all plants for
maintenance



Photo courtesy of Clio Tarazi

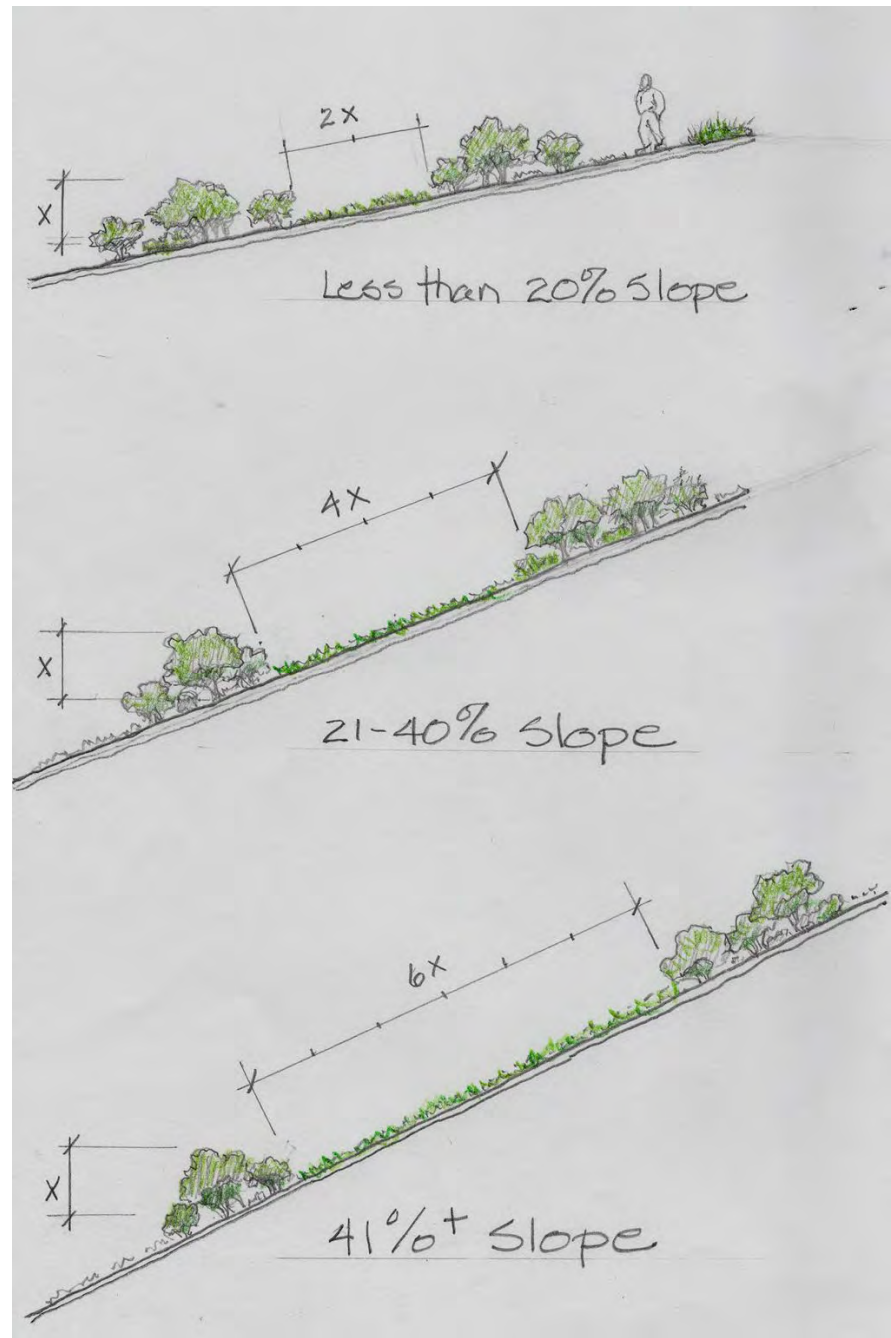
Zone 2 - 30'–100' : reduced fuel zone

- Regularly remove dead plant material
- **Keep annual grasses mowed to 4"**
- 4-5' wide walkways can help separate planting areas & act as fire breaks



Suggested Spacing Guidelines (within 100' of buildings)

