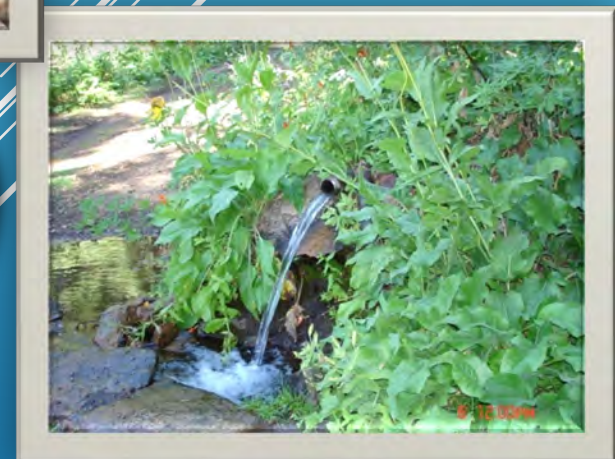
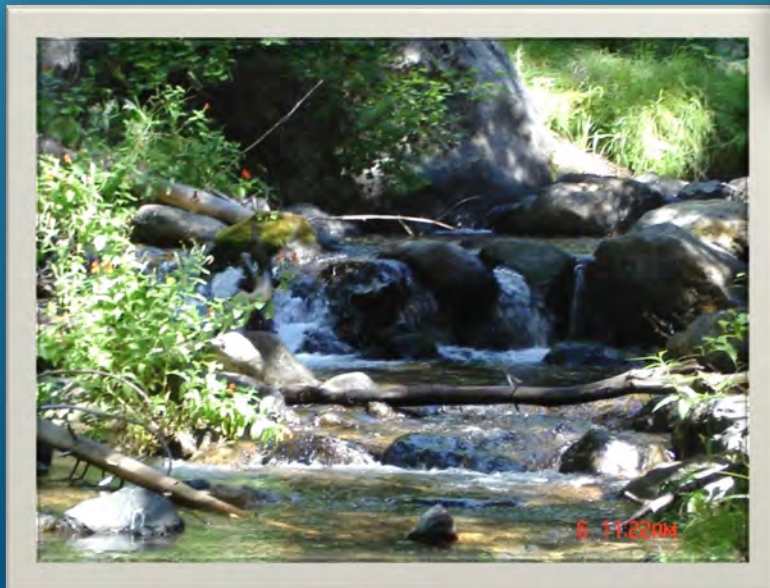




# LIVING IN THE FOOTHILLS - EASTERN MADERA COUNTY





# NATURE – WHERE WE LIVE





# OAKHURST RIVER PARKWAY – NATURE TAKES IT BACK...





# PEOPLE – YES ALL OF US



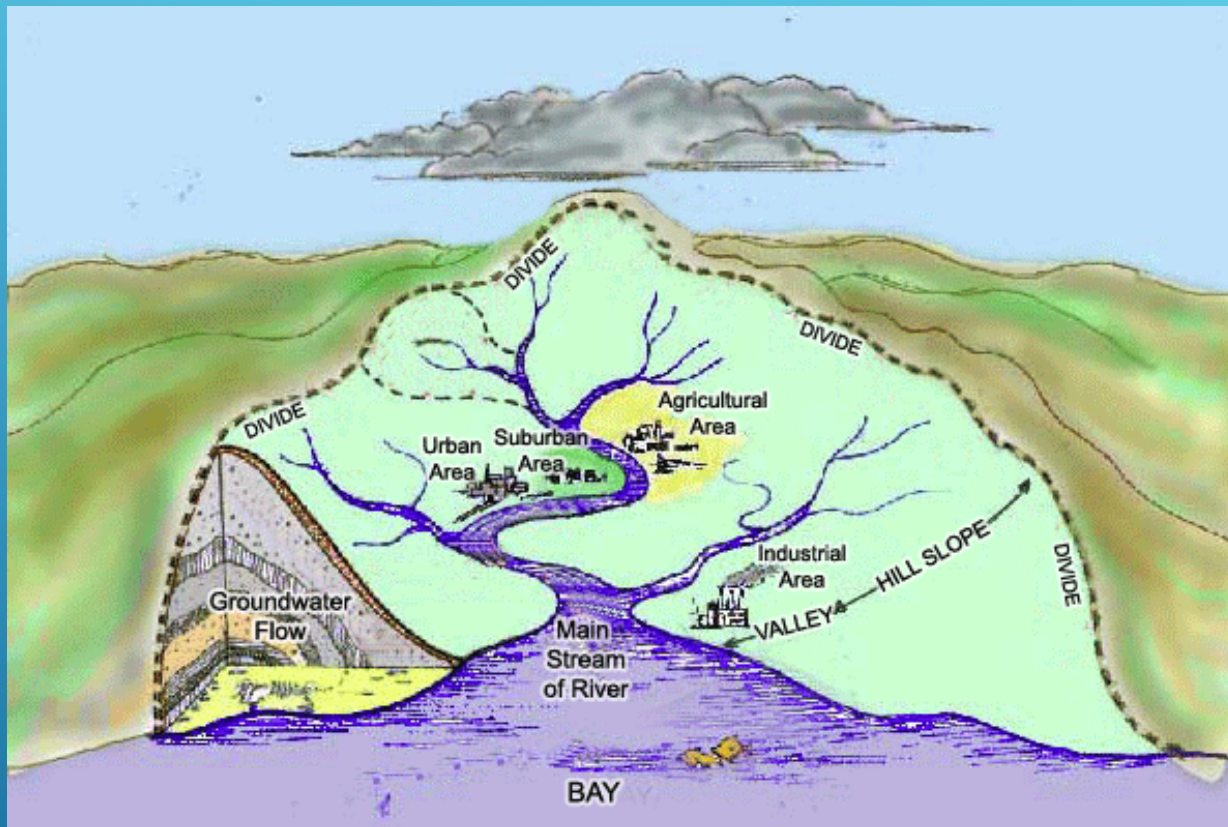


# PEACE IN OUR ENVIRONMENT





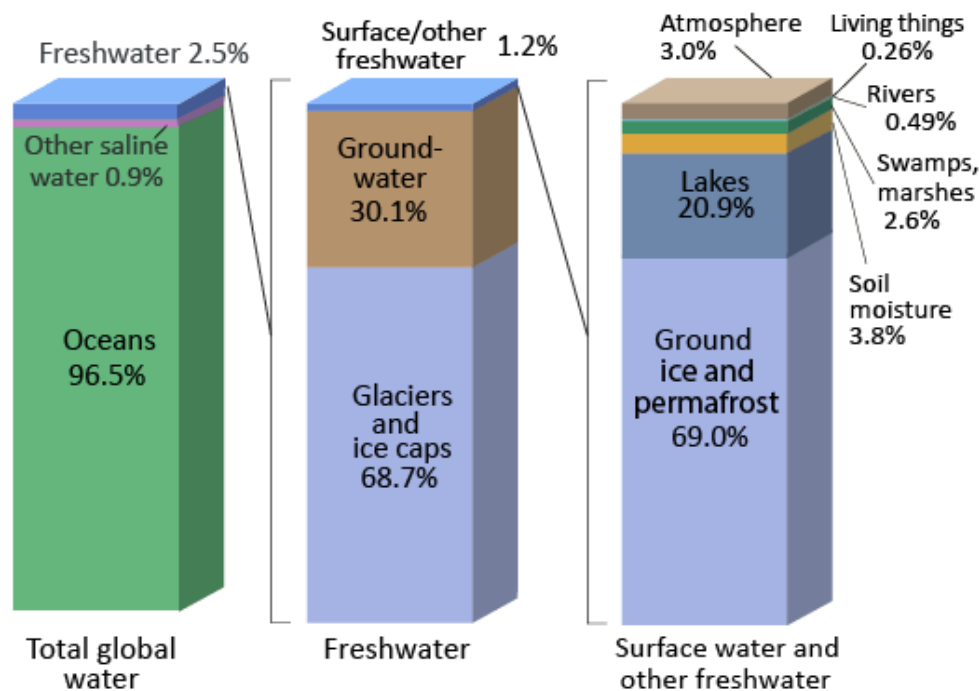
# WHAT IS A WATERSHED?



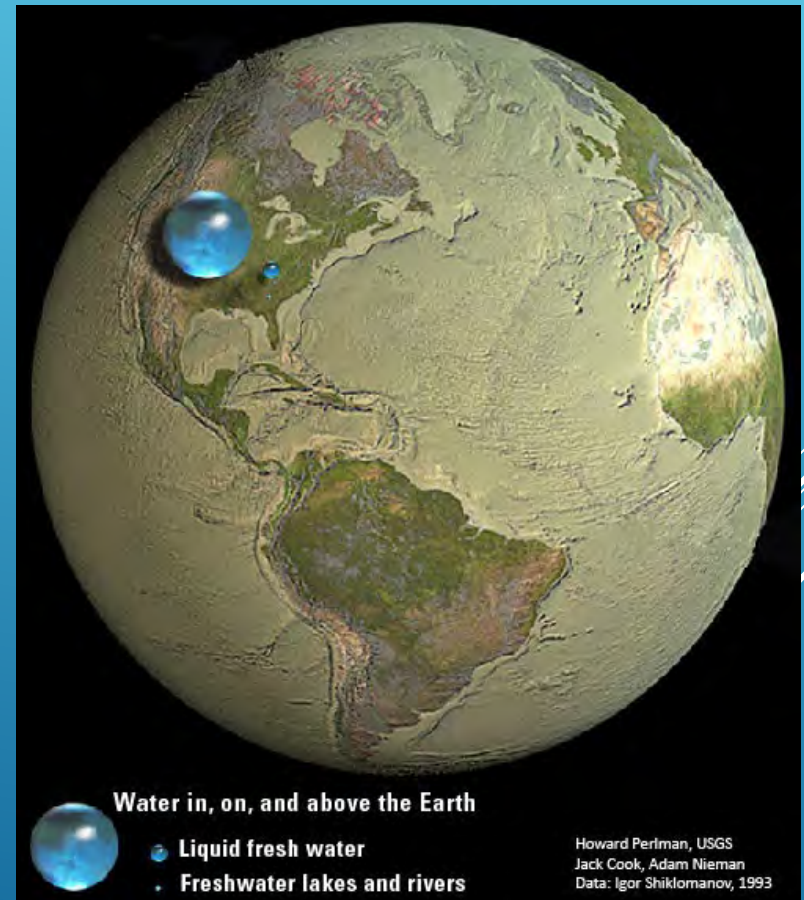
A watershed is the “area of land” where all of the water that is under it or drains off of it goes into a common waterway, such as a stream, lake, river, etc. and/or ultimately to the ocean. Watersheds come in all shapes and sizes; and cross county, state, and national boundaries. Everyone lives in a watershed!

