

# Gardening in a Changing Climate



Presented by  
UC Master Gardeners of Placer County



**University of California**

Agriculture and Natural Resources

■ UCCE Master Gardener Program

# Who Are Master Gardeners?

## Master Gardeners of Placer County

- ❖ Extend **research-based**, sustainable gardening and composting information
- ❖ Present accurate, impartial information to **home gardeners**
- ❖ Encourage public to make **informed** gardening decisions



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# Who Are Master Gardeners?

## Where to find us...

### Online, in the Media, and Special Publications

- ❖ Hotline: Call **(530) 889-7388** or submit your questions online
- ❖ Website: [pcmg.ucanr.org](http://pcmg.ucanr.org)
- ❖ Facebook, Twitter, Instagram
- ❖ Gold Country Media monthly column
- ❖ *Curious Gardener* monthly newsletter and on our website
- ❖ *Gardening Guide and Calendar*



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# Who Are Master Gardeners?

## Where to find us...

### Workshops, Fairs and Festivals and Special Events

- ❖ Speakers by Request
- ❖ Workshops (various venues, check website)
- ❖ Farmers' Markets (seasonal: Auburn, Roseville, Lincoln)
- ❖ Fairs and Festivals Booths (varies)
- ❖ Garden Faire (April)
- ❖ Mother's Day Garden Tour (May)



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# Homepage pcmg.ucanr.org

The screenshot shows the homepage of the UC Master Gardeners of Placer County website. A green arrow points to the navigation bar, and three red arrows point to the left sidebar. A yellow arrow points to the 'Upcoming Events' section, and another yellow arrow points to the Facebook icon. A green arrow at the bottom points to the '2021 Gardening Guide & Calendar - Vendor List' link.

**University of California**  
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SKIP TO CONTENT SITE MAP  [GIVE](#)

[Placer Pests](#) [Gardening Essentials](#) [Gardening Year Round](#) [Vegetables](#) [Landscape Plants](#) [Fruits & Nuts](#) [UC Gardening Guides](#)

[Home](#)  
[2021 Gardening Guide and Calendar](#)  
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[About Master Gardeners](#)  
[How to Become a Master Gardener](#)  
[Contact Us](#)  
[Placer/Nevada UCCE](#)  
[For PC Master Gardeners Only](#)

**Connect With Us!**

**UC Master Gardeners of Placer County**

**Upcoming Events**

Event Name	Date
<a href="#">From Bambi to Thumper Zoom Workshop: An Integrated Strategy for the Management of Vertebrate Pests</a>	3/13/2021
<a href="#">Growing Citrus in the Foothills Zoom Workshop</a>	3/27/2021
<a href="#">Gardening in a Changing Climate</a>	4/10/2021
<a href="#">Composting and Mulch Zoom Workshop</a>	4/17/2021
<a href="#">Principles of Propagation Zoom Workshop</a>	5/8/2021

[View More Events](#)

**Virtual Gardening Workshops**

To view previous workshops: [Recorded Virtual Gardening Workshops](#)

**HOTLINE UPDATE**

The Hotline office continues to be closed to all walk-in clients. We are, however, available to answer your gardening questions. You can submit them by using the Ask A Master Gardener link below or by leaving a message on our Hotline number shown at the bottom of this web page.

[Ask a Master Gardener...](#)

To learn more, [Click here.](#)

[2021 Gardening Guide & Calendar - Vendor List](#) [Placer County Vegetable](#)

# Agenda

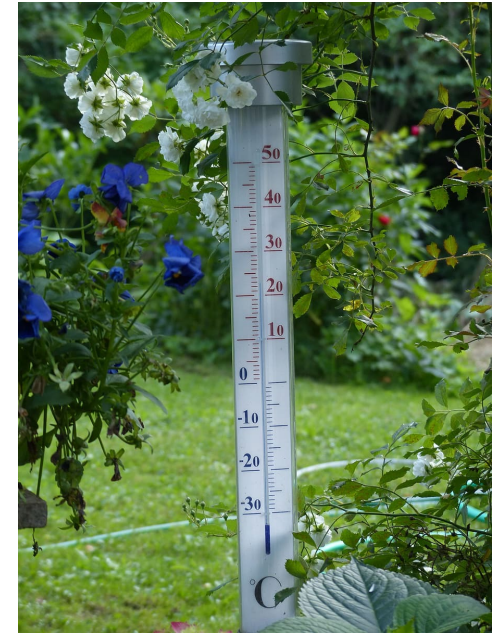
What is Climate Change?

The Science of Change

Adapting Gardening Practices

Be Fire Smart

Ask Questions



A Handout with links  
is available on our website: [pcmg.ucanr.org](http://pcmg.ucanr.org)

# What is Climate Change?

Measured in small increments

Changes add up over time

Can have a huge impact on our gardens



# What is Climate Change?

## Weather vs. Climate



### Weather

What the temperature will be tomorrow or whether it will rain on Thursday.

### Climate

Looks at long term (about 30 year)  
averages of daily weather.

# Climate Change Vocabulary

- ❖ Mitigation
- ❖ Adaptation
- ❖ Phenology
- ❖ Synchrony
- ❖ Carbon sequestration
- ❖ Ecosystem services



# Mitigation vs. Adaptation

## **Mitigation (of climate change):**

Implementing actions to reduce the sources of greenhouse gas emissions.

## **Adaptation (to climate change):**

Adjusting to actual and expected climate impacts

- Can moderate harm

- Can exploit beneficial opportunities

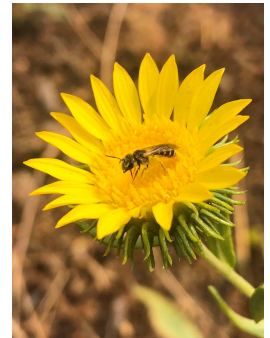
# Phenology and Synchrony

## Phenology Annual cycles of plants and animals

- ❖ Extremely sensitive to climate changes
- ❖ Not all species respond with the same speed

## Synchrony Events that occur at the same time

- ❖ Climate change can disrupt species' interactions
- ❖ Plants bloom before pollinators are active
- ❖ Caterpillars emerge before migratory birds need to feed young





# Carbon Sequestration

- ❖ **Removing carbon from the atmosphere**
- ❖ **Storing it in a fixed molecule**

**In soil**

**In the ocean**

**In plants**





# Ecosystem Services

**Ecosystem**--a community of organisms and their Environment, functioning as an ecological unit

**Ecosystem Services** are the benefits of an ecosystem to human life, such as clean water, food, and the decomposition of organic matter.