Graphic courtesy of
Ellie Insley



Ideal Spacing Guidelines (within 100' of buildings)

0% to 20% slope

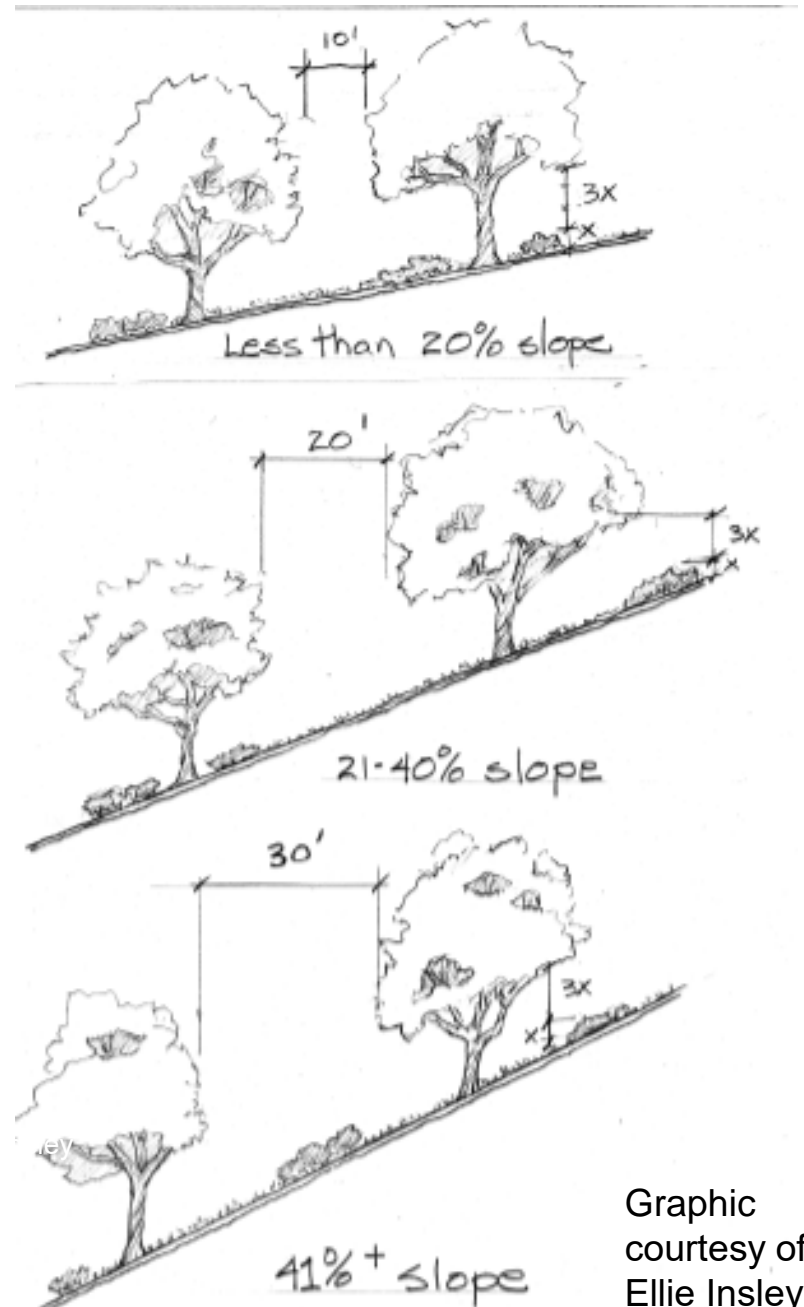
Trees spaced 10' apart
Shrub separated by a space 2 times the height