# WHERE IS THE EARTH'S WATER?

## Where is Earth's Water?

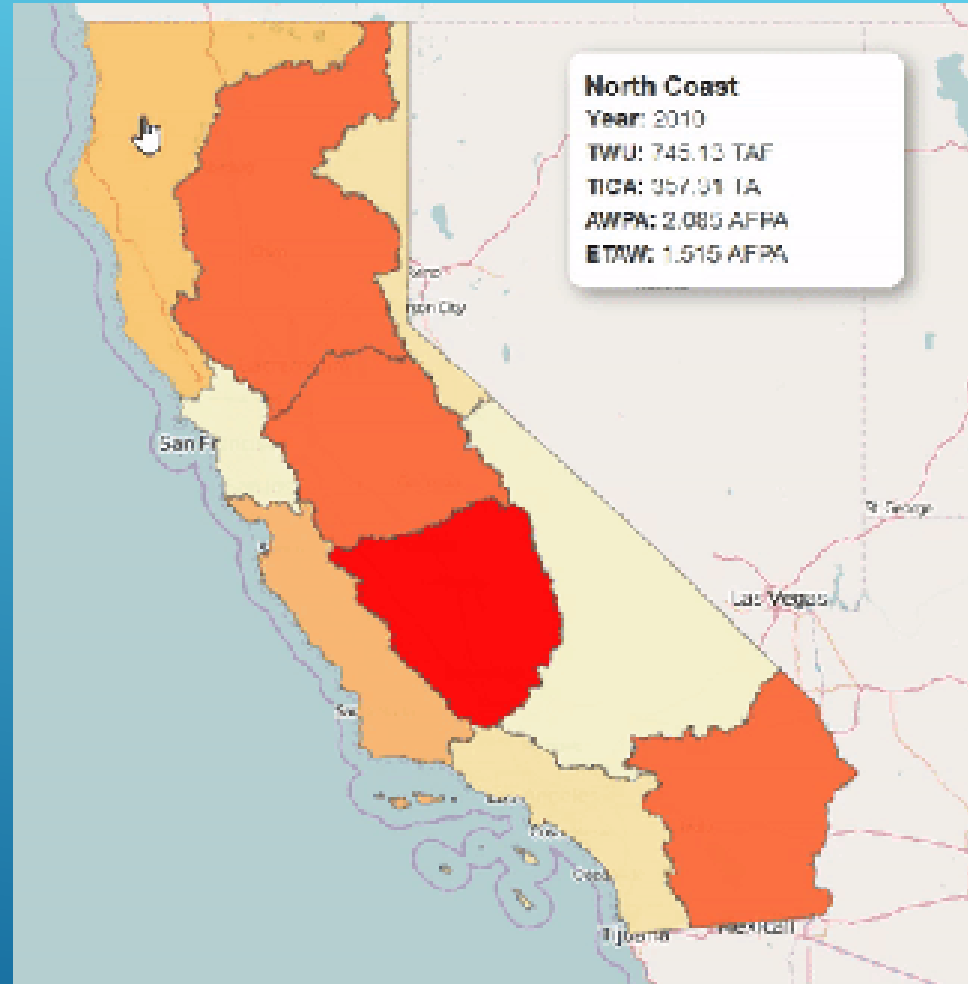


Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, *Water in Crisis: A Guide to the World's Fresh Water Resources*.  
 NOTE: Numbers are rounded, so percent summations may not add to 100.



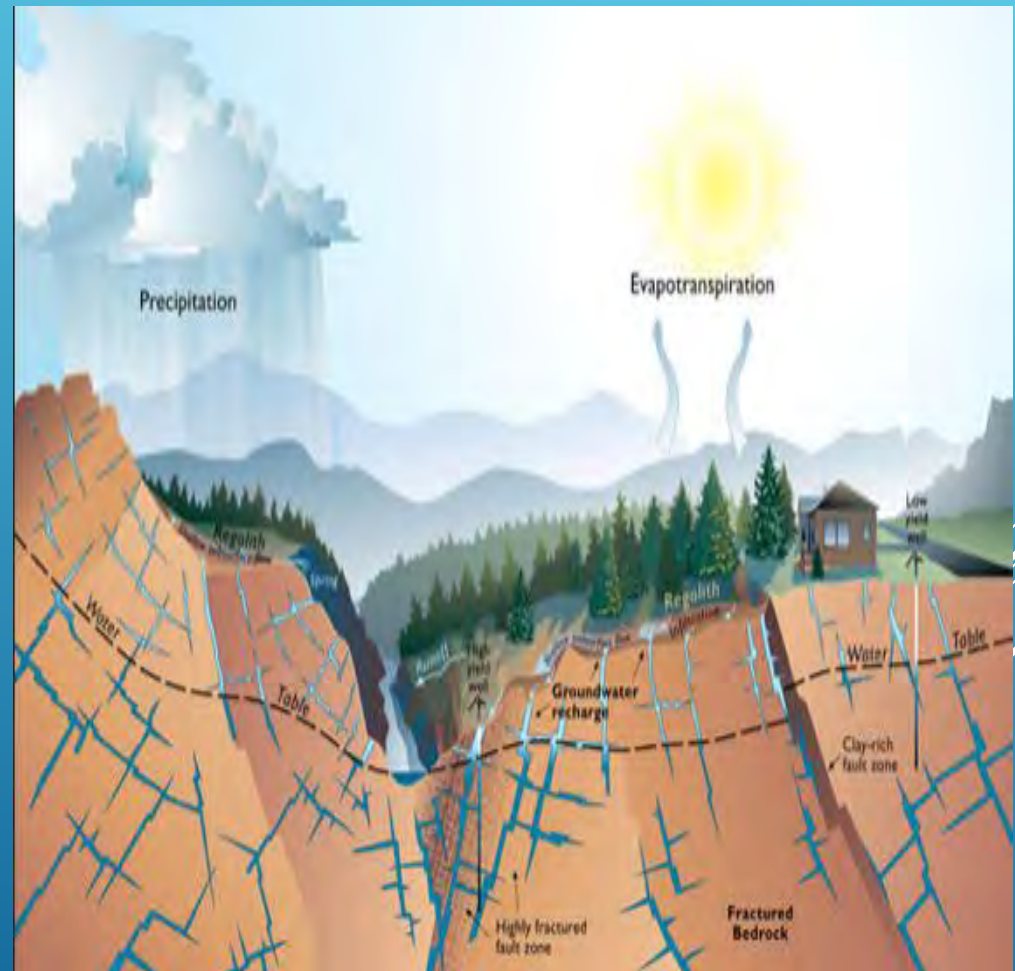
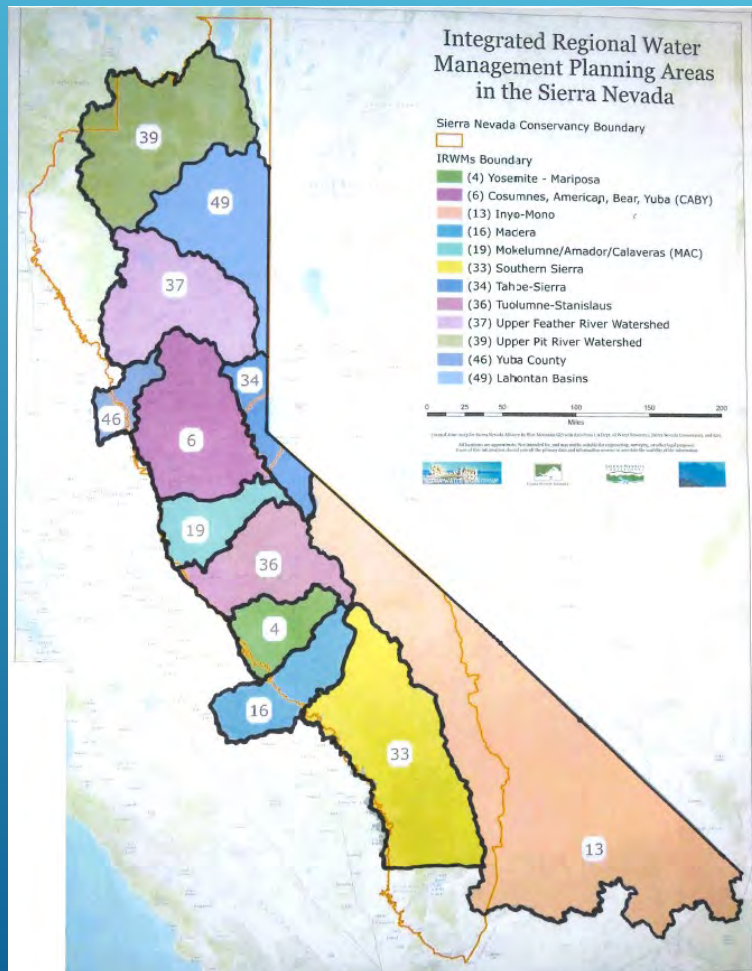