# The Science of Change

Here are a few examples of the most common ecological responses to climate change that scientists have documented:

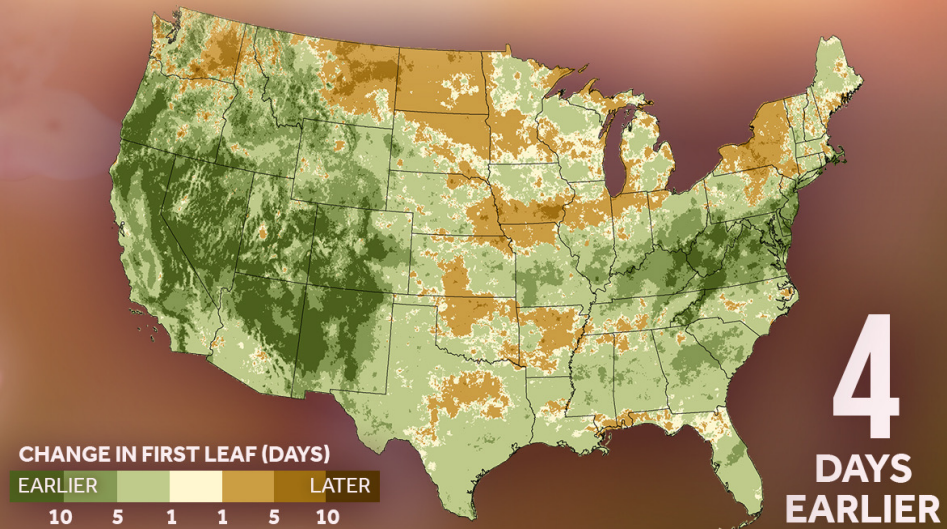
# The Science of Change

Spring is arriving earlier:

- ❖ Leafing out and bloom events are generally happening earlier



# SACRAMENTO SPRING COMING EARLIER



Change in average date of first spring leaf emergence (1981-2019)  
Source: U.S.A. National Phenology Network

CLIMATE  CENTRAL

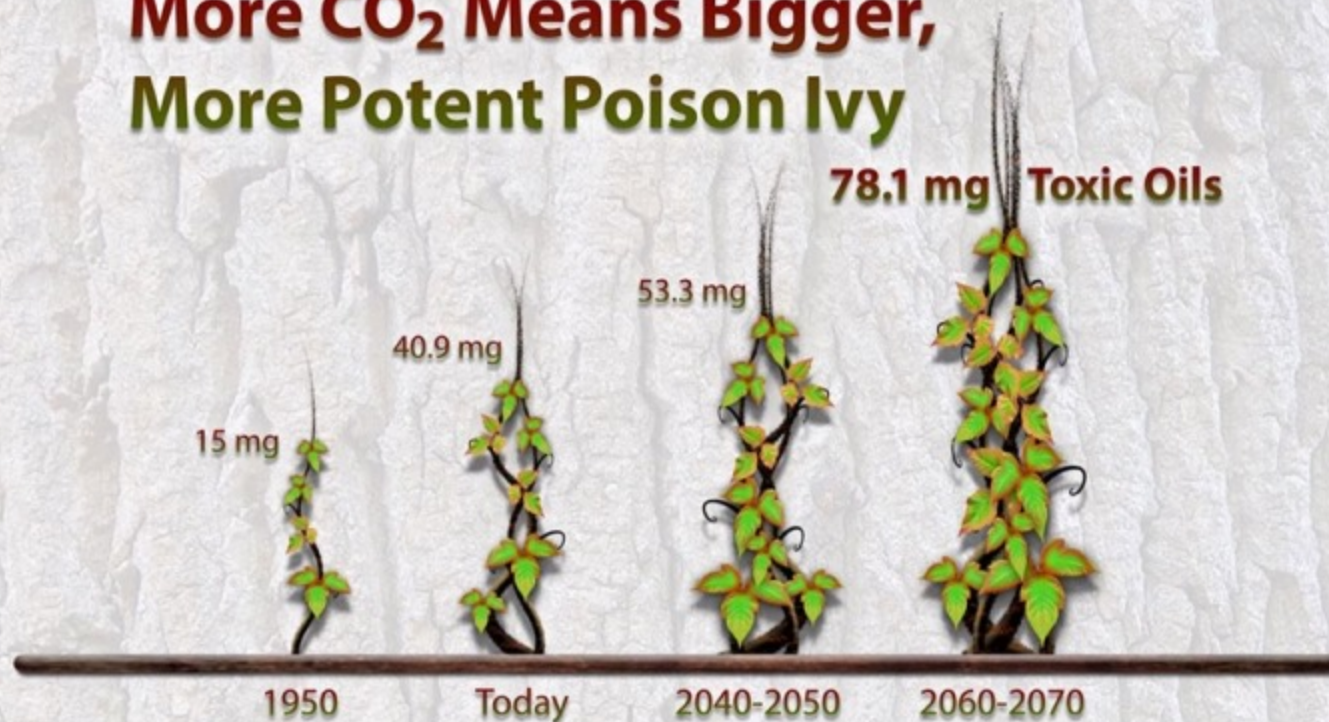
# The Science of Change

- ❖ Rising temperatures mean pollen seasons will start earlier and last longer, causing an uptick in asthma and allergies