21% to 40% slope

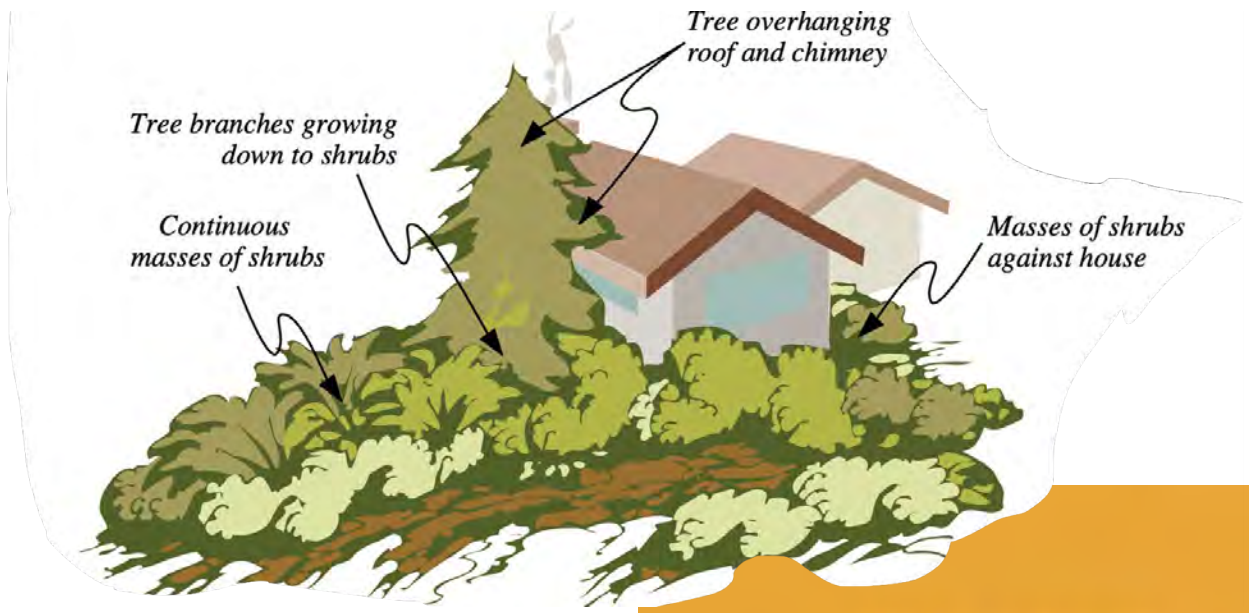
Trees spaced 20' apart
Shrubs separated by a space 4 times the height

41% slope or more

Trees spaced 30' apart
Shrubs separated by a space 6 times the height



Graphic
courtesy of
Ellie Insley



Before



After

5/9/2020

Access Zone

- Maintain vegetation on both sides of roads & driveway – 10' from road edge and 15' vertically
- Maintain 12' of unobstructed pavement for passage of vehicles

Neighborhood Considerations

- Start with your house & defensible space zones. Then talk with your neighbors! Work together to develop a fuel reduction plan for the entire neighborhood.
- Watch for maintenance needed -
- debris accumulating on a neighbor's roof, uncovered woodpiles, unmown tall weeds.
- What is total volume of vegetation in area? Any ladder fuels?

Shaded fuel break

- Control fire behavior by reducing ladder fuels
- Open the canopy
- Maintain ground fuels
- Facilitates fire suppression (ground and air attack)



Work with your neighbors!



Photo: Mimi Enright

Ongoing Maintenance

- Remove dead plants & dead branches from trees and shrubs
- Remove vines from trees & shrubs



Annually before fire season:

- Mow annual grasses & weeds to 4" tall or less
- Cut back woody perennials & shrubs as needed
- Thin overgrown vegetation
- Consider timing of plant removals/cutbacks based on wildlife cycles
- Move woodpiles to 30+ feet from buildings, or cover with fire resistant tarps and clear surrounding vegetation

Every few
years as
needed:

- Thin & reduce tree canopies to remove twiggy growth, maintain separation between trees & reduce overall fuel load
- Keep lowest branches of trees pruned up at least 6' from ground
- Cut back groundcovers & vines to remove build up of dry stems & dead leaves
- Cut back shrubs to renew

Mulch

Large sized composted arbor mulch are the best options in 30-100' zone (NO "gorilla hair")



Image courtesy of Fire Safe Marin

Mulch

Separate mulched areas (2-3" deep) with non-combustible materials where possible, especially in 5-30'



Photo: Mimi Enright



Photo: Clio Tarazi

Mulch

No organic mulch in the 0-5' zone



Defensible Space Zone Design Recap

- 0-5' zone from house: No organic materials if possible. Use inorganic materials such as gravel or stepping stones.
- 5-30' zone from house: Plant in "islands" with materials such as low herbaceous perennials, grasses or succulents, and specimen (or individual) shrub or tree are optimal.
- 30-100' zone from house: Same basic principles as the 5-30' zone, but you can include shrub and tree groupings in widely spaced groups separated by areas that break up the spread of wildfire.

