

# Off the “*Water Grid*”: Weathering the Drought on the Central Coast



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# Central Coast Water Supply

- ❖ **Where does Central Coast water come from and who are the principal users?**
- ❖ **What are the main concerns with supply and quality?**
- ❖ **What are some of the solutions?**

# Central Coast







Monterey County Agriculture Value 2014 = \$4.5 billion

Vegetables = \$3.1 billion

Fruits and Nuts = \$1.0 billion

\$8.2 billion contribution to local economy  
(73,000 jobs)



# The Central Coast is the Salad Bowl Capital of the US

Top vegetables by value:

Lettuce

Broccoli

Celery

Cauliflower

Baby greens

Spinach

Mushrooms

Artichokes

Carrots

Kale

Radicchio

Peas

Asparagus

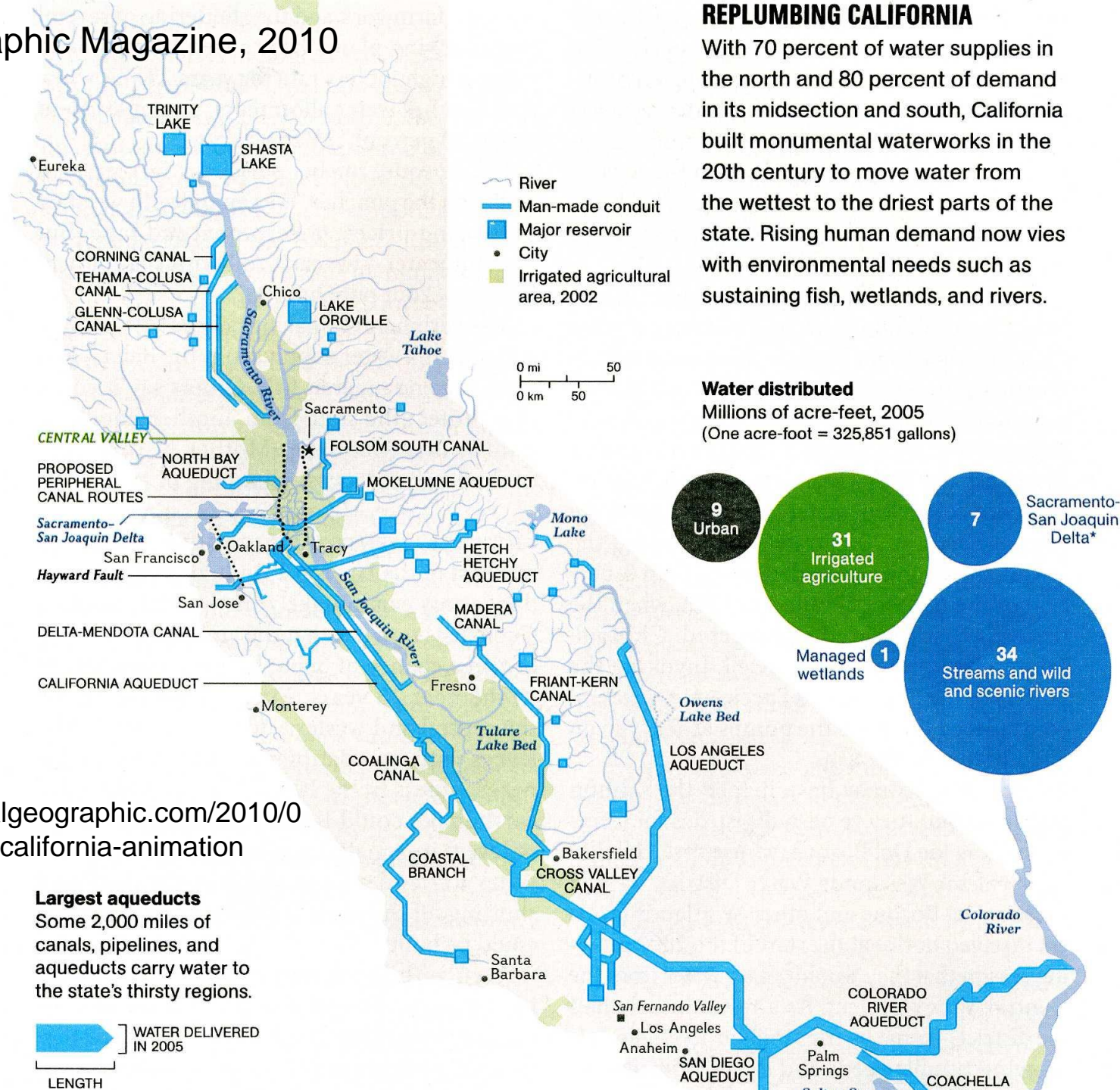
Onions (green)