# More CO<sub>2</sub> Means Bigger, More Potent Poison Ivy



Average per plant in Ziska (2007) lab study

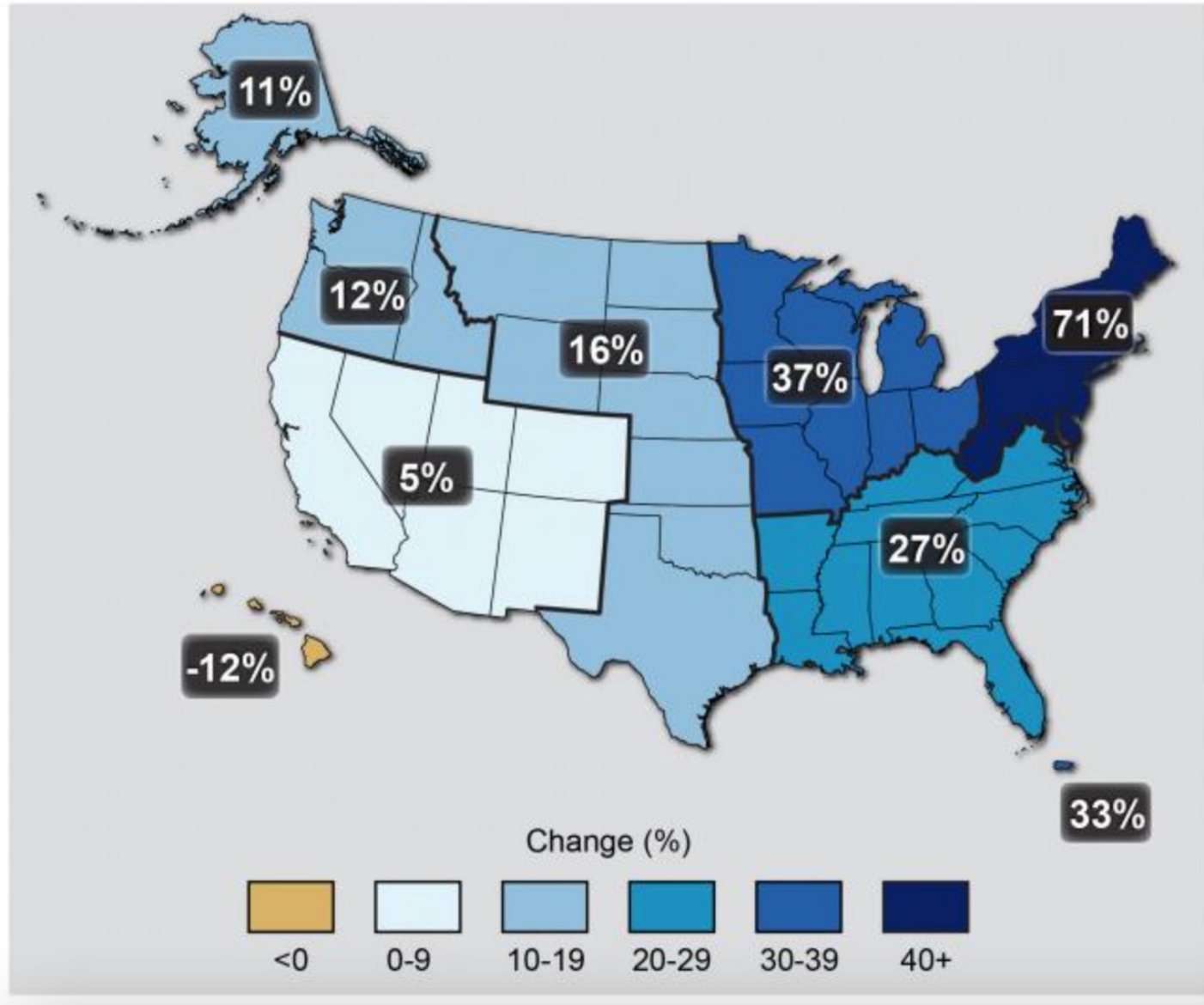
CLIMATE CO<sub>2</sub> CENTRAL

# The Science of Change

- ❖ Frost and freeze damage threaten plants when an earlier spring is combined with more extreme winter storms.



### Observed Change in Very Heavy Precipitation





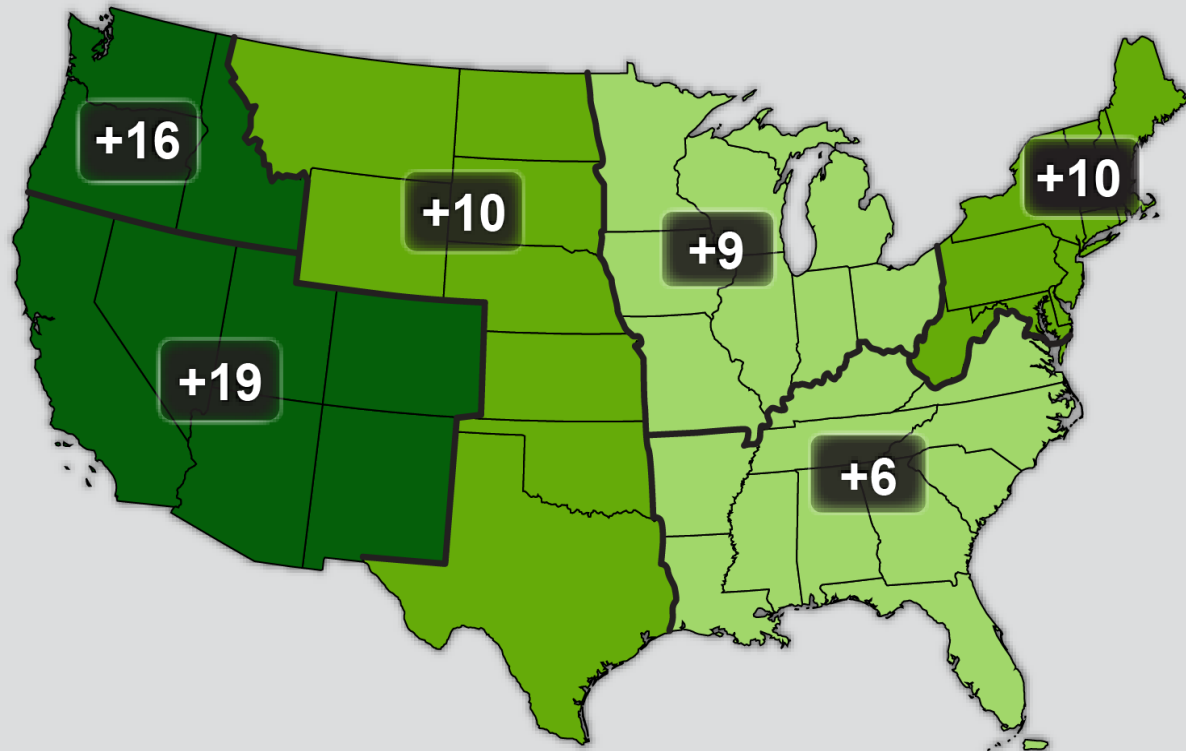
# The Science of Change

- ❖ Reduction in winter chilling is expected to impact fruit and nut trees through too few chilling hours for fruit set