Resilient Landscaping

Ongoing maintenance is essential!

- Remove dead or dying branches from trees and shrubs regularly
- Prune out any dead material from the interior of shrubs if possible
- Remove any ladder fuels – prioritize removing any shrubs planted directly under trees

More Resources

For more resources go to the UC Master Gardener Program of Sonoma County web page: <http://sonomamg.ucanr.edu/>

Or send an email to our Information desk at mgsonoma@ucanr.edu





Photo: Saxon Holt - Photo Botanica

Biodiverse, Drought Resistant,
Fire-wise and Beautiful

Sonoma County

Resilient Landscapes - Santa Rosa Unit

An illustration of several tall, thin grass stalks with small, dark, teardrop-shaped seed heads. A single orange butterfly is flying in the upper left quadrant. The background is a light, textured green.

Mission

To create and promote California native plant restoration gardens in the urban environment.

Vision

- **Create** – Leading by example we design and install California native plant gardens replacing lawns and traditional water intensive landscapes and creating demonstration gardens
- **Restore** – wildlife habitat and support biodiversity in the urban landscape
- **Educate** – Inspire the public with knowledge: talks, gardening tours and signage, downloadable plans for residential and public landscapes, public outreach, partnerships with government agencies and similar not-for-profit organizations

habitat corridor project

HabitatCorridorProject.org

Resilient Landscapes

TIP: Take a Hike! - look at
how Mother Nature
designs.