74% of lettuce produced in the US is from California



REPLUMBING CALIFORNIA

With 70 percent of water supplies in the north and 80 percent of demand in its midsection and south, California built monumental waterworks in the 20th century to move water from the wettest to the driest parts of the state. Rising human demand now vies with environmental needs such as sustaining fish, wetlands, and rivers.



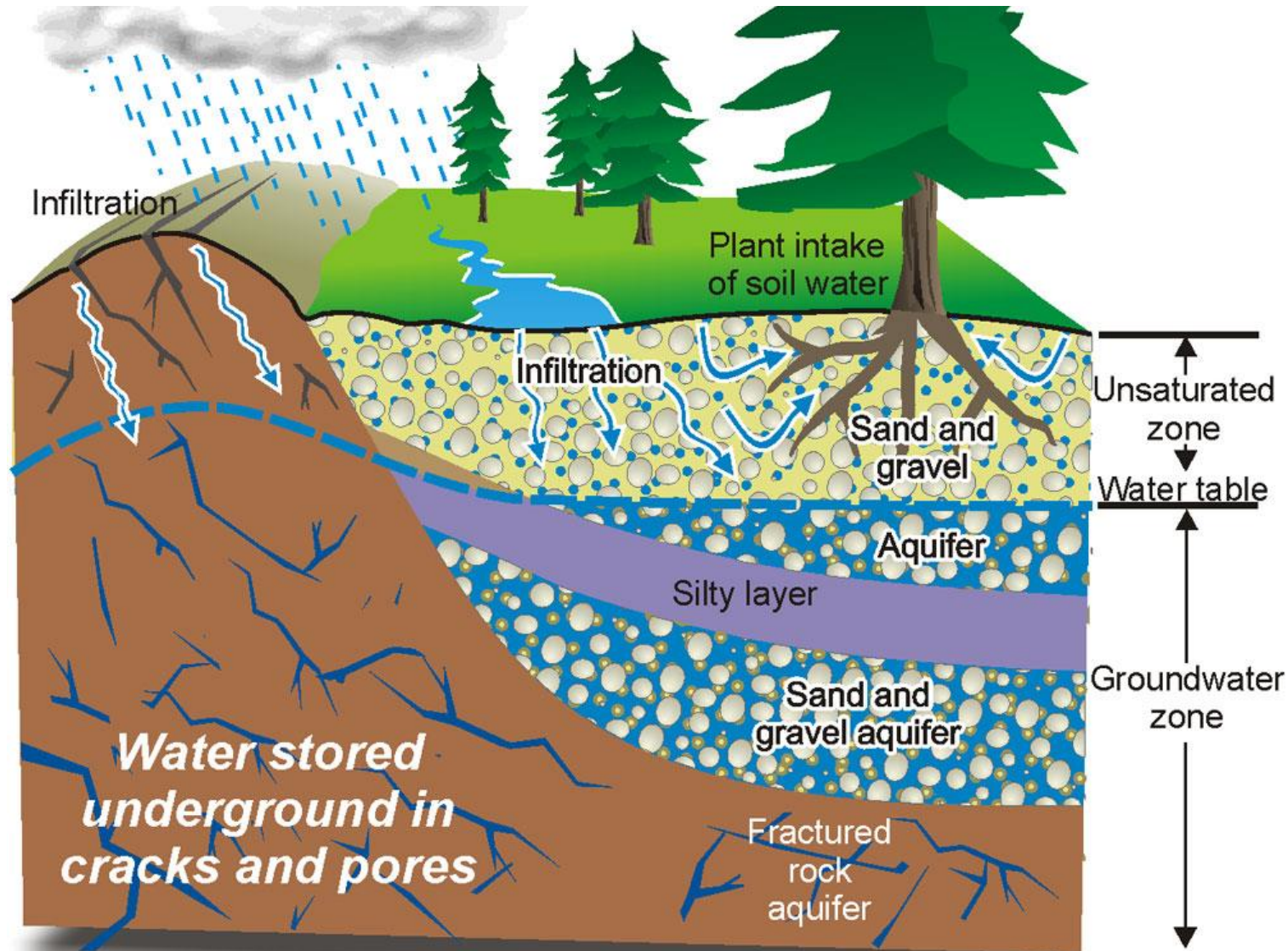
<http://ngm.nationalgeographic.com/2010/04/water/plumbing-california-animation>