# Observed Increase in Frost-Free Season Length

<https://nca2014.globalchange.gov/report/our-changing-climate/frost-free-season>

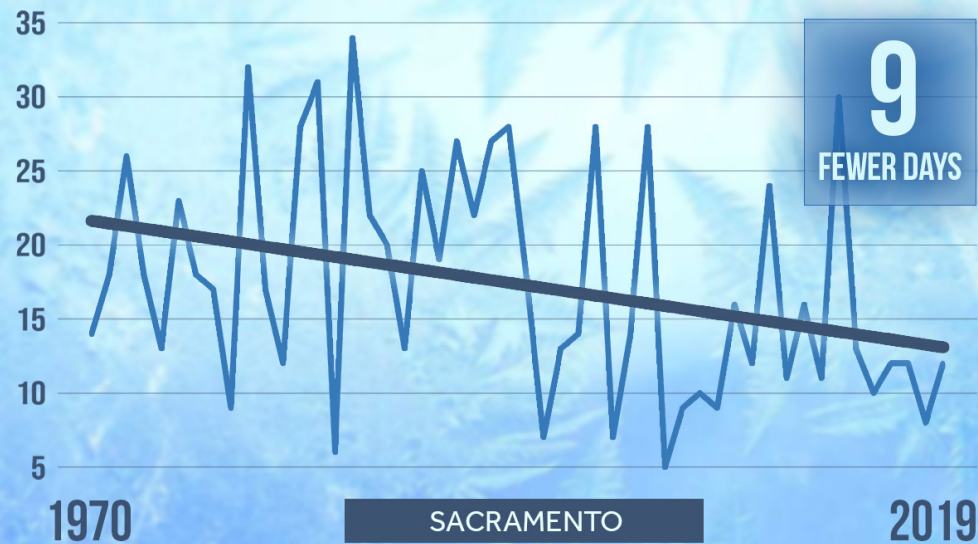


Change in Annual Number of Days



# SHORTER COLD SNAPS

## CONSECUTIVE WINTER DAYS BELOW NORMAL



Most consecutive days that Dec-Feb average daily temperature is below NCEI 1981-2010 normal  
Source: RCC-ACIS.org. Produced 1/22/2020

CLIMATE  CENTRAL

# The Science of Change

- ❖ Invasive species are more responsive to climate changes, facilitating naturalization and invasion.

[plantright.org](http://plantright.org)











## Resource List



## How You Can Help

1

Don't plant  
invasives

2

Buy beautiful  
non-invasive  
alternatives

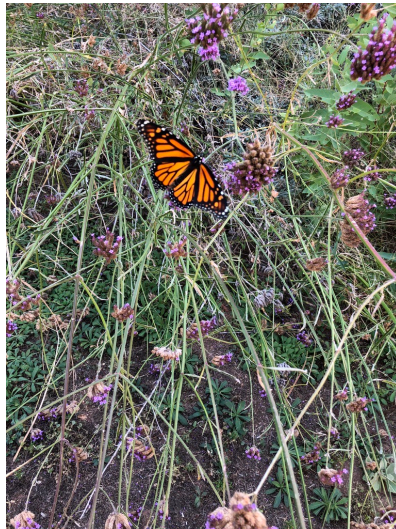
3

To find resources  
in your region, visit  
[PlantRight.org](http://PlantRight.org)