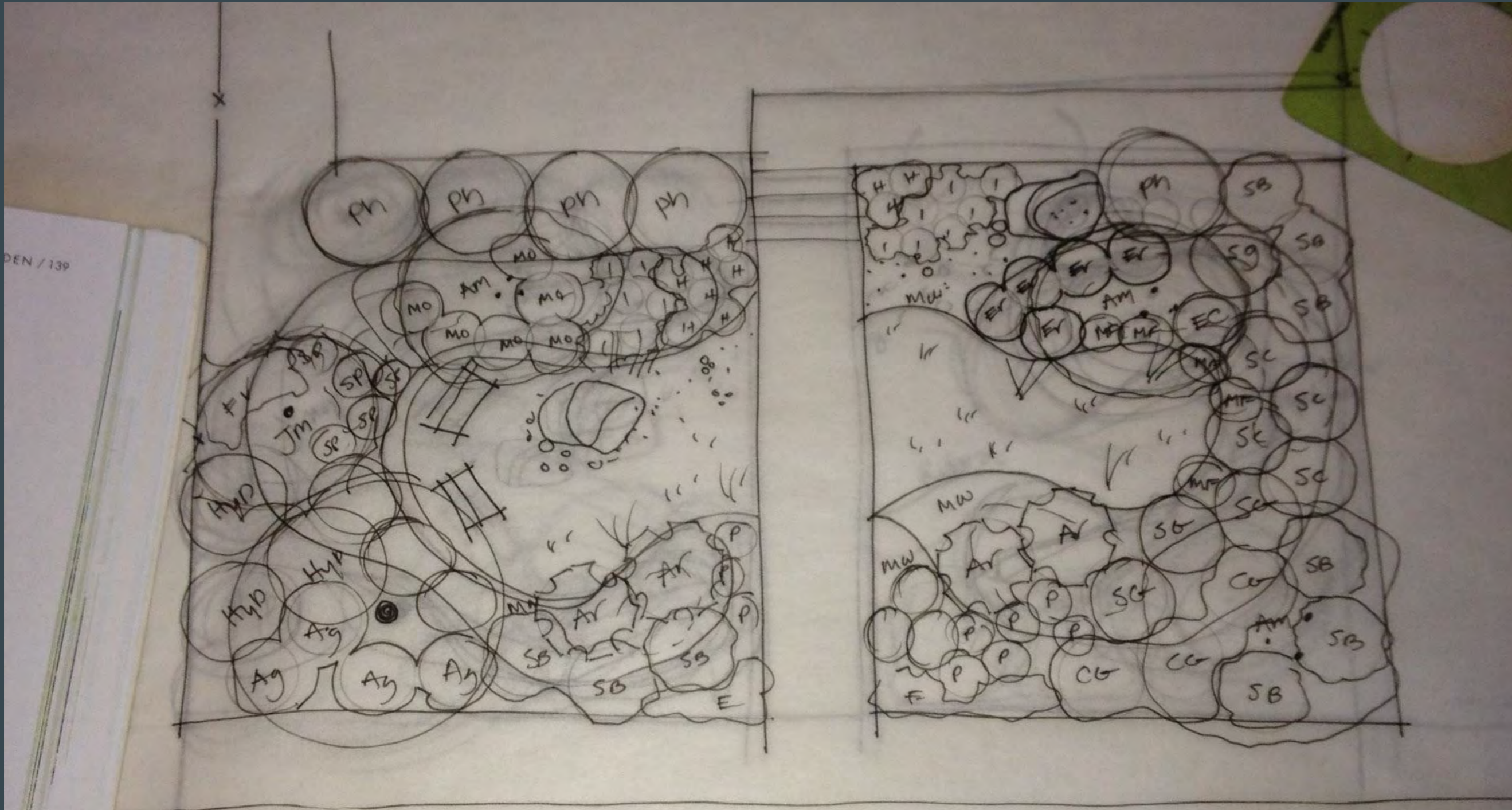
Systems Thinking

Resilient landscapes consider
drought, fire, development and
biodiversity as they are
designed.

Variety of California Native
Salvias

Sustainability

Iraqi definition: The Seventh Generation Principle is based on an ancient **Iroquois** philosophy that the decisions we make today should result in a **sustainable** world seven generations into the future.





**Crushed Rock Patio
over 4" Base Rock with
Steel Edging**

TIP:

Steel Edging is a durable material to hold rock and pebble in place rather than plastic.

Design 0'-5'

Decorative Rock and Boulders

Permeable Hardscape

Fountains for Bee's, Birds and Butterflies

Containers

TIP:

Pollinators need food,
water and cover. Don't
forget the water!





**Cobble Mix on 4" Base
Rock with Small Island
of Well Maintained
Perennial California
Naives**

TIP:

**Finally, mulched
with Lean and
Green Compost.**



Photo by Ellie Insley





Concrete
 $\frac{3}{8}$ " Trinity Pebble
2' x 3' Bluestone Pavers
Steel Edging
Shale driveway



Festuca rubra (Red Fescue)



Swale and Swale Path (more about that later!)

Design 0'-5' EXISTING TREES

Energy Savings

Coast Live Oak - Habitat
Powerhouse and Some
Studies Point to Leaf Fire
Resistance

Deciduous Trees - Sun in
Winter Shade in Summer

Vigilant Maintenance In
Fire Season - Risk
Assessment



Design 5'-30'