# WHERE IS CALIFORNIA'S WATER?



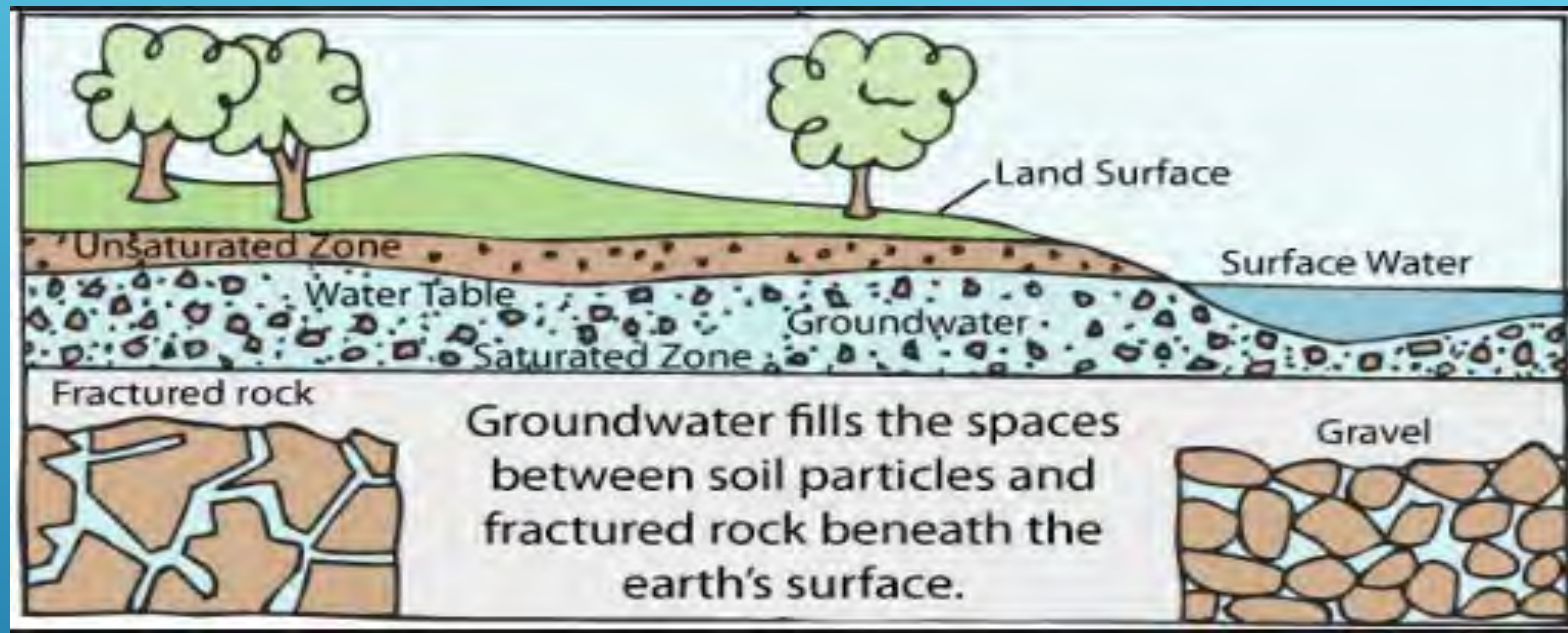


# THE FOOTHILLS OF THE SIERRAS – FRACTURED ROCK WATER





# GROUNDWATER – AQUIFER IN THE VALLEY

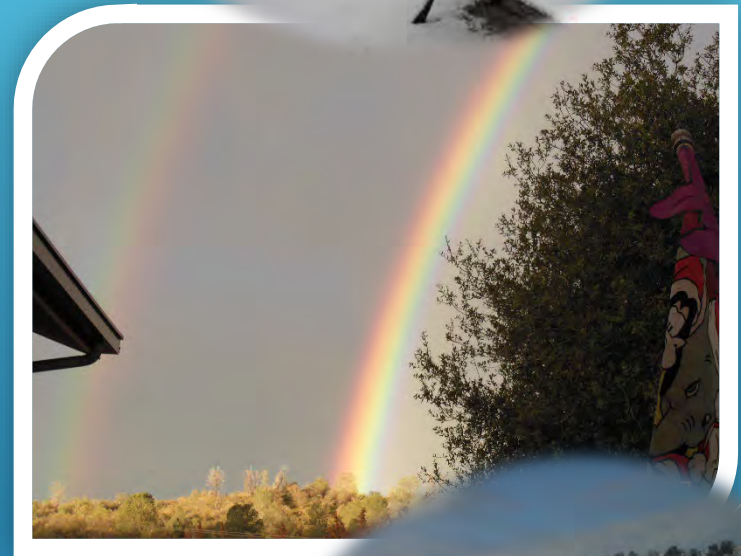


December  
2019



# CLIMATE CHANGE

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time. Climate change may refer to a change in average weather conditions, or in the time variation of weather within the context of longer-term average conditions.





# DROUGHT

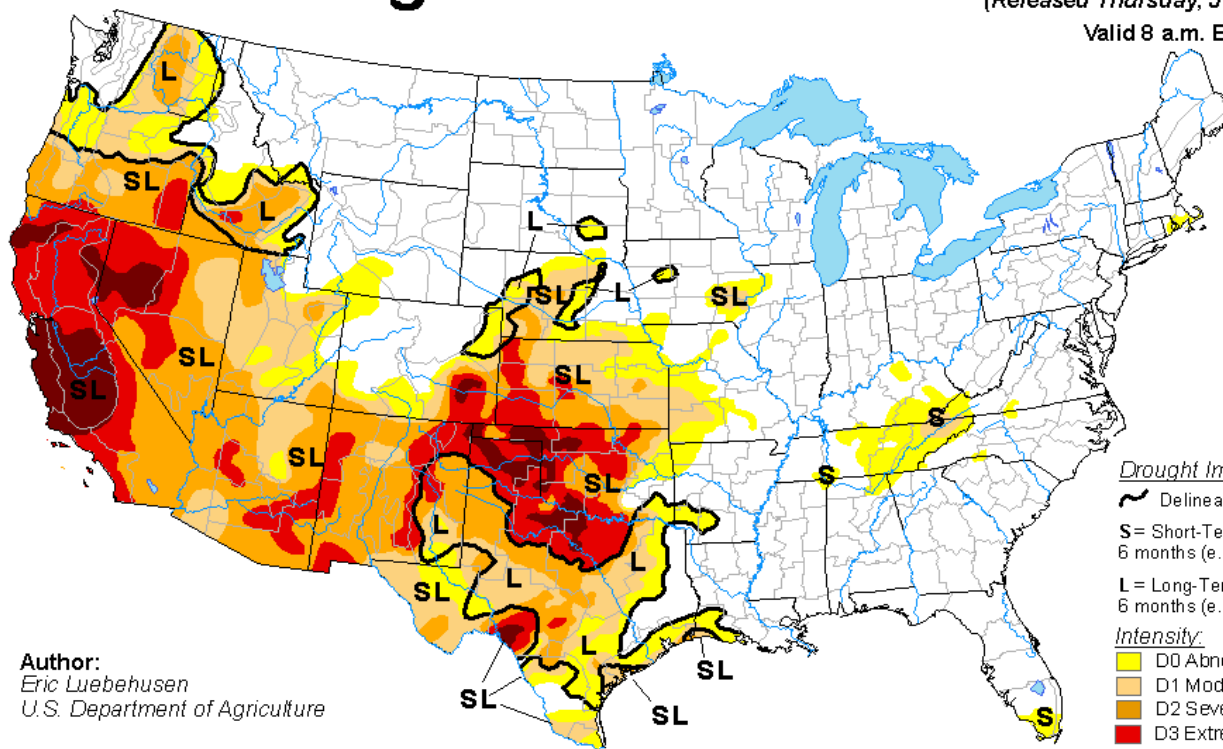


## U.S. Drought Monitor

June 17, 2014

(Released Thursday, Jun. 19, 2014)

Valid 8 a.m. EDT



Author:  
Eric Luebehusen  
U.S. Department of Agriculture

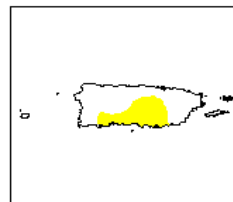
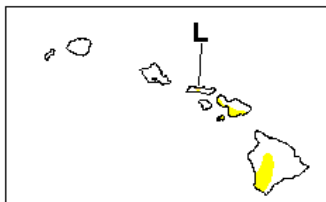
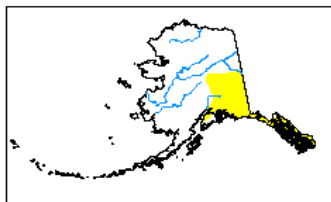
### Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

### Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



<http://droughtmonitor.unl.edu/>



# THE DROUGHT

- Madera County and the Central Valley was “Ground Zero” for the drought
- 53 out of 58 counties in CA were considered disaster areas
- CA the only state that did not regulate groundwater – until SGMA in 2017
- Snowpack is only foothill storage – no snowfall is huge issue.