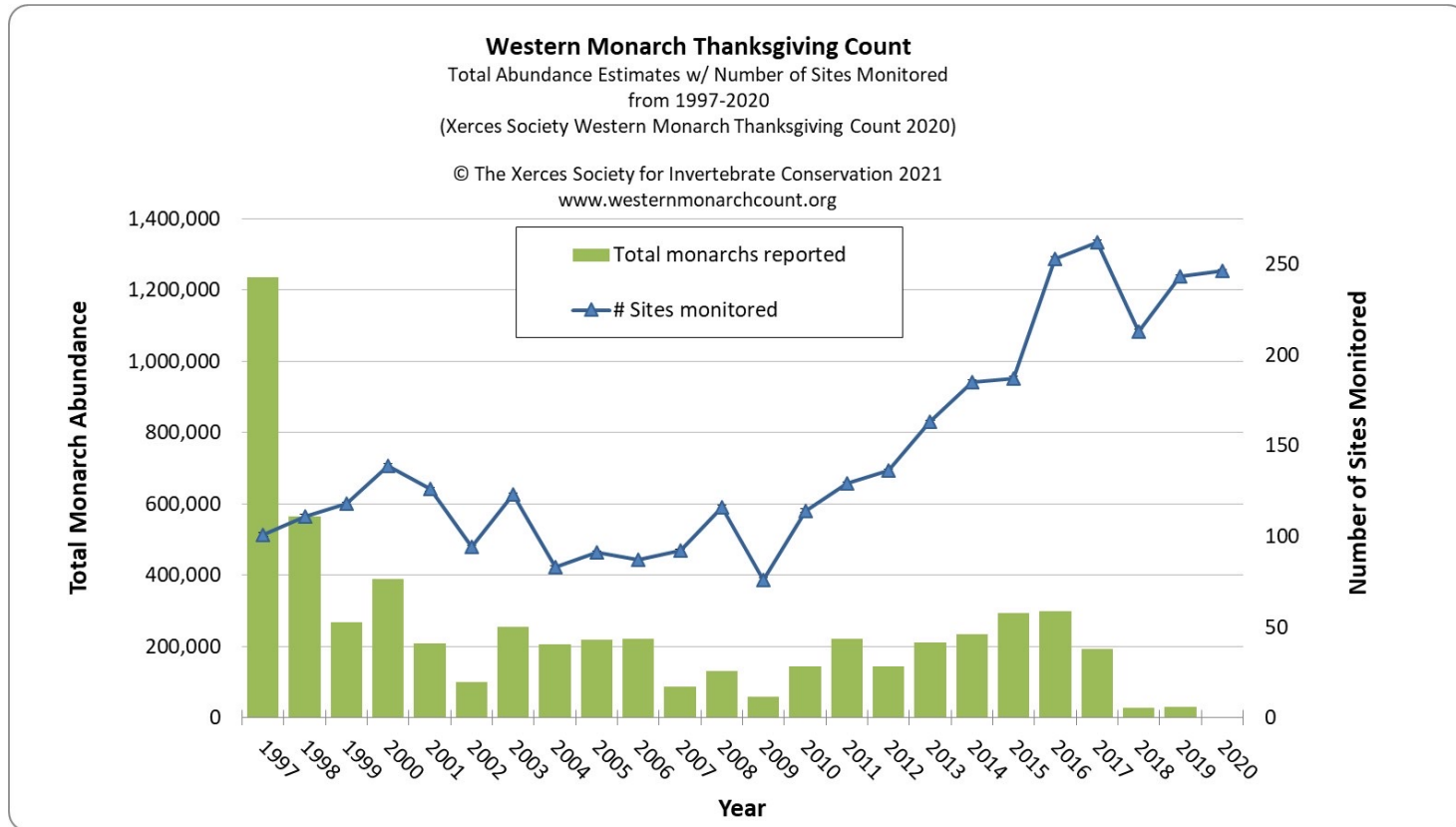
# The Science of Change

- ❖ Extinctions have occurred  
in hundreds of species



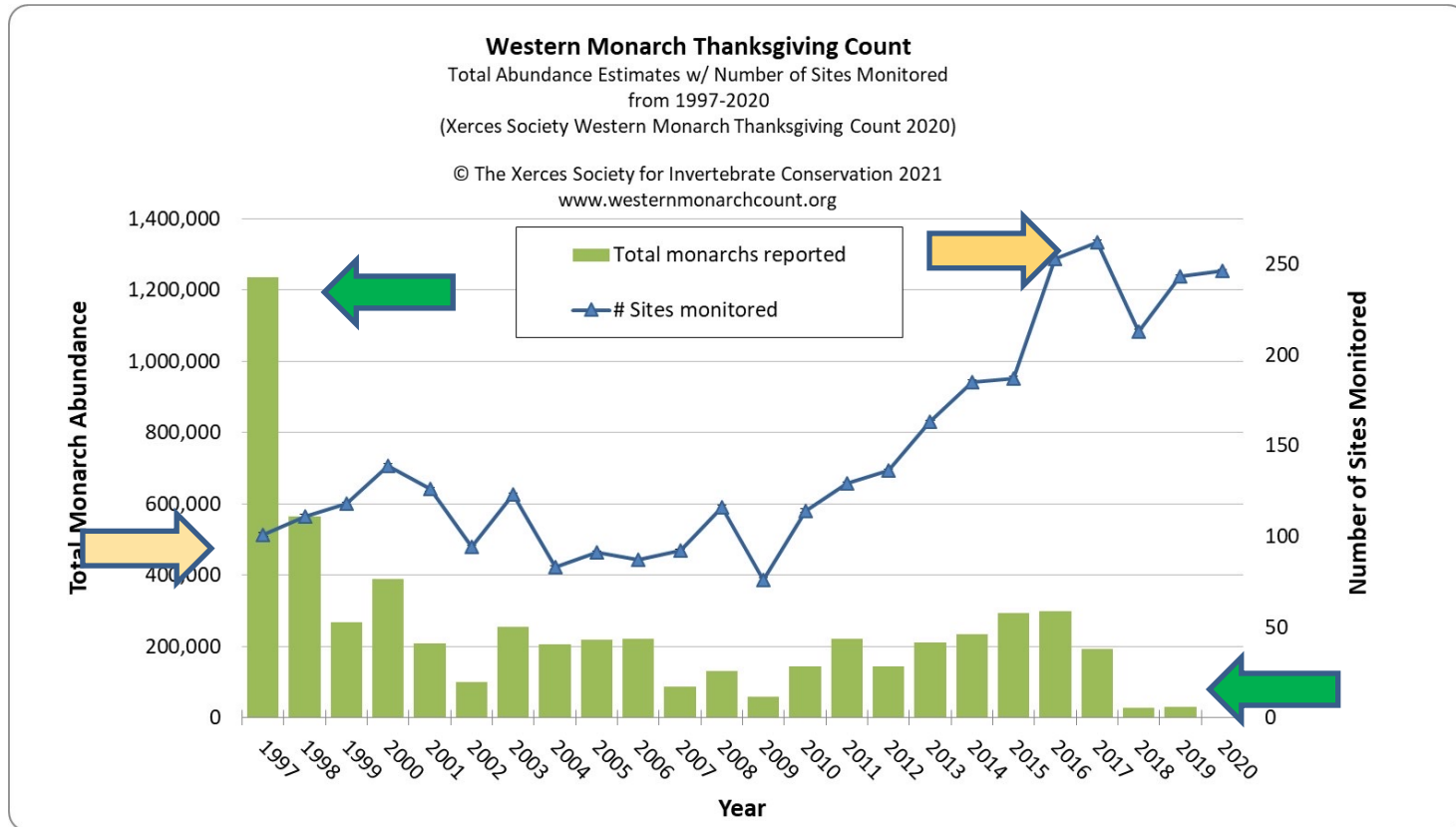


# Where Have all the Monarchs Gone?



Unfortunately, to the surprise and dismay of many, only 1,914 monarchs were counted at all the sites. This is a shocking 99.9% decline since the 1980s.

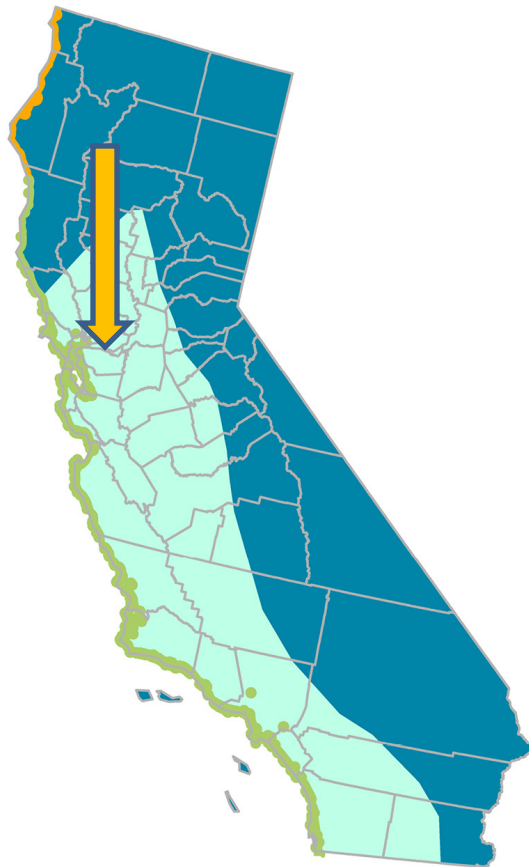
# Where Have all the Monarchs Gone?