# Coastal Mountains are Key to Capturing Winter Moisture



# Ground Water is the Largest Water Supply on the Central Coast





# **Water Issues on the Central Coast**

- ❖ **Supply (drought)**
- ❖ **Seawater intrusion into ground water aquifers**
- ❖ **Flooding**
- ❖ **Nitrate contamination of ground water**
- ❖ **Pollution of surface water (rivers, sloughs, lakes)**

# Salinas Valley Basin

128 km

A satellite image of the Salinas Valley Basin. The image shows a large, elongated valley system. A white double-headed arrow spans the length of the valley, with the text "128 km" written along it. The left side of the image shows a dark blue body of water, likely the Pacific Ocean. The land is a mix of green (vegetation) and brown/tan (bare soil or low vegetation). The topography appears to be a series of connected basins and ridges.

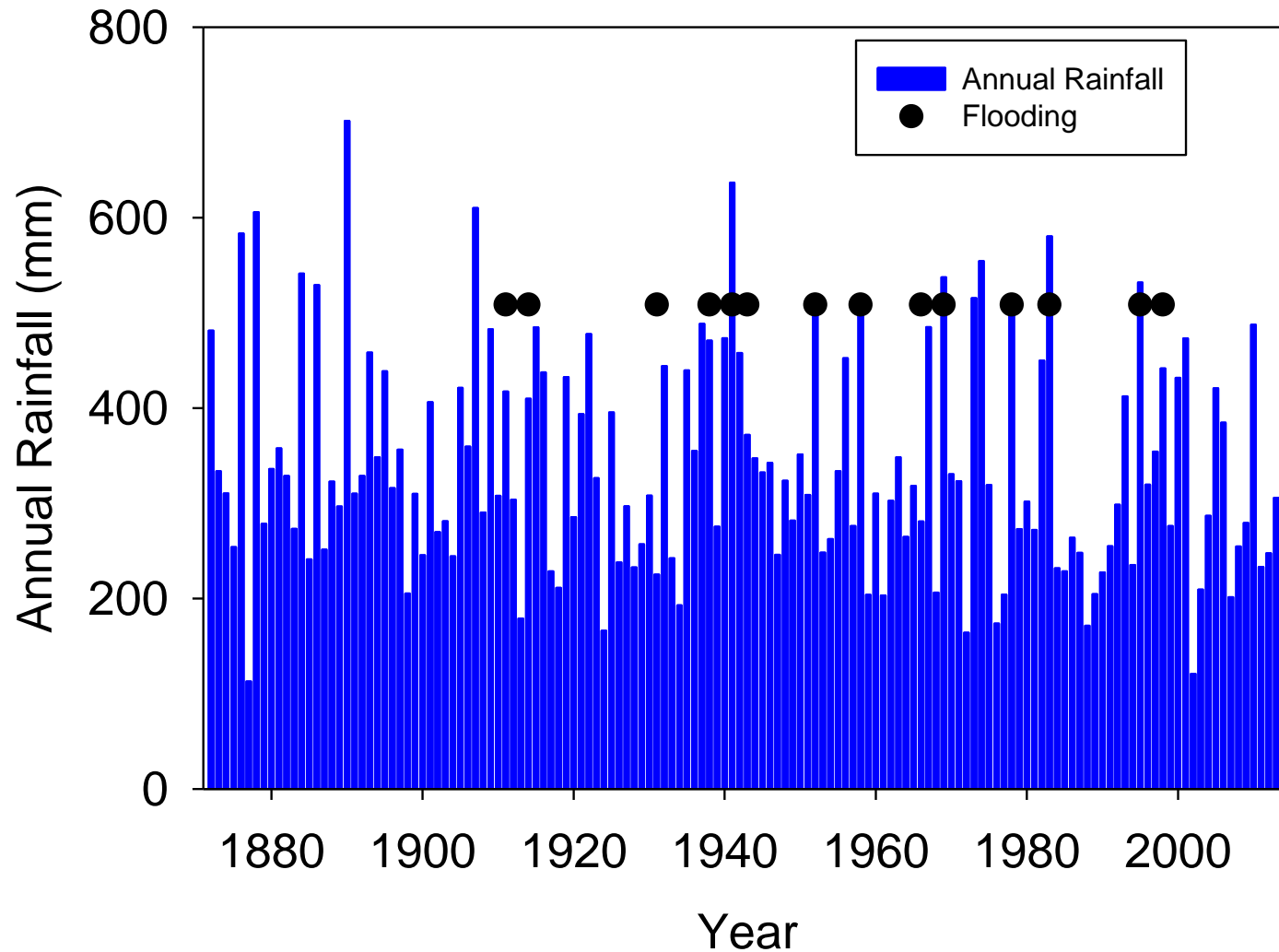


# **Water Supply for the Salinas Valley (2013)**

- ✓ **627 million m<sup>3</sup> pumped during 2013**
- ✓ **1,819 active wells**
- ✓ **91% of water pumped was for agriculture**
- ✓ **No water imports from other regions**

Monterey County Water Resource Agency (MCWRA), 2013 Ground Water Extraction Report