December 17, 2014






*(Released Thursday December 19, 2014)*

Valid 8 a.m. EDT

Drought Condition (Percent Area):

**[View More Statistics](#)**

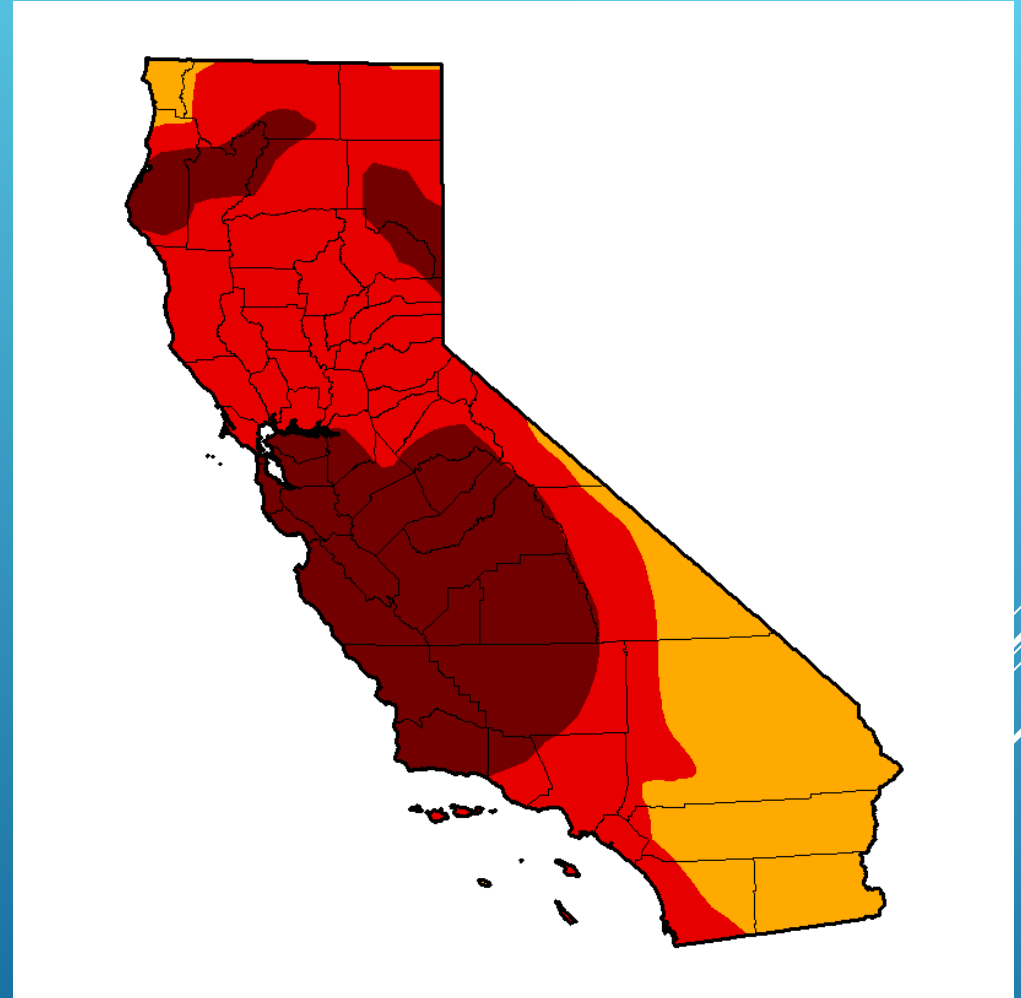
## Intensity:

-  D0 - Abnormally Dry
-  D1 - Moderate Drought
-  D2 - Severe Drought
-  D3 - Extreme Drought
-  D4 - Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying [text summary](#) for forecast statements.*

## Author(s):

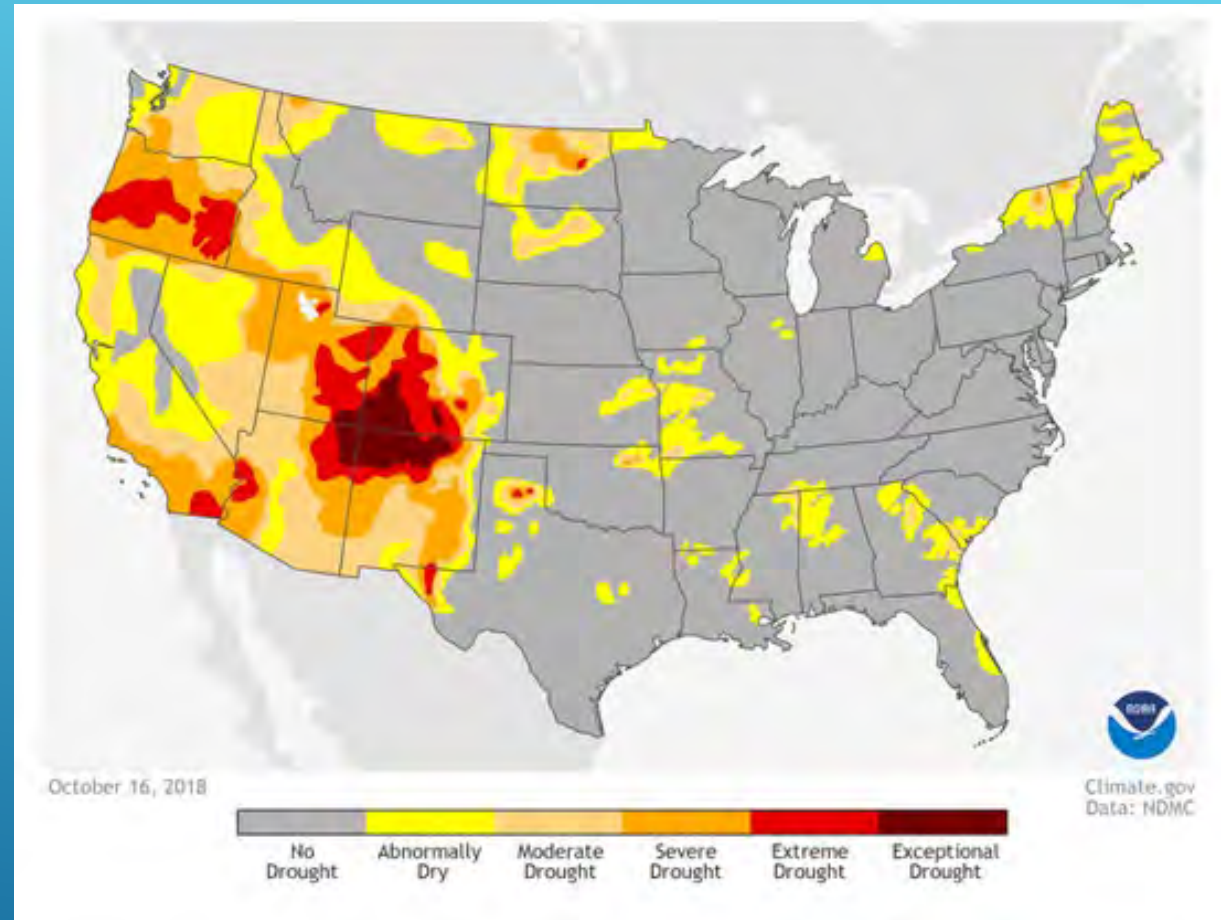
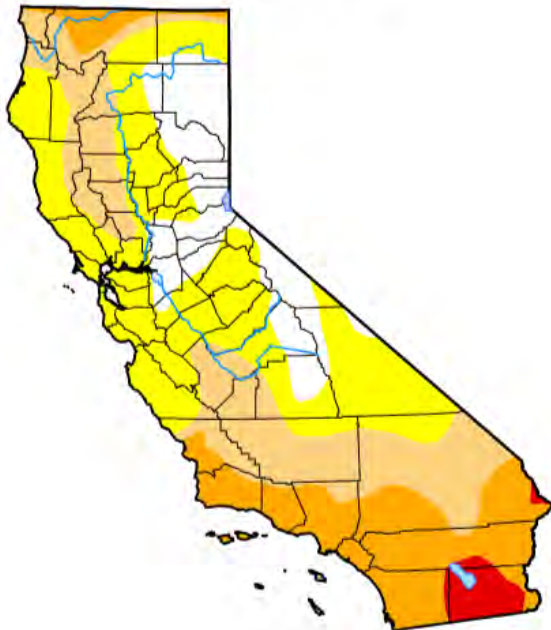
•Eric Luebehusen, U.S. Department of Agriculture