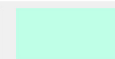
Unfortunately, to the surprise and dismay of many, only 1,914 monarchs were counted at all the sites. This is a shocking 99.9% decline since the 1980s.


# Plant for Monarchs

## Priority Action Zones in California for Recovering Western Monarchs




### Priority #1


 In the monarchs' first stopover zone, protect and plant early season native milkweed and nectar plants

 In the coastal areas where monarchs overwinter, protect and restore overwintering habitat and plant native nectar plants

In coastal California, even planting California-native milkweed species such as narrowleaf milkweed (*Asclepias fascicularis*) can be problematic because the mild climate may prevent or delay these species from going dormant. This can cause disease and parasite build-up and natural life cycle disruption similar to that seen with non-native tropical milkweed (*A. curassavica*).

### Priority #2

 Protect and plant native milkweed and nectar plants

 Plant native nectar plants

# Climate Change Adaptation



## **Bumblebees Bite Leaves**

Prompts plants to pollinate early when bees lack pollen

Bees bite the leaves of plants that are lacking flowers

Causing plants to bloom as much as

a month earlier than they normally would

May help both bee and plant resilience

# The Science of Change

**Plants react to extremes, not to averages.**

- ❖ Uncertainty; keep eyes on the weather
- ❖ Respond appropriately
- ❖ Protect what you have

# Adapt Gardening Practices to Climate Change

- ❖ Monitor your Garden
- ❖ Improve and protect the soil
- ❖ Choose plants for our climate
  - California natives (and other low water plants)
- ❖ Support our native pollinators
  - Continuous floral resources
- ❖ Eliminate invasive plants
- ❖ Adapt your food garden

# Monitor Your Garden

- ❖ Observe and keep a record
- ❖ Document garden characteristics
  - ❖ Sun exposure
  - ❖ Soil type
  - ❖ Climate Zone
  - ❖ Water availability
  - ❖ Use hydrozones



# Strengthen Soil's Ability to Store Carbon

- ❖ Apply compost, yard waste and other organic matter to feed microbes in the soil
  - ❖ Reduce—or eliminate-- tillage
  - ❖ Irrigate efficiently
  - ❖ Use cover crops
- 
- ❖ Keep landscapes vegetated and soil hydrated for plants to grow and sequester carbon







## Choose plants for our climate

California native plants support native animal species and are adapted to our growing conditions.

[calscape.org](https://calscape.org)

- ❖ **7988** plants native to California
- ❖ 644 native to my zip code
- ❖ 632 native to my **address**
- ❖ Advanced search to select



CALIFORNIA NATIVE PLANT SOCIETY

**Calscape**

Restore Nature One Garden at a Time

Search for California native plants by name



ADVANCED SEARCH

Enter a California address or click the map to see plants native to that location

California

7988 plants native to California



All Plants  
7988



Trees  
216



Shrubs  
1451



Perennials  
3700



Annuals  
2216



Grasses  
646



Succulents  
188



Vines  
92



Ferns  
113



Sun  
2844



Shade  
586



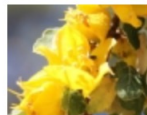
Part Shade  
2278



Groundcovers  
825



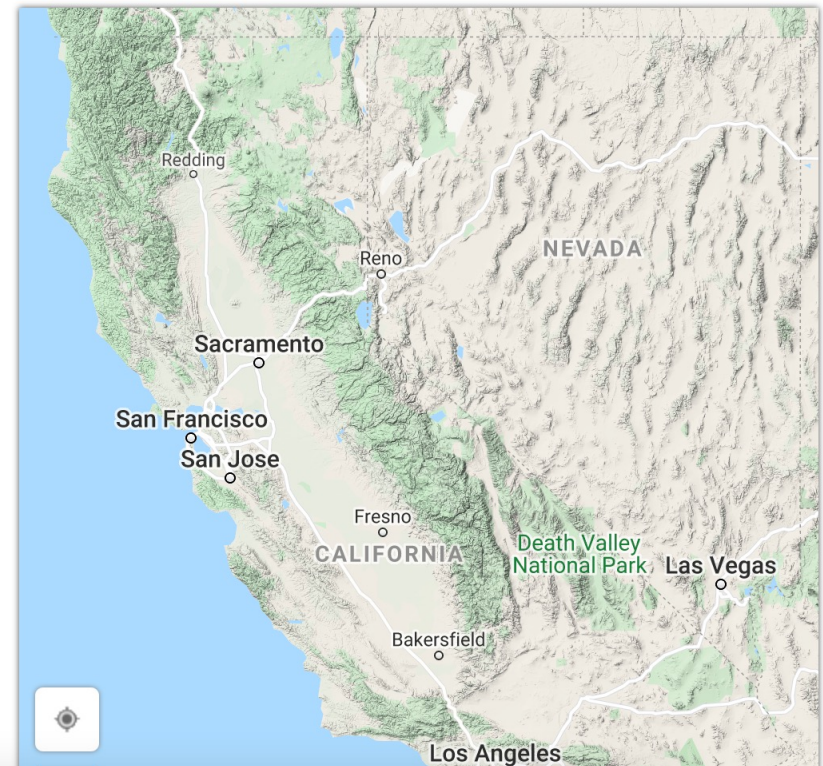
Butterfly Hosts  
5079



Hedges  
322



Bank Stabilization  
305



# Support our native pollinators

- ❖ More than 75% of flowering plants depend on pollinators
- ❖ 1 in 3 bites of food you eat is thanks to pollinators



# Eliminate invasive plants

- ❖ Manage weeds and uninvited plants

Remember: Do not plant a pest!

# Adapt your food garden

- ❖ Check planting dates
- ❖ Choose varieties for your area
- ❖ Monitor sun and water





# Vegetable Planting Guide



## Placer County Vegetable Planting Guide

Version 3.0

### Warm Season Vegetables

Start seeds indoors

Direct sow in garden

Transplant

Harvest

The dates on this chart are for gardens at about 1200' of elevation. For Winter/Spring planting, gardeners at higher elevations should delay planting by about 2 weeks for every 1000' above 1200'. Gardeners at lower elevations should plant about 2 weeks earlier for every 1000' below 1200'.