# Annual Rainfall and Flooding Events (Salinas)



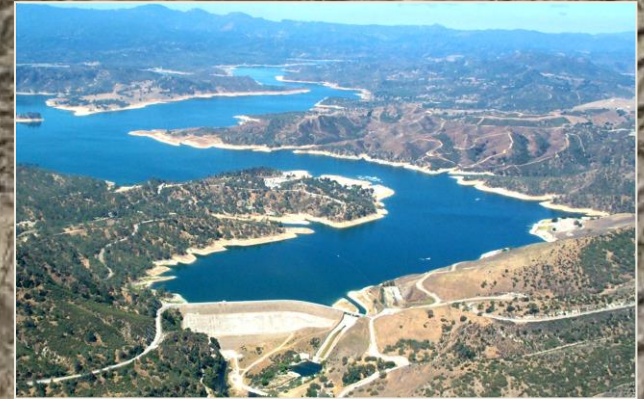


# Lake San Antonio



- Completed in 1965
- Capacity 413 Million m<sup>3</sup>  
Currently 4% capacity

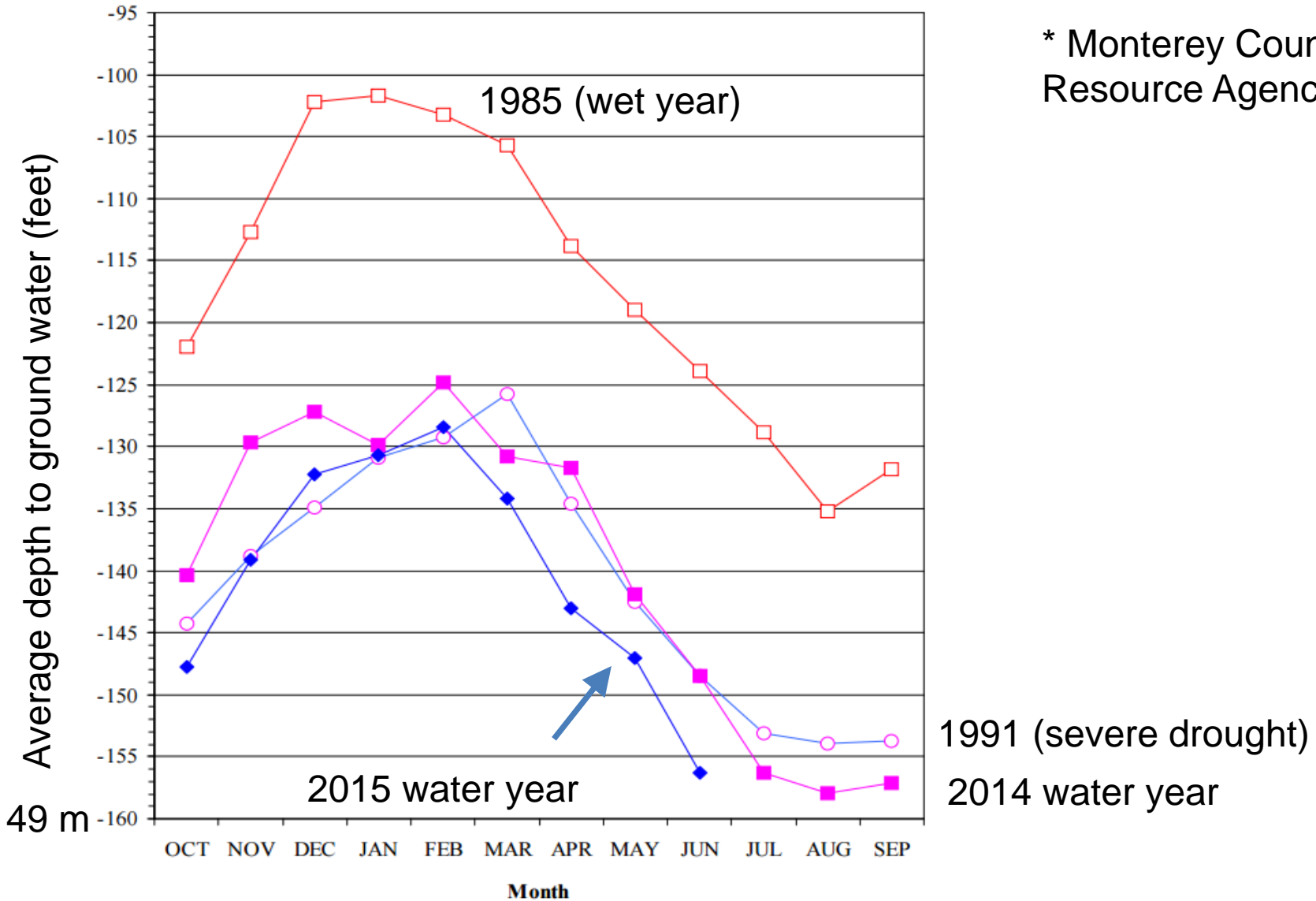