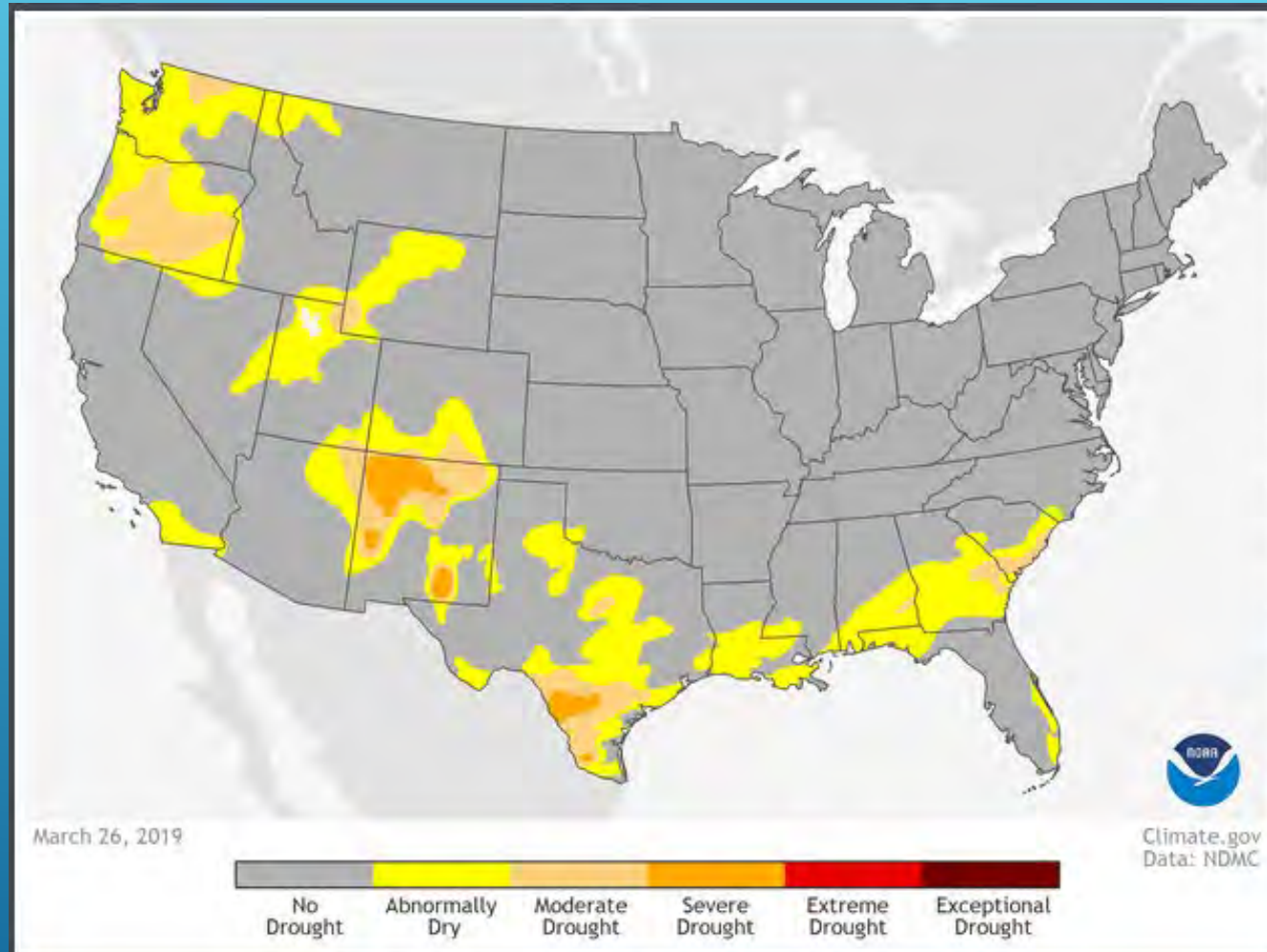
# DROUGHT 2018

**U.S. Drought Monitor  
California**





# DROUGHT 2019





# TREE MORTALITY

Since 2010, an estimated nearly 149 million trees have died in California's national forests



This is across 9.7 million acres of federal, state, local and private lands in California since the drought began in 2010. Since 2016, federal, state, and local partners have felled 1.5 million dead trees.

County	Estimated Cumulative Number of Dead Trees High Priority Counties									
	Totals Rounded to the nearest 1000									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	All Years
Amador	7,000	2,000	600	2,000	17,000	79,000	682,000	276,000	99,000	1,164,600
Calaveras	8,000	2,000	2,000	4,000	144,000	237,000	1,875,000	1,016,000	211,000	3,499,000
El Dorado	53,000	19,000	5,000	11,000	47,000	200,000	1,359,000	1,371,000	614,000	3,679,000
Fresno	82,000	59,000	82,000	65,000	269,000	4,300,000	11,912,000	4,385,000	3,504,000	24,658,000
Kern	79,000	18,000	8,000	23,000	176,000	3,300,000	2,994,000	387,000	114,000	7,099,000
Madera	15,000	8,000	6,000	31,000	55,000	1,900,000	8,972,000	3,327,000	1,145,000	15,459,000
Mariposa	18,000	10,000	21,000	72,000	68,000	1,200,000	6,562,000	1,497,000	585,000	10,033,000
Placer	90,000	16,000	5,000	5,000	21,000	80,000	557,000	709,000	304,000	1,787,000
Tulare	234,000	46,000	57,000	67,000	272,000	6,800,000	12,957,000	4,808,000	3,709,000	28,950,000
Tuolumne	39,000	15,000	45,000	83,000	287,000	997,000	6,213,000	2,721,000	731,000	11,131,000
<b>Total</b>	<b>625,000</b>	<b>195,000</b>	<b>231,600</b>	<b>363,000</b>	<b>1,356,000</b>	<b>19,093,000</b>	<b>54,083,000</b>	<b>20,497,000</b>	<b>11,016,000</b>	<b>107,459,600</b>

# TREES DYING IN OUR FOREST

Provided by:



Acres of Tree Mortality in National Forests in California's Ten High Priority Counties		
National Forest	2010-2018	2018
Rounded to the nearest 1000		
Eldorado	296,000	72,000
LTBMU	44,000	14,000
Sequoia	654,000	142,000
Sierra	787,000	206,000
Stanislaus	447,000	75,000
Tahoe	297,000	94,000
<b>Total</b>	<b>2,525,000</b>	<b>603,000</b>

# Native Bark Beetles

## Primary tree killers in CA forests

- ▶ Western pine beetle
- ▶ Mountain pine beetle
- ▶ Jeffrey pine beetle



Info & Pictures  
Provided by:



*Fir engraver beetle*



Acres of Tree Mortality in California's Ten High Priority Counties		
County	2010-2018	2018
Rounded to the nearest 1000		
Amador	93,000	15,000
Calaveras	181,000	22,000
El Dorado	403,000	41,000
Fresno	641,000	170,000
Kern	363,000	20,000
Madera	394,000	86,000
Mariposa	326,000	47,000
Placer	244,000	65,000
Tulare	862,000	200,000
Tuolumne	526,000	91,000
<b>Total</b>	<b>4,033,000</b>	<b>757,000</b>



# BASS LAKE – TREE MORTALITY

After



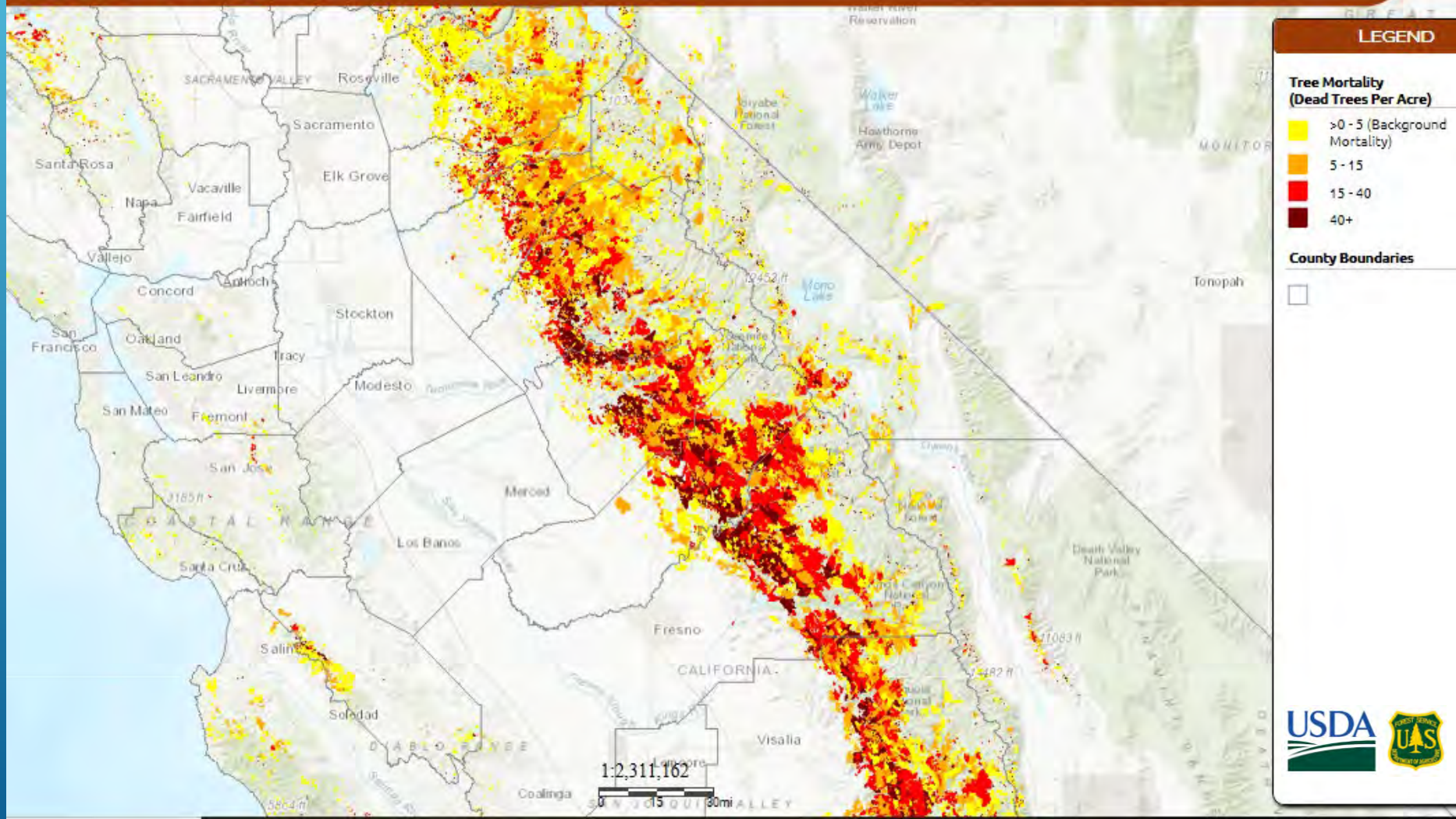
Before





# CALIFORNIA TREE MORTALITY

## Tree Mortality Viewer





# DEAD TREES LEADS TO CATASTROPHIC WILDFIRES!!!



# NOT ALL FIRE IS BAD – NOT ALL TREES ARE GOOD

-BRITTANY DYER





# SMOKEY THE BEAR





# SO HOW DO WE ADJUST TO THIS NEW LANDSCAPE

Know the basics of fire  
Fire safety at home  
Conservation/Recycling  
Energy Efficient Building  
Drought Tolerant Planting  
Smart Planting with  
Native Plants