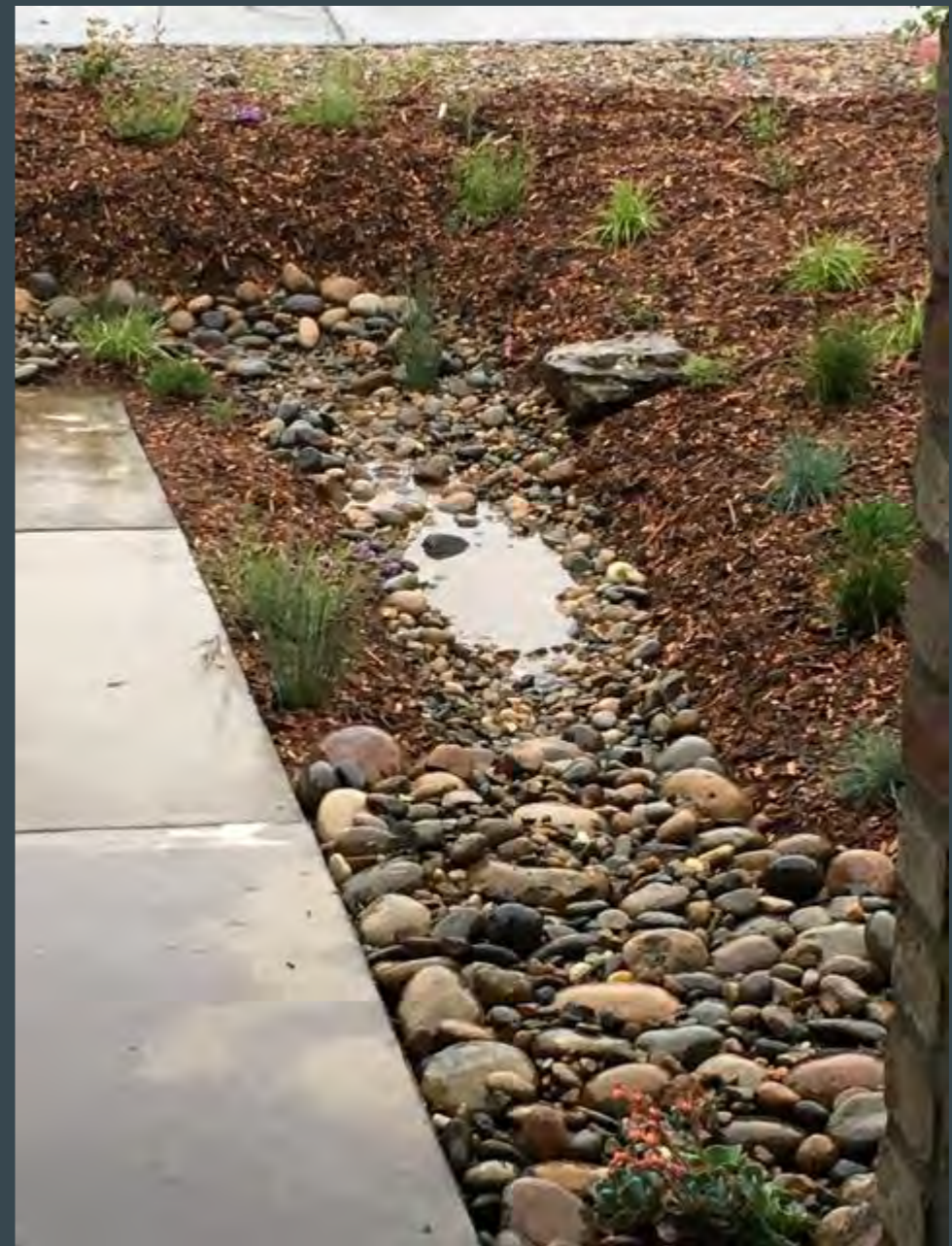
- Low growing
- Low fuel
- Rock mulch between plantings
- Well hydrated

Paths and Swales as Separation of Islands



How we build a swale.