# Lake Nacimiento



- Completed in 1957
- Capacity 466 Million m<sup>3</sup>
- Currently 22% capacity

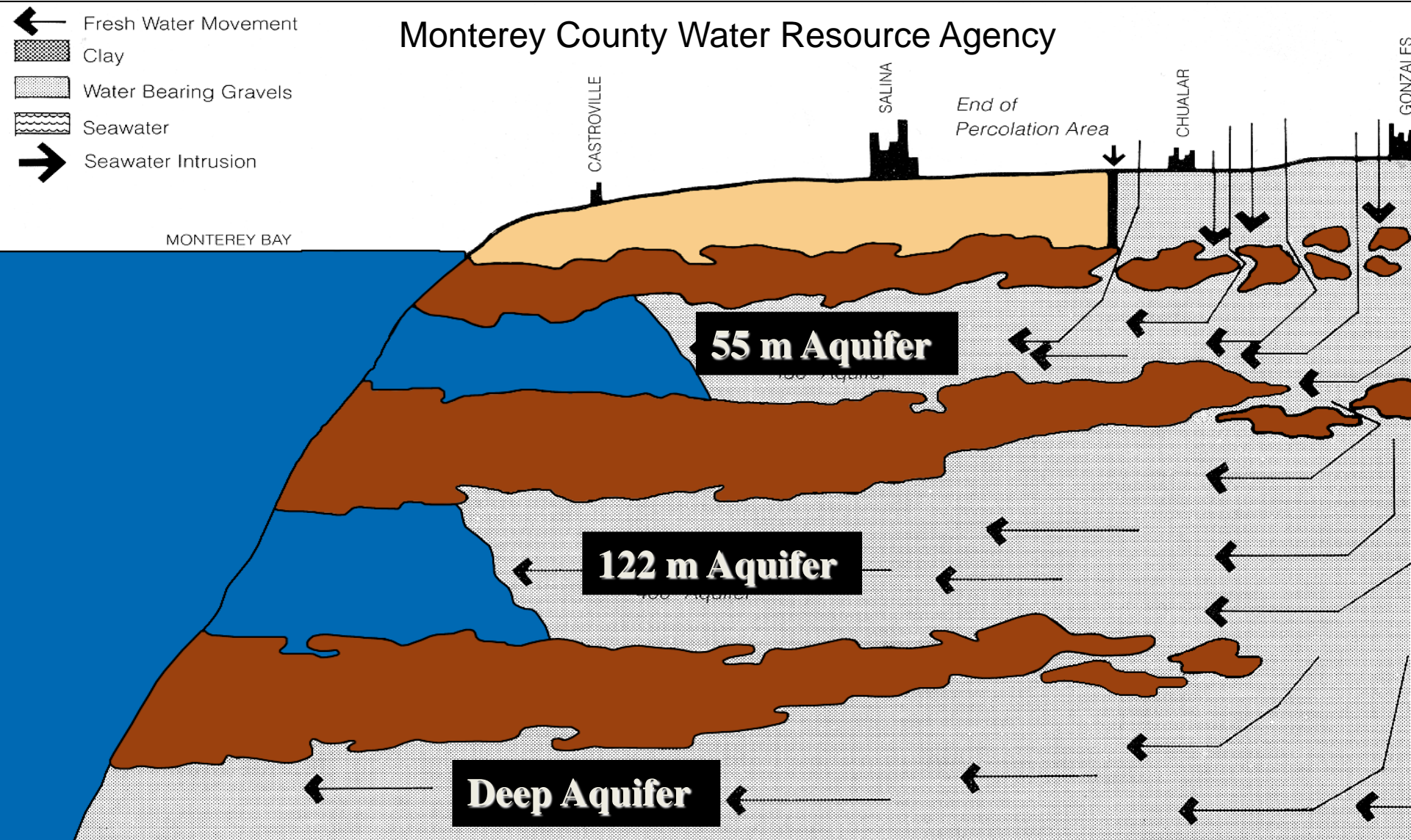
# Average Ground Water Depths are Currently at Historically Low Levels\*