# Know the basics of fire:

Fuel + Oxygen + Heat = Fire

Fuel + Weather + Topography = Fire Behavior

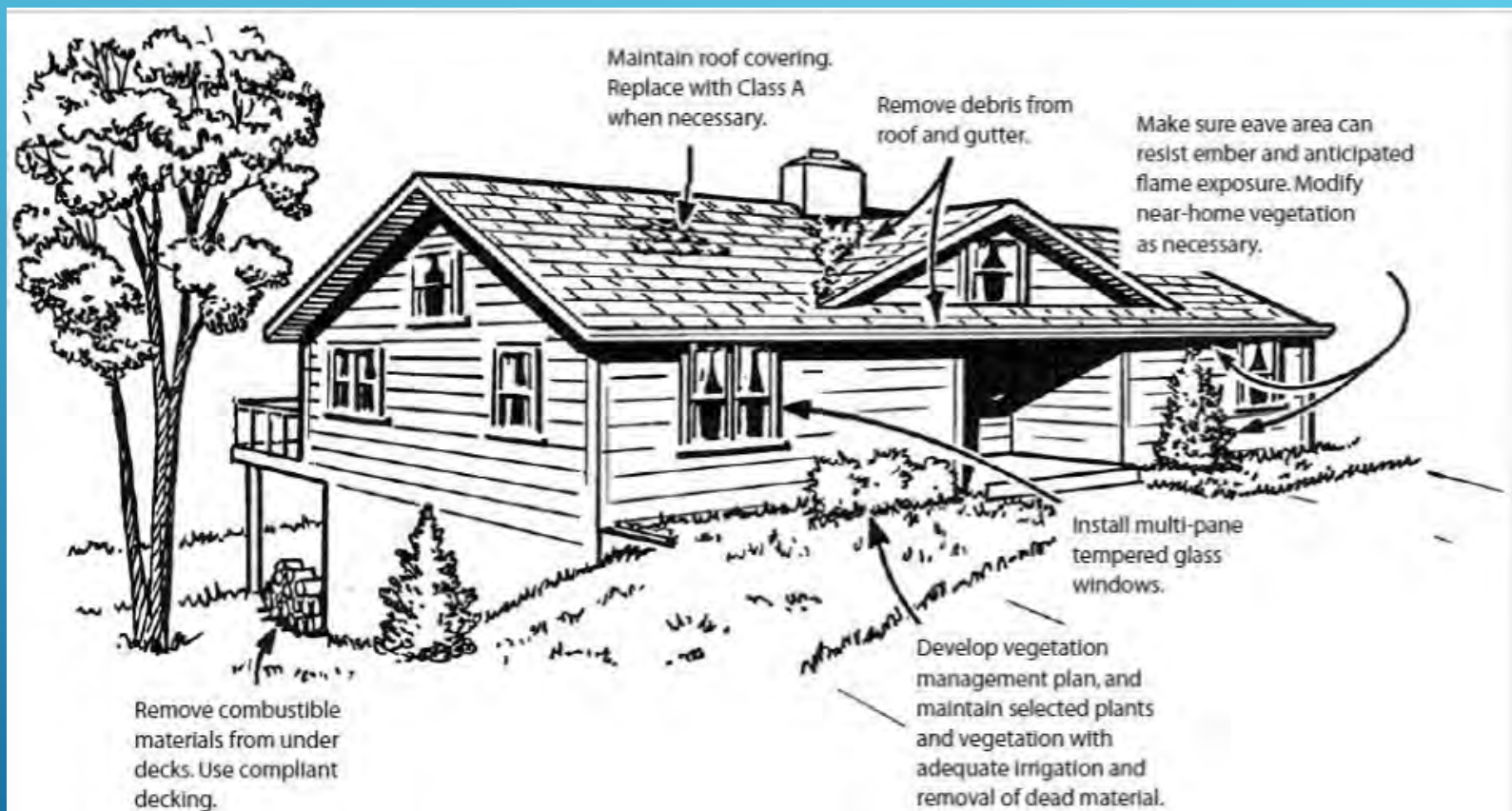
➤ What can you control?

Fuel is... anything that will burn

- Dry or dead vegetation
- Wood siding, roofing, fencing
- Trees
- Woody shrubs or perennials
- Landscape mulch



# HOME SURVIVAL IN FIRE ZONES



**Figure 19.** Important guidelines for creating and maintaining a home and landscape that can survive a wildfire threat.  
Source: Stephen L. Quarles.



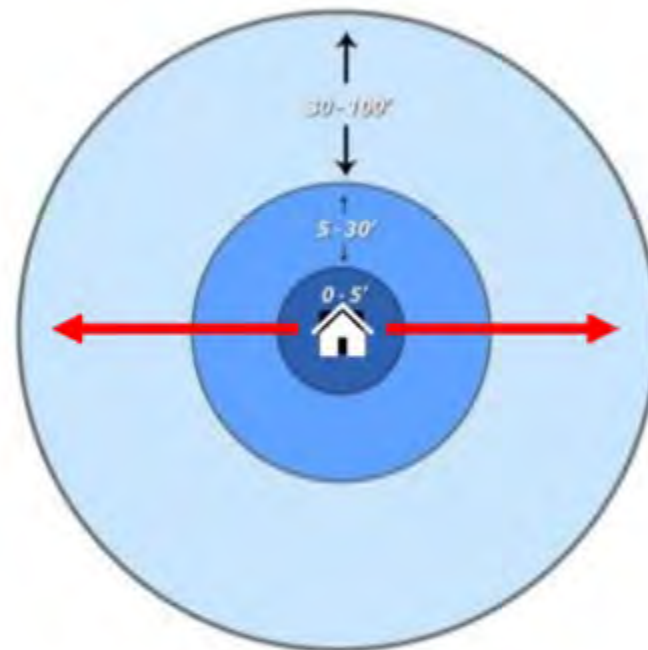
# Work from the house out

## Defensible Space

**Zone 1:**  
0-5 feet “non-combustible zone”

**Zone 2:**  
5-30 feet “lean and green zone”

**Zone 3:**  
30-100 feet or to the property line “reduced fuel zone”



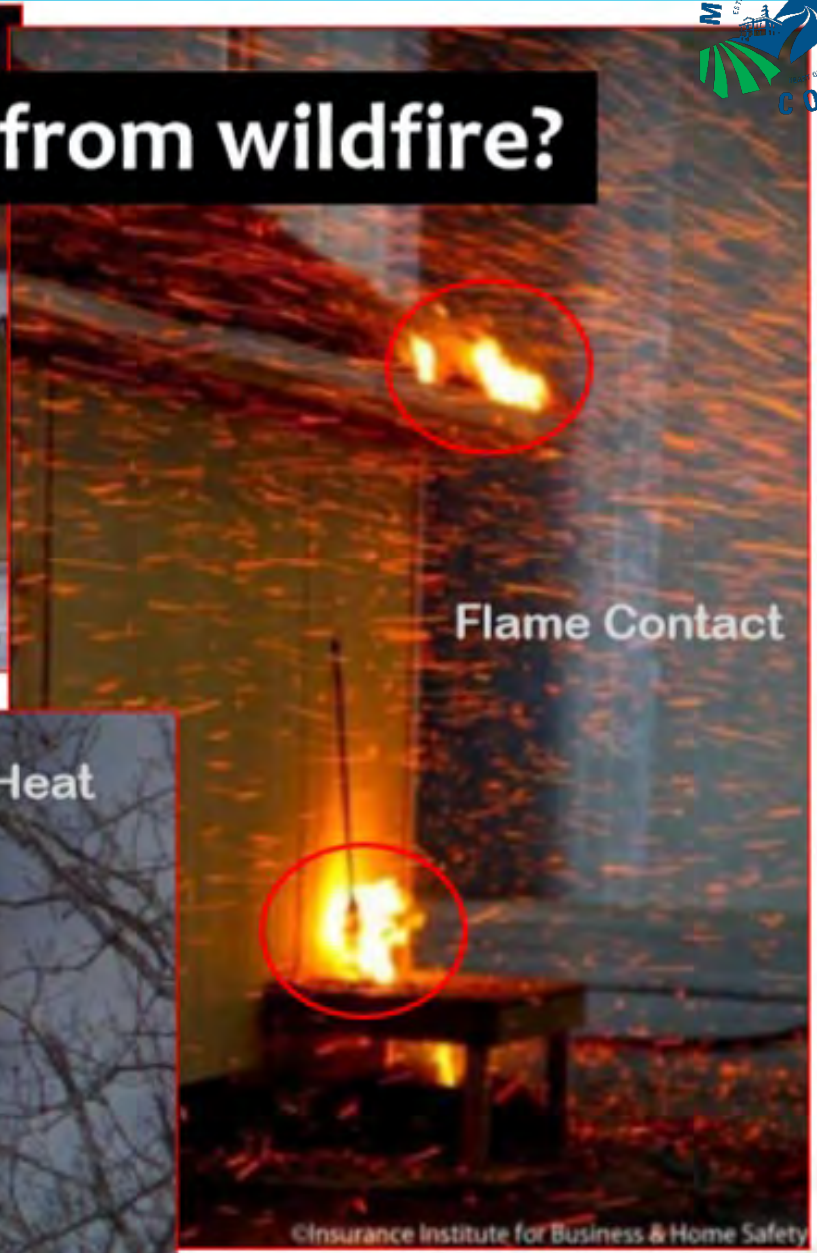


# Homes were the most combustible part of the landscape





# How a house burns from wildfire?





# Embers

Wind-blown  
embers are  
responsible for the  
majority of building  
ignitions



**Angora Fire – South Lake Tahoe**



## Roof edges and openings

## Roof is #1 Priority



## Vents are your 2<sup>nd</sup> Priority

## Avoid Building Attics – Have a conditioned space instead

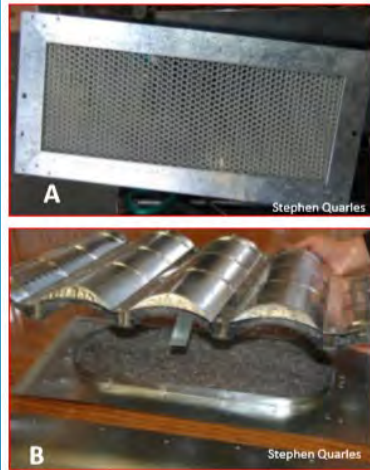




# HOUSE VENTS



## Ember Entry



A = screening (embers) and intumescent honeycomb mesh (flame)  
B = steel wool mesh (embers and flame); C = screening and baffles (embers and flame); D = screening and steel wool mesh (embers and flame)