City	Approx. Elevation	Avg. Last Frost Date
Roseville	165'	3/15
Lincoln	165'	3/15
Rocklin	250'	3/23
Loomis	400'	3/26
Granite Bay	480'	3/26
Penryn	625'	3/26
Newcastle	950'	4/2
Auburn	1225'	4/2
Meadow Vista	1700'	4/9
Applegate	2000'	4/9
Weimar	2250'	4/9
Colfax	2425'	4/9
Foresthill	3225'	4/16

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
eggplant											Until frost	
peppers											Until frost	
tomatoes											Until frost	
winter squash												
beans, green									Until frost			
beans, dried											Until frost	
summer squash												
corn												
cucumber												
melons												
sweet potato					*Slips						Until frost	
okra											Until frost	

Planting and harvest dates may vary between varieties; please check seed packets for details.

Frost dates are approximate due to recent climate changes and varying topography within Placer County.

Acknowledgments: Thank you to Professor Emeritus, Dr. Robert Norris at the UC Davis Plant Sciences Department and the El Dorado County Master Gardeners for the inspiration to create a local planting guide for Placer County.

**Master Gardeners of Placer County can be reached at (530) 889-7388, or online at [pcmg.ucanr.org](http://pcmg.ucanr.org).**

\*Sweet potato slips are rooted cuttings. Please go to [sacmg.ucanr.edu/files/187714.pdf](http://sacmg.ucanr.edu/files/187714.pdf) for more information.

# When to Water

**Test:** Water if dry at 3-4 inches



**Monitor Regularly      Avoid over watering.**

**NOTE: Drooping leaves does NOT always mean the need for watering. Check the soil. Avoid overwatering. Roots can drown.**

Build Your Basic Gardening Foundation and Become a More Informed Gardener

Build a great foundation of climate-conscious, earth-friendly gardening principles and knowledge tailored to the needs, climate and conditions of **gardens in Marin**. Dig in!

[Earth-Friendly Gardening](#)

[Site Analysis](#)

[Climate & Microclimate](#)

[Climate Change & Your Garden](#)

[Fire-Smart Landscaping](#)

[Soil](#)

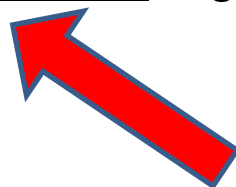
[Compost & Other Soil Amendments](#)

[Mulch](#)

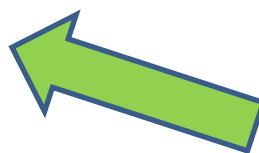
[Irrigation](#)

[Conserving Water & Energy](#)

[Minimizing Waste](#)



Remember, that Marin is a different climate zone than Placer County



Lots of info about gardening here

# Climate Change & Your Garden

[http://marinmg.ucanr.edu/BASICS/CLIMATE CHANGE - YOUR GARDEN/](http://marinmg.ucanr.edu/BASICS/CLIMATE_CHANGE_-_YOUR_GARDEN/)

## BACK TO BASICS

Climate Change Mitigation -

Be Part of the Solution!

How Can Gardeners Adapt for a Changing Climate?

CLIMATE & MICROCLIMATE

What is Your Climate Zone?

How to Assess Your Microclimate

# Be Fire Smart



Photo UCANR



# Be Fire Smart

Increased warming, drought, and insect outbreaks, due to climate change have increased wildfires and impacts to people and ecosystems in the Southwest.

Fire models project more wildfire and increased risks to communities across extensive areas.

# Be Fire Smart

## 5 largest fires in California history

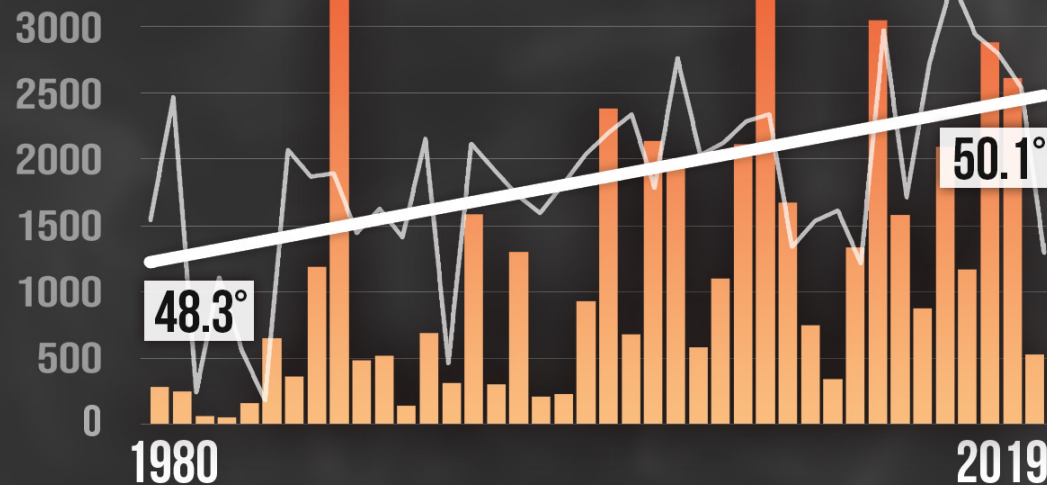
1. AUGUST COMPLEX FIRE August 2020 1,002,097 acres
2. MENDOCINO COMPLEX FIRE July 2018 459,123 acres
3. SCU LIGHTNING COMPLEX FIRE August 2020 396,624 Acres
4. LNU LIGHTNING COMPLEX FIRE August 2020. 363,220 acres
5. CREEK FIRE Sept. 2020 322,089 acres

4 of these fires occurred in 2020

# Be Fire Smart

## HOTTER YEARS, HIGHER FIRE RISK ACRES BURNED ACROSS WESTERN STATES

(THOUSANDS OF ACRES)