\* Monterey County Water Resource Agency, 2015





# Salinas Valley Aquifers



# Seawater Intrusion Map, Monterey (55 m Aquifer)

4250 ha in 122 m  
aquifer

MCWRA



# Salt damage symptoms in strawberry



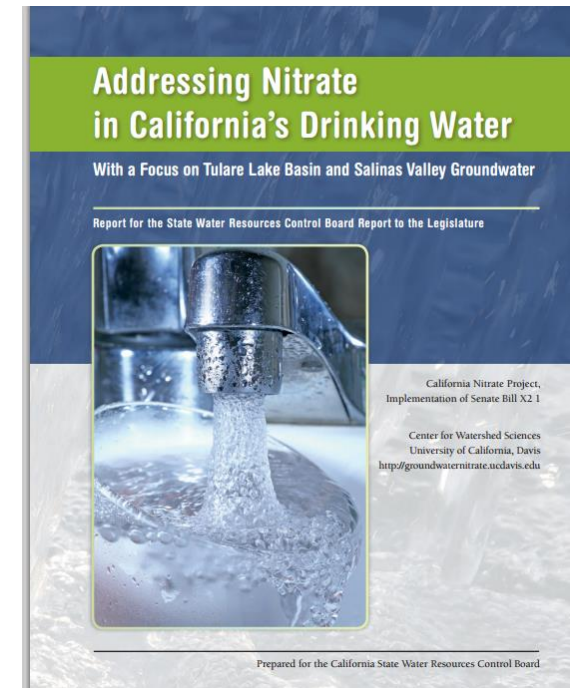
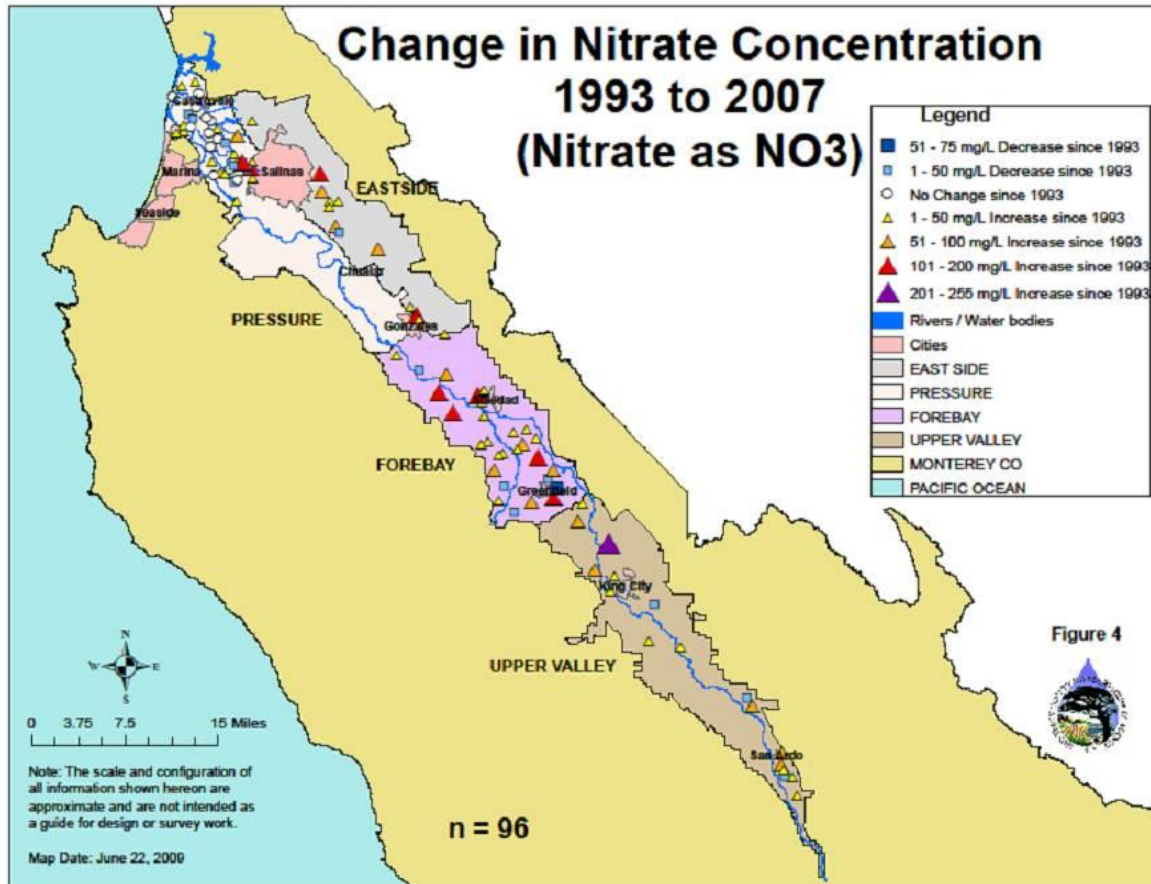