Smaller Landscapes

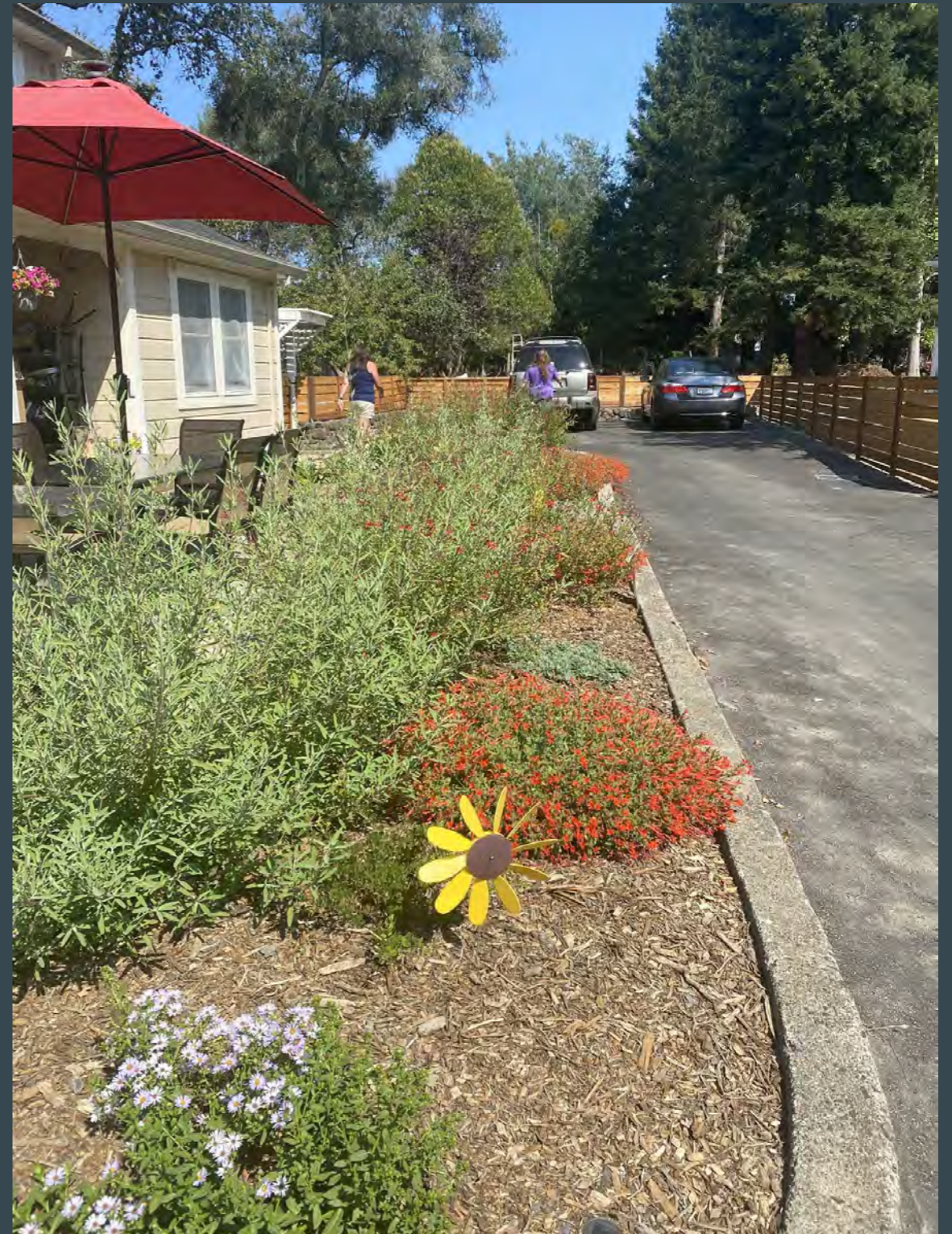




Smaller Landscapes



Smaller Landscapes



Design 30'-100'

More Habitat - Larger Islands with
Shrubs - Plenty of Space Between

Larger Islands: 15' x 6'

Smaller Islands: 10' x 3'

4' of spacing between them

Design 30'-100'

Tip:

Islands Separated by
Rock Walls

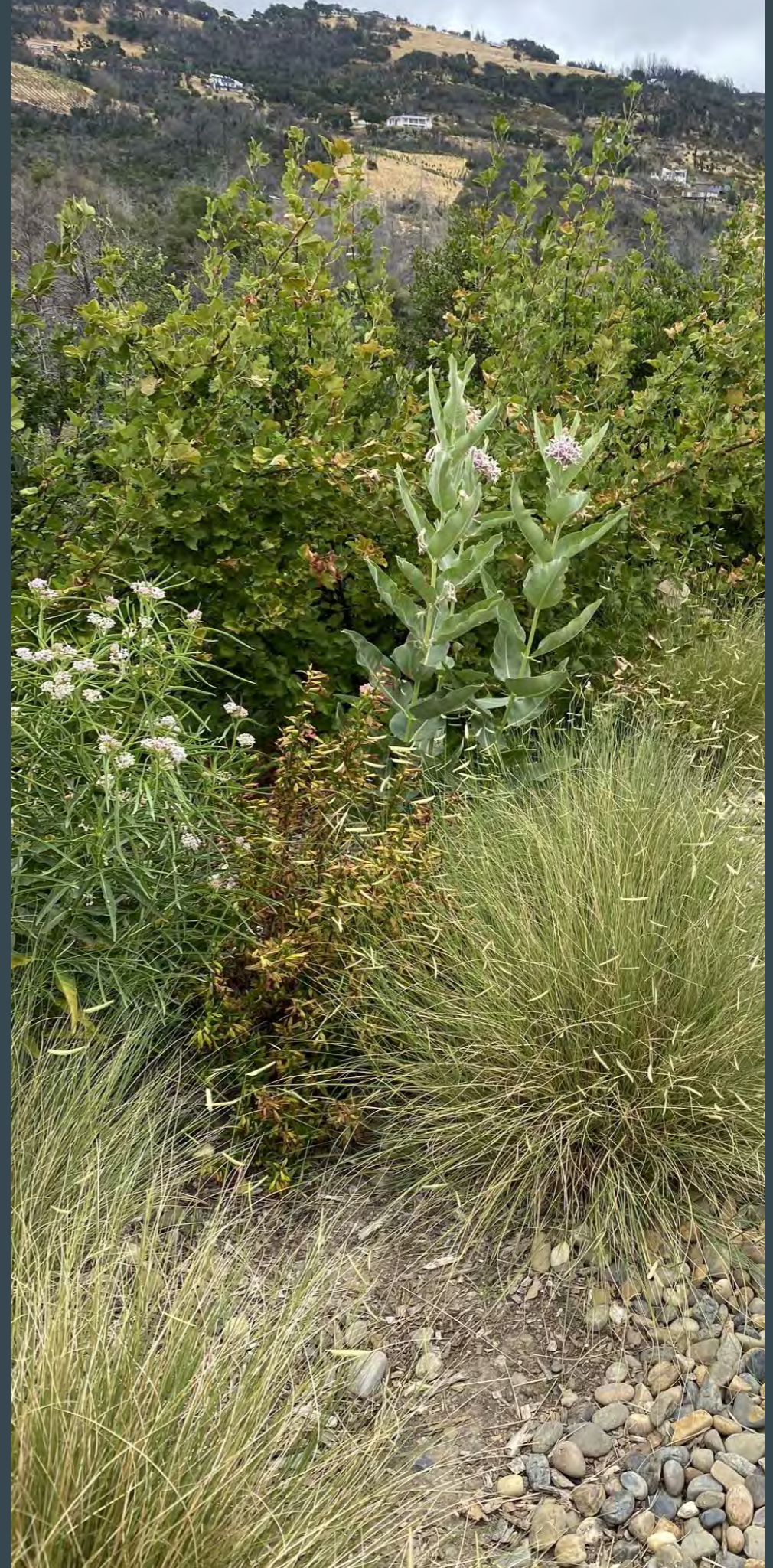
Mimulus, Salvia,
Deer Grass



Design 30'-100'

Tip:

Create a Hedgerow with multiple shrubs and perennials in a grouping to sustain habitat.



California Native Shrubs- Toyon (Heteromeles arbutifolia)



California Native Shrubs -Coffeeberry (Frangula californica 'Mound San Bruno')





**Ceanothus spp.
(California Lilac)**

What to use between the masses of plants?



Arbor Mulch



Mowed California Native Bunch Grasses or Well Maintained Groundcover





Why use California Native Plants? Add your why in chat!

Keeps local ***insect and animal populations thriving***

Reduces need for water

Bringing in other species potentially spreads exotic diseases

Beauty: blooming season matches our climate

*Plus using natives gives another **fun aspect/challenge** to gardening as a hobby. It also helps **start conversations** with neighbors and visitors about why native plants are important/awesome (especially if you have or "native plants live here" sign!) -- so it's an **education opportunity**.*

Plants- California Natives

80% California
Native Plants +
20% Favorite
Pollinator Plants
or Annuals in
Containers
= Biodiversity



Big Habitat Value!

Groundcover to Large Shrub - Cultivars vs. Species



Buckwheat (*Eriogonum* spp.) and California Fuchsia (*Epilobium* spp.)

Hydrating Your Landscape



It's Complicated!



Or Grid of Drip

LivingLearningLandscapes.com

Tip: check out our free plans
LivingLearningLandscapes.com



Tips for Successful Habitat Gardens

Many Types of Flowers

Large Groupings - Pollinator Targets

Flowering at Different Times

Plants that Provide Both Nectar and
Pollen Sources

Add Water to the Garden

Think of Cover

Leave a Little Mess - Small Brush Piles

WOOLY SUNFLOWER
(*ERIOPHYLLUM LANATUM*)





Why? For our future.



SonomaResilientLandscapes.com

HabitatcorridorProject.org

SonomaEcologyCenter.org

<http://sonomamg.ucanr.edu/>

FireSafeSonoma.org

LivingLearningLandscapes.com

Calscape.org

CNPS.org

Design Services: Habitat Corridor
Project and Sonoma Ecology Center