**Vents – Mesh Size Use 1/8 inch or smaller**





# IN SUMMARY: RECOMMENDATION

- 1. Roof: install and maintain a Class A rated roof covering. Install a metal drip edge and address other edge of roof vulnerabilities**
- 2. Vents: upgrade to flame resistant and ember resistant**
- 3. Non-combustible zone should include the area 5-feet near the house, under the entire foot print of the deck, and 6-inches vertically upward from the ground to the start of your siding**
- 4. Home design, maintenance, and construction can be more important than any individual fire-resistant building product when addressing ember ignition. Poor installation and maintenance can increase the vulnerability of a given product to an ember exposure. ➤ Good practices: remove stored fuels, debris, clean gutters**

December 2019



# IMPORTANT THREE R'S





# BETTER FOR LANDFILLS

- Recycling an aluminum can uses approximately 4% of the energy it would take to create a new one from raw ore, conserving enough energy to operate a TV for about 3 hours
- Use natural cleaning products
- Use coffee filters and paper towels that aren't whitened with sodium hypo-chloride (chlorine bleach)
- Composting scraps
- Pour cooking oil onto towels and throw them in the garbage – not down the sink
- Use reusable grocery bags





# WATER CONSERVATION





# SAVE WATER

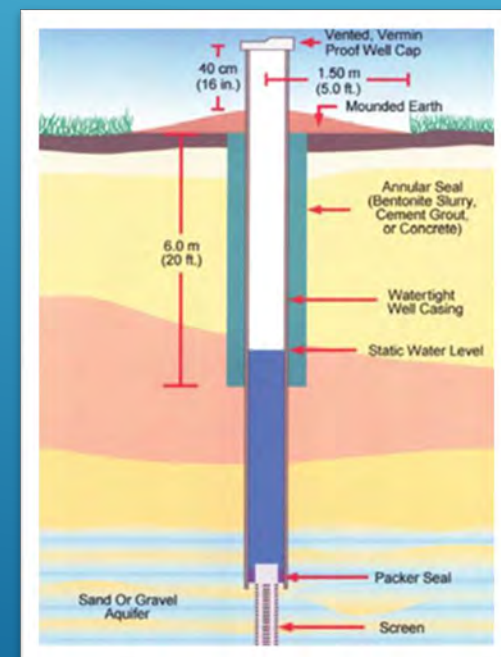
- Install water saving faucets and shower heads
- Shorten shower times
- Fill tub  $\frac{1}{4}$  full instead of  $\frac{1}{2}$  full
- Don't use toilet as a wastebasket
- Turn off water while brushing your teeth and washing hands
- Store water in refrigerator – instead of running water to get a cool drink
- Don't over water your plants and garden





# HOMEOWNER'S CHECKLIST

- ✓ Always use licensed or certified water well drillers and pump installers when a well is constructed, a pump is installed, or the system is serviced.
- ✓ An annual well maintenance check, including a bacterial test, is recommended. Drinking water should be checked any time there is a change in taste, odor or appearance, or when the well system is serviced.
- ✓ Keep hazardous chemicals, such as paint, fertilizer, pesticides, and motor oil far away from your well.
- ✓ Periodically check the well cover or well cap on top of the casing (well) to ensure it is in good repair.
- ✓ Always maintain proper separation between your well and buildings, waste systems or chemical storage facilities. Your professional contractor knows the rules.
- ✓ Don't allow back-siphonage. When mixing pesticides, fertilizers, or other chemicals, don't put the hose inside the tank or container.
- ✓ When landscaping, keep the top of your well at least one foot above the ground. Slope the ground away from your well for proper drainage.



From – NGWA  
wellowner.org



# HOMEOWNER'S CHECKLIST CONT.



Take care in working or mowing around your well. A damaged casing could jeopardize the sanitary protection of your well. Don't pile snow, leaves, or other materials around your well.



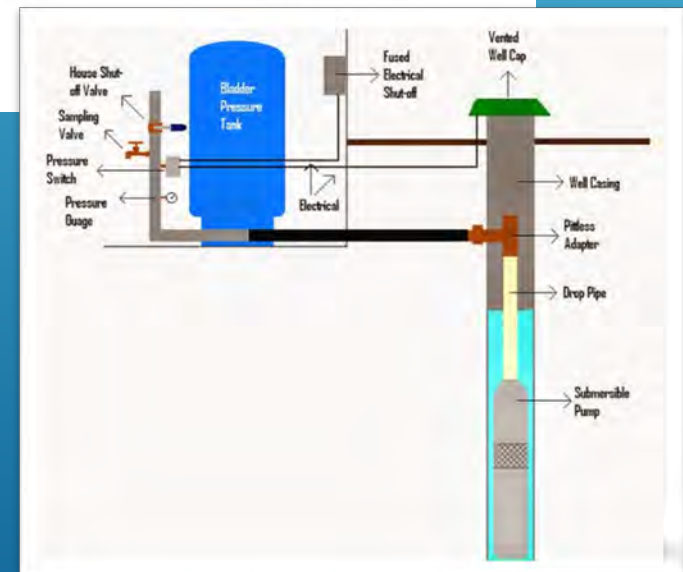
Keep your well records in a safe place. These include the construction report, as well as annual water well system maintenance and water testing results.



Be aware of changes in your well, the area around your well, or the water it provides.



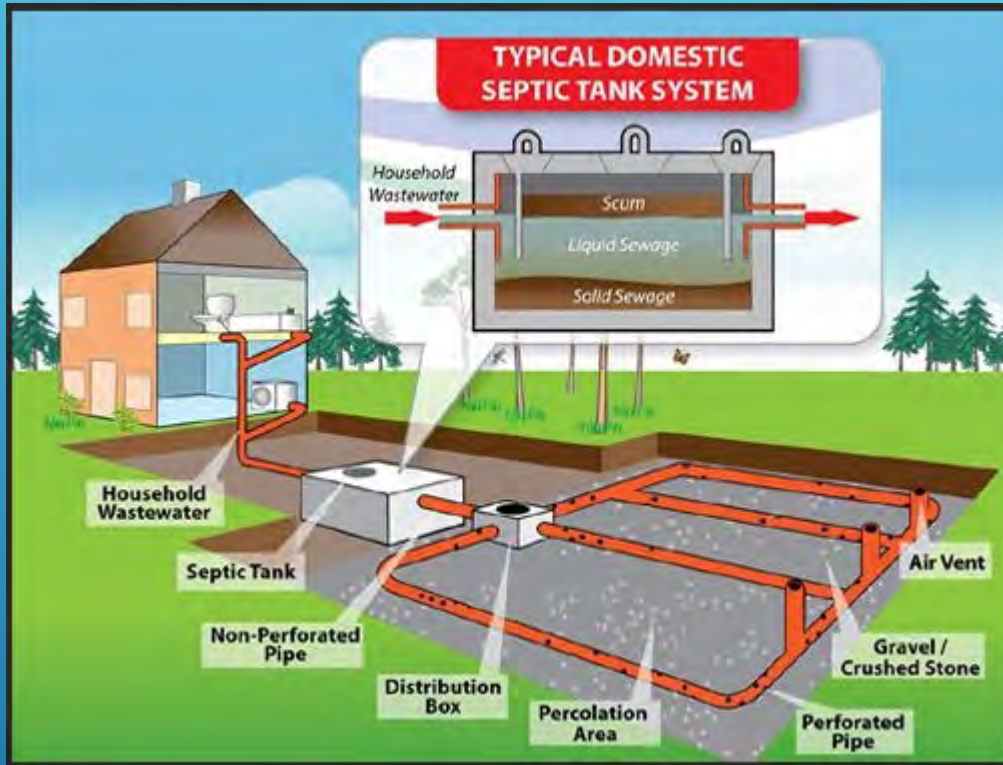
When your well has come to the end of its serviceable life (usually 20+ years), have a qualified water well contractor decommission it after constructing your new system.



From – NGWA - [wellowner.org](http://wellowner.org)



# SEPTIC CARE – TOP TEN WAYS



1. Keep heavy things off & away from the tank
2. Don't flush or pour non-biodegradable objects and/or chemicals down the drain
3. Avoid using garbage disposals
4. Flush liter of spoiled buttermilk down toilet every few months – Great bacteria!
5. Use Septic safe products





# SEPTIC CARE



1. Conserve Water – check for running toilets or leaking faucets
2. Provide good maintenance around the tank
3. Get the tank pumped (every 1 -5 years based on size and usage)
4. Minimize the amount of grey water that enters the system
5. Understand your septic system





# ENERGY EFFICIENT BUILDING

**Green building is not always Energy efficient...**

**But - Building Energy efficient is Green ...**

**Some important points in both -**

- **Start with Smart Design**
- **Super-Seal the Building Envelope**
- **Super-Insulate the Building Envelope**

**\*\*\*Note\*\*\* The Envelope is the most important part of the building**

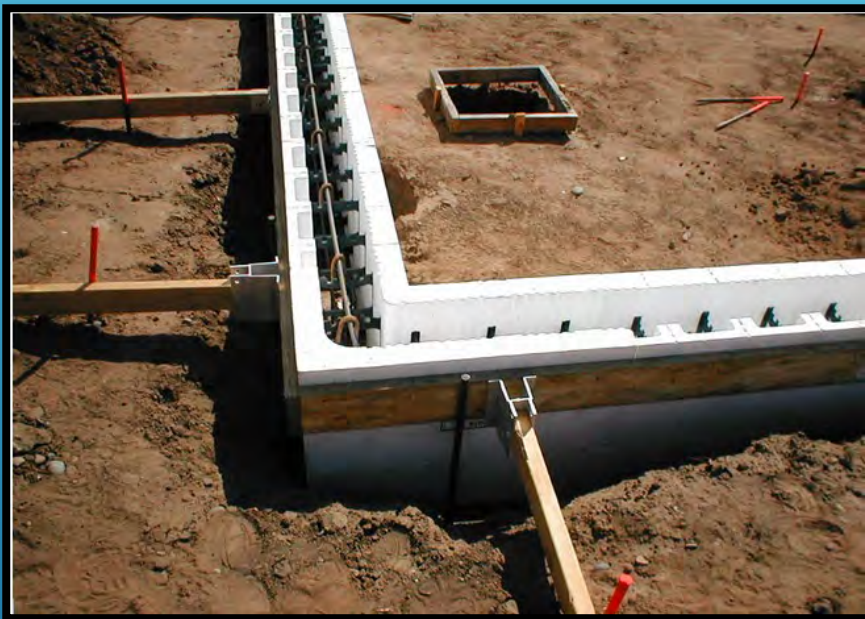
- **Use Highly Insulated Windows and Doors**