# Recycled Water Supplies about 6,822 ha of farmland on the Central Coast





# Nitrate contamination of Ground Water



Harter and Lund, 2012

MCWRA



# Eutrophication of Surface Water



Regulatory Concentration targets:

$P < 0.7 \text{ ppm}$

$\text{NO}_3\text{-N} < 10 \text{ ppm}$



# Elkhorn Slough



# Commodities and irrigated acres have changed in Monterey County

Comodity	Harvested area	
	1955	2013
	hectares	
Vegetables	40,503	122,355
Strawberry	978	4,445
Wine grapes	0	17,403
Grain and dry beans	46,594	4,293
Total	106,424	149,468



# Coastal crops: berries and vegetables are water and salt sensitive



**Moderate deficits in moisture can cause yield loss and reduce quality**





# Water use efficiency of commodities produced in the Salinas Valley has increased during the past 50 years

## Head Lettuce

Year	Yield	Water Use	Water Use Efficiency
	boxes/ha	m <sup>3</sup> /ha	m <sup>3</sup> /box
1955	776	6103	7.9
1975	1482	4883	3.3
2013	2470	3662	1.5



A background image showing a farm scene. On the left, there's a brown, tilled field. In the center, a person is visible working in a field of young green plants. On the right, there's a lush green field. In the far background, there are mountains under a blue sky with some clouds.