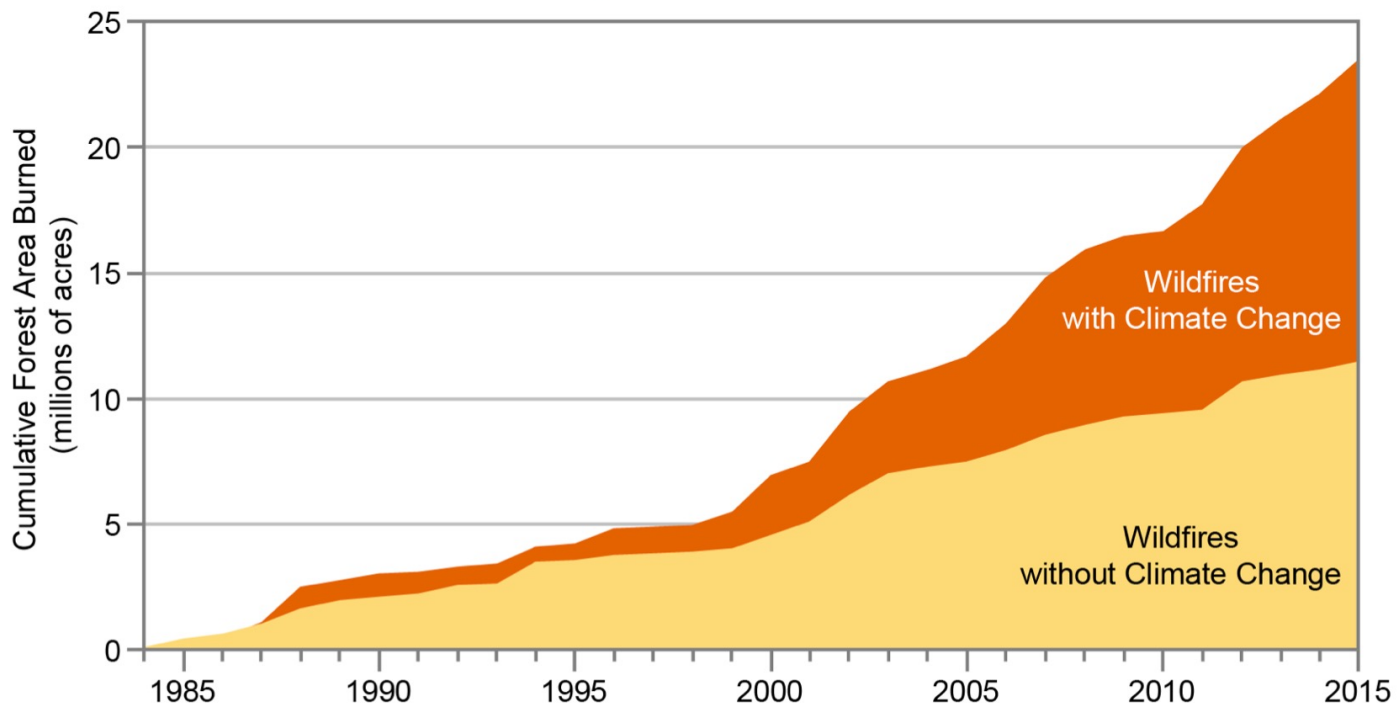


Total acres burned in the west calculated by summing acres burned across 11 states: AZ, CA, CO, ID, MT, NV, NM, OR, UT, WA, & WY. Avg annual temps (1980-2019) calculated by averaging temps across same states. Source: National Fire & Aviation Management FAMWEB Data Warehouse & NOAA/NCEP's Climate at a Glance

CLIMATE  CENTRAL

# Be Fire Smart

## Climate Change Has Increased Wildfire



The cumulative forest area burned by wildfires has greatly increased between 1984 and 2015, with analyses estimating that the area burned by wildfire across the western United States over that period was twice what would have burned had climate change not occurred. *From Figure 25.4 (Source: adapted from Abatzoglou and Williams 2016).*

# Be Fire Smart

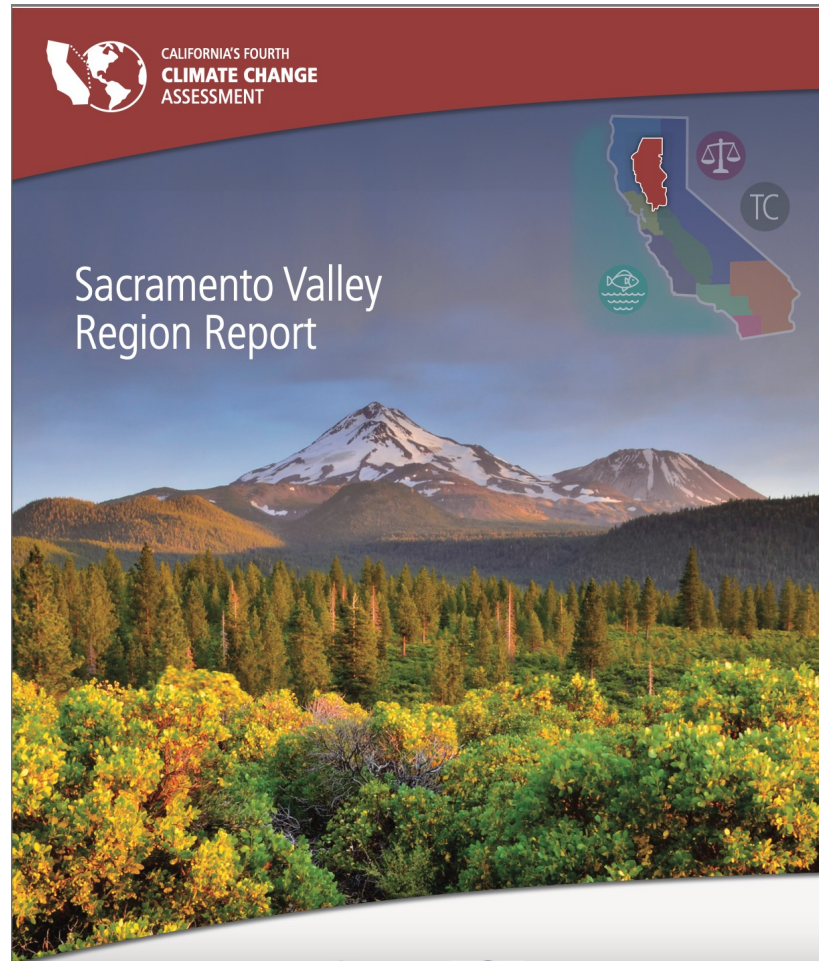
- ❖ Prepare defensible space
- ❖ Use fire resistant landscaping.

Ready Set Go!  
Personal Wildfire Action Plan





# Fourth Climate Assessment Sacramento Valley



# Thank You!

## Any Questions?

Master Gardener Website: [pcmg.ucanr.org](http://pcmg.ucanr.org)

Master Gardener Hotline: **(530) 889-7388**

Composting Rot Line: **(530) 889-7399**



UC Master Gardeners of Placer County