# ENERGY EFFICIENT HOME BUILDING

## ICF



**Insulated Concrete  
Form**





# ENERGY EFFICIENT BUILDING – OPTION 2

SIP – Structural Insulated  
Panels





# OTHER TYPES OF EFFICIENT STRUCTURES



- Hay Bale Home
- Tiny Home
- Efficient Earth-Sheltered Home
- Concrete Home



**Ultimate Goal –  
Net-Zero Living**



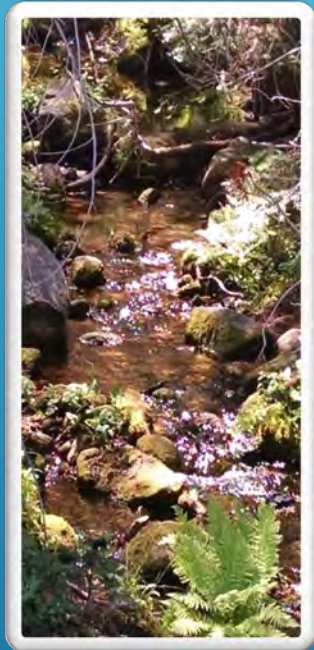
# EXISTING HOME RETROFITS

- ▶ Upgrade windows – dual or triple pane
- ▶ Weather stripping doors and windows
- ▶ Caulking around areas
- ▶ Insulate attic to a higher “R” value
- ▶ Install window shades to keep sunlight/heat out during the day
- ▶ Install whole house fan to bring in cool air at night
- ▶ Plant deciduous shade tree on the south or west side
- ▶ Change to newer energy efficient appliances
- ▶ Install a tankless hot water heater
- ▶ Show your fridge some love: clean coils, check seals, etc.





# LIVING HABITS –SMALL ADJUSTMENTS



- ▶ Clothes dryer – use in the morning during the summer and mid-day in the winter
- ▶ Air drying dishes after washer has run
- ▶ Adjusting thermostats up in the summer and down in the winter
- ▶ Run only full loads in clothes washer and dishwasher
- ▶ Turn off lights when not in use



# DROUGHT RESISTANT LANDSCAPING





# DON'T PLANT A PEST – GIVE THEM AN INCH ... THEY WILL TAKE AN ACRE



Algerian Ivy



English Ivy



Foxglove



Crimson Fountaingrass



Chinese Tallow Tree



Purple Loosestrife



# DON'T BUY - DON'T PLANT (GRASSES)

- ▶ Arundo Donax
  - ▶ False Bamboo
  - ▶ Giant Reed
  - ▶ Carrizo Cane



# INSTEAD PLANT (GRASSES)

- ▶ Deer grass –  
muhlenbergin  
rigens



- ▶ California Fescue –  
festuca californica





# DON'T BUY – DON'T PLANT (SHRUB)

- ▶ Scotch, Spanish, French Broom *Cytisus scoparius*



- ▶ Scarlet wisteria, rattlebox (*Sesbania punicea*)



# INSTEAD PLANT (SHRUB)

- ▶ Western Redbud – *cercis occidentalis*



- ▶ Bush Lupine - *Lupinus arboreus*





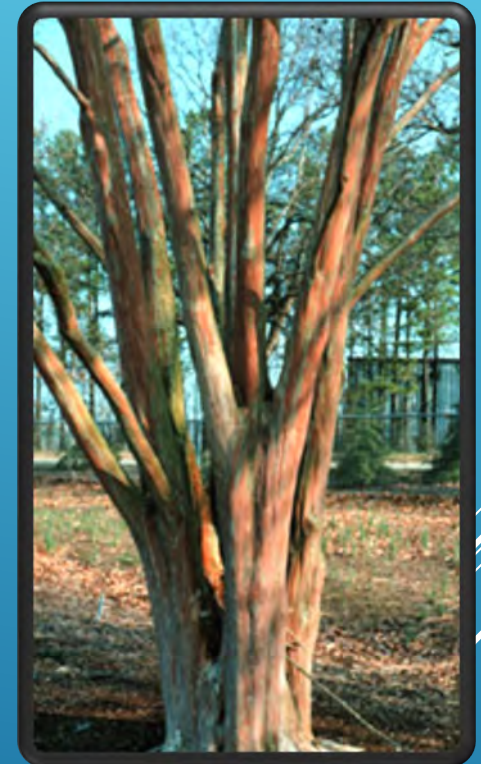
# DON'T BUY – DON'T PLANT (TREE)

- ▶ Tree of Heaven – *ailanthus altissima*
- ▶ Chinese Sumac



# INSTEAD PLANT (TREE)

- Crape Myrtle – *lagerstroemia*



# OTHER INVASIVE WEEDS IN CALIFORNIA

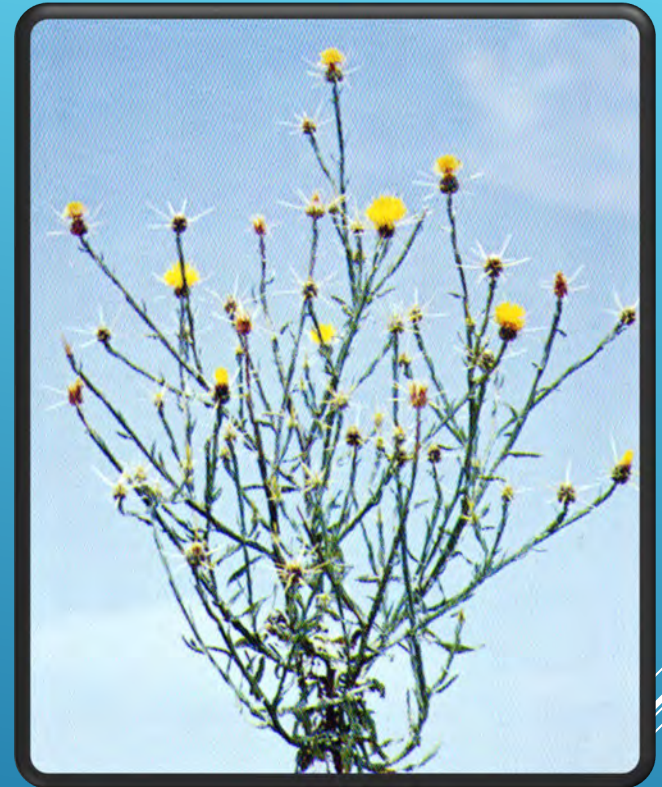
## Bull Thistle





# INVASIVE WEEDS

## ► Yellow Star Thistle





# INVASIVE WEEDS

## ► Himalayan Blackberry



Non-Native: Sharp  
5-angle & Ribbed  
stems; large, red,  
hooked prickles; 3-  
5 Leaflets



Native: Round  
Stems; Slender &  
Straight prickles;  
Smaller fruit; Only  
3 Leaflets

# INVASIVE WEEDS

- Klamath weed – St. Johnswort

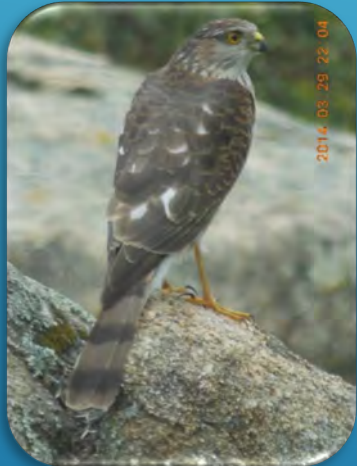


# WE ALL WANT THE SAME THING



*This for many generations to come!*

This is  
why we  
live  
here...



December 2019



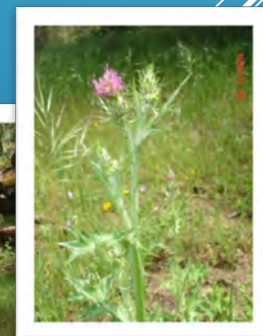
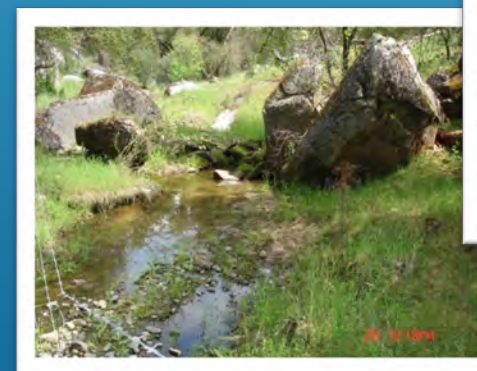
**Jeannie Habben**  
**Deputy Director**  
**Water & Natural Resources**  
**559-675-7703**



**[jeannie.habben@maderacounty.com](mailto:jeannie.habben@maderacounty.com)**

## THANK YOU

- ❖ California Fire Science Consortium
- ❖ Resource Conservation Districts
- ❖ Sierra -San Joaquin Noxious Weed Alliance
- ❖ Save Our Water
- ❖ UC Cooperative Extension
- ❖ Climate.nasa.gov
- ❖ USDA/NRCS
- ❖ US Forest Service
- ❖ National Groundwater Assoc.
- ❖ Wellowner.org



December  
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# Questions?