Linear move

Solid set sprinklers

**Irrigation method**

**1993**

**2010**

----- % of acres -----

Furrow

2

1

Sprinkler<sup>1</sup>/furrow

64

21

Hand move sprinklers

23

17

Solid set sprinklers

5

6

Linear move sprinklers

3

1

Sprinkler<sup>1</sup>/drip

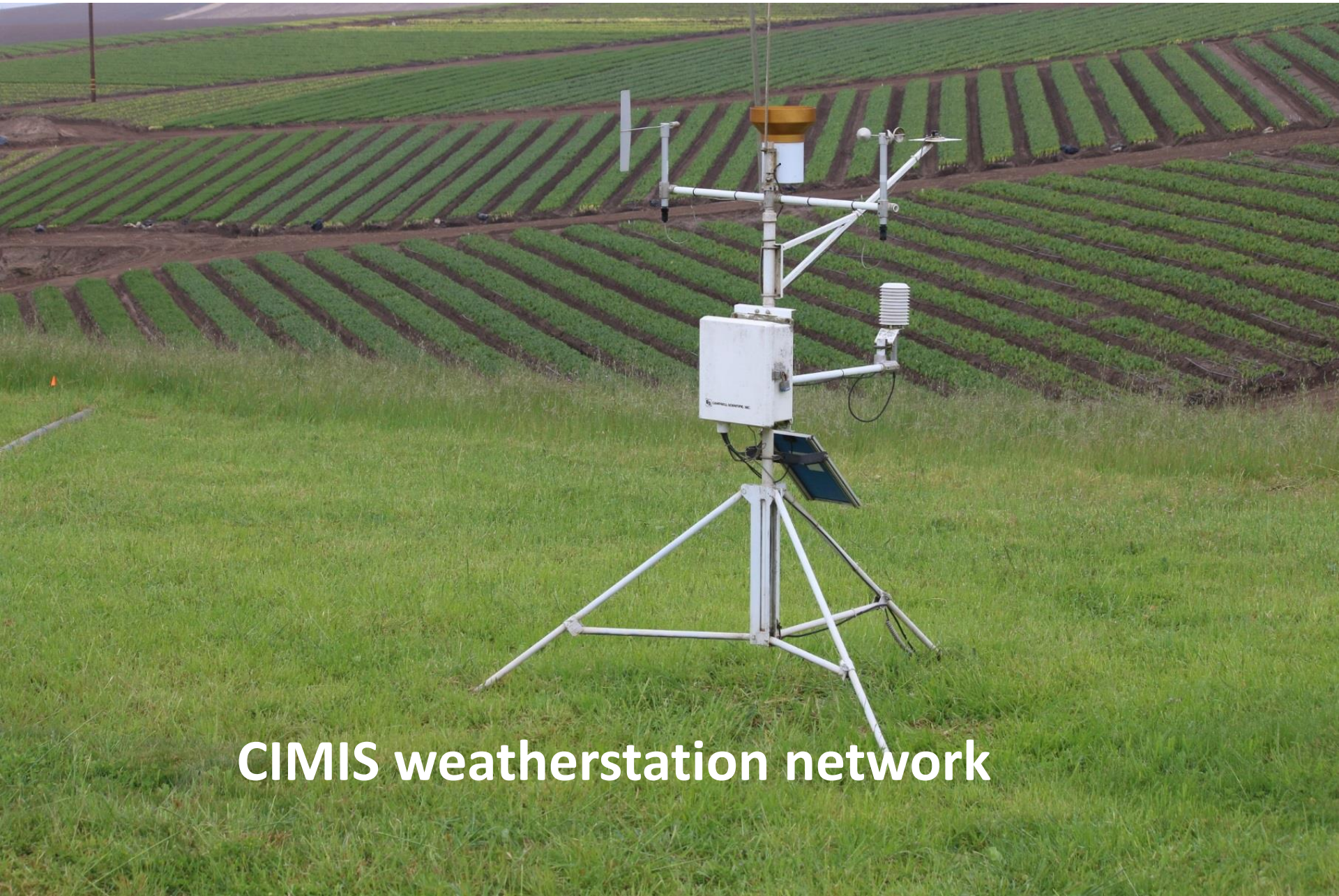
3

48

<sup>1</sup>. Sprinklers are used for establishing the crop  
(approximately 0 to 25 days after planting)



# Improving irrigation scheduling using weather information



**CIMIS weatherstation network**



# Web-based Irrigation and N management decision support tool

<https://ucanr.edu/cropmanage>

## CropManage

About CropManage

### Login

To login enter your e-mail and password below.

E-mail Address

mdcahn@ucdavis.edu



Password

Password

Login

[Forgot Password](#)

[Create New Account](#)

# Evaluation of irrigation system performance





# Hands-on training for irrigators, foremen, and farm managers



# Summary

- ✓ **The Central Coast is self-reliant for water**
- ✓ **Agriculture uses a majority of the water resources on the Central Coast**
- ✓ **The Central Coast community has found creative solutions to manage their water resources**





**SUPPORT LOCAL GROWERS AND CATTLEMEN**



**PRAY FOR RAIN**



**CENTRAL COAST YOUNG FARMERS AND RANCHERS**